



PRE



PROGRAMMED

How Electronic Presets
Changed Music and Media



AMY SKJERSETH

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How Electronic Presets Changed Music and Media

Amy Skjerseth



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*For Jonathan Sterne (1970–2025), the foremost signal-jammer and
translator of academic, musical, technological, and cultural presets*

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Introduction

Setting the Preset

During the Great Depression, a lack of available and affordable ingredients led a company called P. Duff & Sons to create prepackaged cake mix. This invention, like so many others, came from capitalistic necessity: John D. Duff had a surplus of molasses and used it to moisten dehydrated ingredients. Duff's proposed moistening of dehydrated materials would make cake baking easier and less expensive and also would help the company sell off its molasses surplus. But Duff soon realized that if home bakers only had to add water to a prepackaged cake mix, they were dissatisfied with their home baking experience. On June 13, 1933, P. Duff & Sons, Inc., filed a patent for a cake mix that reincorporated a "homemade" variable: "The housewife and the purchasing public in general seem to prefer fresh eggs and hence the use of dried or powdered eggs is somewhat of a handicap from a psychological standpoint."¹ The company took its cues from bakers—gendered as housewives—and refined the mix so that it required the addition of both water and eggs, which satisfied a greater semblance of skills needed to assemble ingredients. With this patent, approved in 1935, P. Duff & Sons perfected the convenience of dehydrated cake mix as premixed ingredients predicated on perceived wastes of time, money, and labor. The mixes gendered "deskilling," Harry Braverman's term for the degradation of workers' skills through mass production, by tying deskilled cake mix to housewives through both labor processes and marketing that continue nearly 100 years later.

This book tells the story of how inventions from 1935 to 2026, from car radio buttons to deepfakes, both maintained and challenged social, economic, and political norms through their electronic presets. Presets are all around us, from the "bake" function on an oven to the many preset sounds on a Casio piano keyboard. A preset is a setting that is stored, ready-to-hand, ready-made—it implies

a manufacturer who does the presetting and a user who encounters a preordained process that constrains their agency while using that device. The user may never have contemplated what is preset on a device: presets on technology imply a temporality that is often far in the past and even sometimes a black box.

Somewhere along the way, we have taken presets—default settings on technology—for granted. Yet we use them every day. Push a button on any household appliance, like a washing machine's wash cycle? That's a preset and, like cake mix, a preset designed by men to simplify women's domestic lives. But presets get complicated quickly. Ever wondered why some popcorn boxes warn you not to use your microwave's popcorn settings? They were preset for particular popcorn bags and microwave conditions and cannot accommodate market competition or product degradation. Microwave popcorn settings resist capitalistic change, like Instagram users' grids did in 2025 when content ratios shifted from squares to rectangles. Try as a manufacturer might to set presets in stone, they are always open to instability if something better comes along for the manufacturer or for the user.

The *Oxford English Dictionary* (*OED*) defines a "preset" as "a control on electronic equipment that is set or adjusted beforehand to facilitate use." In 1926, "preset" referred to predetermined lighting controls on switchboards in theaters. By midcentury, the term described push buttons on car radios that allowed drivers to tune to radio stations; electronic organ stops where sounds were triggered by buttons—"these are wired in advance by the factory or installation engineer, hence the name 'preset';" and to the patching of unique sounds on synthesizers and samplers.² Today, presets are one-size-fits-all sounds or effects used in music recording, as well as Photoshop or Instagram editing—for example, a sepia filter that Instagram users can slap on to create an instant mood change in their photo or the "Use Sound" nudge for TikTok users to add viral songs to their content.³ This book asks us to pay attention to the ways in which mechanized controls, set in advance by manufacturers, attempt to make complex processes simple to understand and enact. But these hidden processes have consequences for art, work, and power that deserve our full attention.

The *OED* definition's keywords of technological control, predetermination, and facilitation have ramifications for uses of presets in everyday life as well as uses of presets to make art. Let us start with everyday use. Each time we run the dishwasher on a "normal" wash setting or touch up a photo on a smartphone, we consent—we cede our free will to a will to make our lives easier—to norms prescribed by manufacturers. By norms, I mean that designers plan and run tests for how to make a device work most efficiently for "normal" use. While designers might aim for presets to be the default setting for the widest range of users, they make assumptions about an "average" user—most often white, affluent, able-bodied, and male, or female and lower class if referring to a domestic or industrial device. Domestic devices often comport with women's bodies: consider the dishwasher, invented in 1886 by Josephine Cochrane when her husband died and left her in

debt; her model was designed specifically for her female servants in height and use. Presets entail predetermined decisions about norms of use that can foreclose other decisions and users.

Norms are the ground on which things assumed to have cultural value are built. And as these norms hum away in the background, so-called typical consumers use presets without (too much) contemplation of their design or purpose, other than to perform according to what they promise. Presets, especially in a postindustrial age, can promise an abundance of things: to obscure their use, to preserve executive function, to level us up, and to save us labor. This book also examines presets in order to think about the cultural defaults that shape the norms of presets' creation and use. I will refer to these cultural defaults as, variously, defaults, norms, and standards, and the book's conclusion provides a glossary of these cousin terms and their wide applications. This book shows how artistic presets are entangled with defaults. As a result, preset and default will often bleed into one another on these pages because presets operate as both mechanisms and metaphors. They are technologies that make complex processes easy to operate or understand, *and* they create cultural grounds that beg us to take their functions in society for granted, which affects how presets are marketed, used, and challenged.

In art, presets overdetermine everything from photography to music creation, as they take the shape of paradigms from app buttons to movements and genres. Take, for example, a camera lens that provides a preset focal length or Photoshop's "Auto Correct" red-eye tool that makes human subjects look less robotic from camera flash glare. In music, presets also take a variety of forms across instruments, media, and production technology. Users can select preset stations on a car radio, access a host of preset sounds on a synthesizer or sampler—from a sonic timbre to a loop to a melody—or they can apply automation in a digital audio workstation. This book begins with the development of push-button presets in 1930s car radios and ends with 2020s AI algorithms used in audio and audiovisual deepfakes. Throughout, I study how presets on technology dovetail with defaults—normative art practices, social systems, and paradigms of control, predetermination, and facilitation. On the one hand, presets enforce control as they have preprogrammed uses that facilitate quick and efficient production. But on the other hand, presets may make us question why we relinquish autonomy to technology and encourage us to retake control of our time, capital, and bodies.

Preprogrammed asks how technologies instrumentalize us but also how we can instrumentalize technologies. As I show throughout this book, presets often are made for heteronormative, patriarchal, and capitalistic uses. But presets also allow for recontextualization, whether to simplify our lives through domestic technologies or to change a default context by manipulating a preset into something new, and even to defy a default. This book analyzes how artists queer certain presets to shift defaults in society. The trans producer SOPHIE, for example, wove common presets like Auto-Tuned voices and commercialized sounds into music

and music videos that flouted the marginalization of queer identities and art. The etymology of “queer,” feminist scholar Sara Ahmed discusses in *Queer Phenomenology*, derives from the Indo-European “twist,” suggesting an active refusal and productive rerouting of societal roles.⁴ As I argue, the ways that SOPHIE and other queer artists twist the physical knobs and buttons of presets parallel how their music, in turn, twists the long-standing paradigm of cis het white male dominance in the aesthetics and politics of most musical genres. Presets are modular options that also facilitate users’ creativity and access: they can choose vastly different contexts for presets and bend them to their own ends—musical or otherwise.

At the first press of a button, the use of presets might seem to relinquish and reduce artists’ control to a default setting. As the British music technology magazine *Sound on Sound* defines it, a preset is “an effects unit or synth patch that cannot be altered by the user.”⁵ But presets’ ready-to-hand interfaces invite play, experimentation, and even subversion of norms—as when organists “pull out all the stops,” letting all of the instrument’s voices spill out (and if you are wondering, yes, organ stops are a preset—more on this later). Presets change how creators make meaning in art, as their supposedly default use is quickly defamiliarized by the contexts artists build around the preset. By reframing presets with uses that challenge societal norms, some creators also loosen our hold on cultural defaults from whiteness to compulsory heterosexuality and Western privilege. As I argue in this book, artistic defaults often precipitated from larger cultural norms that drive capitalist-oriented reproduction, including automation and commodity fetishism. Given the definition of preset as something that controls, is predetermined, and facilitates, these cultural defaults themselves are presets to how we live our lives: they are gendered, raced, sexed, classed, and ableist scripts. As presets reveal, these scripts can be aural, visual, audiovisual, and social.

AUDIOVISUAL SCRIPTS AND VISIBLE PASTS OF MUSIC TECHNOLOGY

This book shows how presets are not neutral black boxes but are embedded within universalizing norms. When an artist uses or a listener hears a preset, these sounds are mediated through technologies, which themselves are created out of prescribed uses for default audiences. Many of the artists studied in this book critique and question these defaults through the contexts they build around their uses of presets. While the examples illuminated in this book relate predominantly to sound technologies, the contexts artists build around these sounds always have a visual register—in the presets’ interfaces that allow artists to use them and in the visual branding and artistic interpretations such as music videos that arise out of preset use. Since electronic presets often combine with visual and cultural presets, music is an increasingly audiovisual phenomenon, seen in the visual spectacle of Taylor Swift’s Eras Tour or the streaming of music on Spotify paired with cover art or music videos.

Aural presets and their accompanying visual signifiers align with the notion of affordances from technology studies. The sociologist Jenny L. Davis gives the example of push notifications on smartphones, which cue us visually to pay attention and act accordingly.⁶ Presets similarly carry a visual set of signifiers that teach us how to use interfaces and also shape our interactions with them. This book asks: How do the visible and tangible mechanics of music technologies shape how people make meaning out of them, whether in creating or receiving art? A focus on presets helps us to understand music technologies as media that are in turn mediated by cultural norms, which are often expressed in the visual signifiers and content that accompany aural uses of presets, including their design, packaging, marketing, and semiotics. But several users—practitioners and spectators alike—can manipulate default settings to generate new aural and visual scripts against the grain. These artists put norms and givens to new audiovisual ends.

This book's method involves continuous oscillations between maker and instrument, instrument and artist, and artist and audience—with multimedia analysis of preset production across sources from artist interviews to technical manuals. By dovetailing between technological and cultural defaults of presets, I trace wandering paths from technological innovation to creative use, starting from the graphic interfaces that allow artists to use and manipulate presets and ending with the ways audiences interact with preset products and their variants. I analyze visual modes of production as well as reception, pairing each chapter's technological preset with a visual medium—from films to fan videos—to show how presets' interfaces inspire visual experiments too. This visible history of music technology predominantly centers on electronic instruments, which emerged as the *OED* definition did during the early 1900s. But music has long been intertwined with graphic interfaces, whether through notational systems or experiments to depict sonic vibrations from scientists like Pythagoras and his monochord to avant-garde artists like Mary Ellen Bute and her classical music–animated films. I now turn to presets that precede this book's case studies to ground the creation and reception of music through presets.

While the *OED*'s preset definition begins with electronic equipment, music has long been sonically and visually systematized. Preelectronic presets influenced how electronic presets took root and shape. For example, default representations of early Western music depicted divisions of the octave interval or frequencies that doubled above or halved below a certain pitch. These notation systems include the Guidonian hand—a visual mapping of early Western solfège that demonstrates the predetermined way that Western tonality divides an octave scale into a system of organized frequencies—and the syllables assigned to note names, as in *The Sound of Music*'s “Do-Re-Mi.” Such preset systems, which were key to the development of vocal music, paralleled how instruments' buttons and keys corresponded with pitches. These preelectronic antecedents were precursors to modern preset-based instruments like synthesizers and Auto-Tune, which reestablish systems of notation.

To zoom out, modes of representation from languages to scripts and codes present preset systems of meaning. In this way, the increasing iterability of sound through visual or graphic forms connects to music's preset use: once sound was able to be captured in a repeatable form, it became easier and even more desirable to circulate certain kinds of sounds. Before the 1920s emergence of the term "preset," two main precedents influenced how electronic presets formed: their materials and their meanings.

Laying the groundwork of presets' material contexts entails a quick tour of instruments that were figured prior to presets *per se*. This history does not begin with musical instruments but rather with the cybernetics bound up with presets, which connect analog technologies, like weaving looms and car radios, to more contemporary digital tools. Presets pervaded the Industrial Revolution in early punch cards, especially for looms. The famous automata inventor Jacques de Vaucanson designed a paper-punched loom prototype in the mid-1700s, but it did not catch on in part because of weavers' labor concerns, since loom weaving at the time required two simultaneous workers.⁷ In the early 1800s, Joseph-Marie Jacquard was able to automate what became "Jacquard looms" by replacing the weaver assistant's work of placing patterns with a punch-card system. These machines effectively used binary code—a punched hole or the absence of one—which precipitated the use of punch cards for computing. This binary system became the preset code through which looms, and later computers, shuttled art through gendered systems of labor.

In 1847, weaving—largely codified as women's work before the Industrial Revolution—was combined with computing by mathematician Ada Lovelace, who found that Charles Babbage's analytical engine, an antecedent to the modern computer, "weaves algebraic patterns, just as the Jacquard loom weaves flowers and leaves."⁸ Babbage's and Lovelace's translations of punch cards for computing data did not bear fruit in the mid-19th century, but women's contributions connected weaving and computing in other realms, speaking to a much-discussed cultural default in this book: when society benefits from women's labor but does not take their innovations seriously. The gendering of technology looms large in these accounts, as has been explored by Sadie Plant and others. For example, Lisa Nakamura, a scholar of media and race, gender, and sexuality, explores the history of Navajo women weavers who manufactured circuits for the Fairchild Corporation's Semiconductor Division, where "electronics manufacture [w]as a high-tech version of blanket weaving performed by willing and skillful Indigenous women." However, their work "came to be understood as affective labor, or a 'labor of love'" that was absorbed into the market, colonized by capital and consigned to immobility in local and global systems of power.⁹ This book shifts narrative focus away from men as the only computational innovators, like Alan Turing, who in 1950 completed a punch-card system for the Pilot Automatic Computing Engine for the United Kingdom's National Physical Laboratory, or the male-dominated IBM,

which began selling data-efficient punch cards as of 1928.¹⁰ I write against the male cultural default of innovation to show how often invisible feminized and racialized labor has changed the ways we sense and use technology. Who gets to create presets, and what old or new norms do they challenge with it?

Crucially, the punch card was a storage medium that predated magnetic tape and floppy disks, two key material substrates for presets in this book. But there were also musical formats and instruments that preset the preset. The player piano used punch cards and operated in a similar way to automated looms; both were marked by domesticity and women's work. Player pianos' mechanisms date back to cylindrical pinwheels such as the automatic carillon (13th-century Netherlands) and the music box, though like the loom, player pianos used paper wheels instead of metal pins.¹¹ Importantly, player piano notation systems were not the same as musical notation or the sound waves etched into phonographic wax cylinders; like automated looms' punched and unpunched holes, the piano roll's perforations corresponded with when the piano's keys would be hit. With both "automated" systems, there was still human intervention. As musicologist Thomas Patteson explains, "While the basic pitch and rhythmic relationships of the music are encoded on the roll and automatically reproduced by the machine, significant elements—tempo, dynamics, pedaling, and the air supply for the pneumatic mechanism—are provided by the human operator, known as a 'pianolist' or 'player pianist.'"¹² A similar relationship between artist and mechanical reproduction operates in presets, which stokes debates around the originality and role of the musician. As I argue, even through automated processes of presetting, artists still can be creative with musical defaults by applying varied sensitivities.

Musical defaults also permeated twentieth-century electronic organs and synthesizers. The most enduring of these preset precedents, the Hammond organ, sounded most like a pipe or theater organ (also called a Wurlitzer organ), and was favored in early silent film live accompaniment. Some theater organs featured stops that were ready-to-hand for expressing silent film moods like anger (figure 1). These stops worked in a binary logic—on or off—much like the cybernetic features of automated looms or player pianos. Such early binary system push buttons and punch cards helped to establish musical presets' systematized roles in the linguistic and visual signification of art. But there were also affective consequences. Much as the cultural theorists Sianne Ngai and Cathy Park Hong have identified "ugly" and "minor" feelings in societies, presets seem to present an allowable range of emotions that can be turned on and off. Organ stops, punch cards, and similar push-button devices create binary effects to teach artists a quick relationship between a phenomenon and its accompanying mood. The history of presets in artistic signification is also a history of mood regulation.

The invention of film at the turn of the 20th century laid significant ground for musical presets to signify in audiovisual media. Grounding that ground was

June 10, 1930.

D. MARR

1,762,274

ORGAN

Filed Oct. 20, 1926

2 Sheets-Sheet 1

Fig. 1

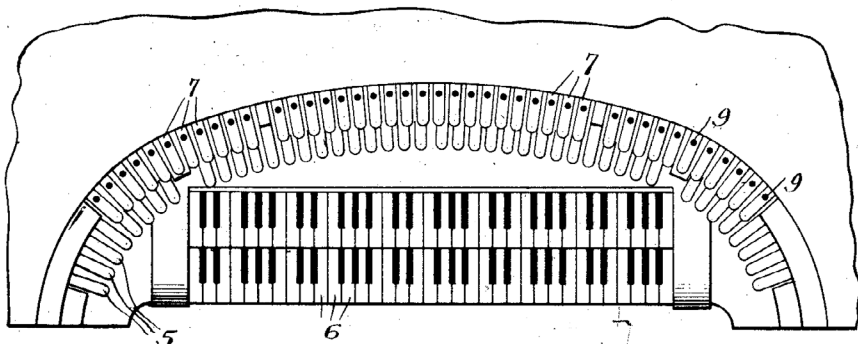
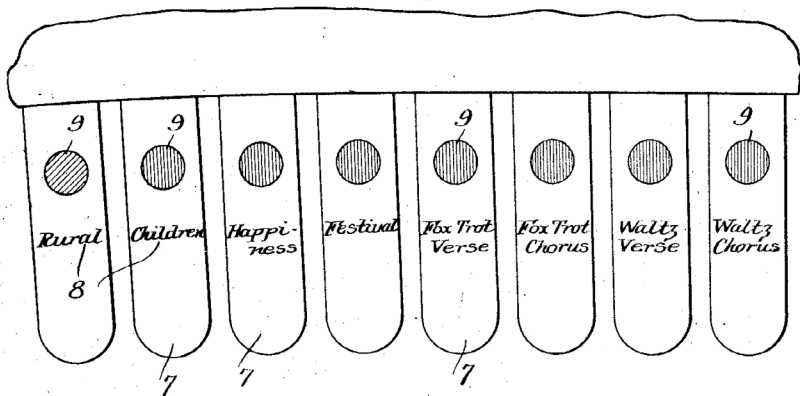


Fig. 2



INVENTOR
David Marr
BY
Cumpton & Griffith
his ATTORNEYS

FIGURE 1. US Patent issued in 1930 showing mood stops on the silent film Marr & Colton organ. Marr, Organ, US Patent 1,762,274A.

the 19th-century leitmotif, a recurring theme for a character, object, or significant event or emotion within a particular work. Used especially in opera and associated with composer Richard Wagner, leitmotifs are given melodies that teach audiences how to decode musical signs in familiar sensorial and linguistic ways. Opera and the leitmotif had an outsized influence on film music: while films lacked a technologically synchronized soundtrack until the late 1920s, they initially were projected in theaters with live musical accompaniment (which also borrowed traditions of melodramatic theater and vaudeville). In order to help immerse audiences in the film experience, musical accompaniment for silent film ran concurrently in the wall-to-wall style of opera, sometimes with live orchestras and sometimes with pianists or small ensembles. Improvisatory silent film accompaniment was built around leitmotifs and musical themes because, as film sound scholar Rick Altman has shown, this form of musical accompaniment was customizable for the amount and skills of performers.¹³ Since many filmgoers looked forward to this musical accompaniment, music publishers began to release predetermined musical excerpts for certain silent films. Published musical selections included cue sheets—a list of suggested melodies to play in certain scenes—as well as orchestral and piano/organ catalogs of leitmotifs and melodies that would suit a range of silent films. For example, cue sheets for films like *Metropolis* (dir., Fritz Lang, 1927) drew on Wagnerian leitmotifs and other European composers' themes.¹⁴ In silent films, a mutually supportive alignment of live music and corresponding images' expressive context, narrative, and character development became a stable system of preset meanings—a proto-algorithmic web like the bottomless suggested content on TikTok's "For You" page.

Short musical themes and motives were pivotal to the success of film scoring, since they provided quick linguistic and cultural signification to audiences, as film music scholar Claudia Gorbman and others have argued. The most successful of these motives were immortalized in film music encyclopedias, and the most famous of them was Ernő Rapée's, which cataloged predetermined melodies around predetermined emotions as one large preset system. Whereas cue sheets constrained agency in preprogramming music for film, catalog themes and organ stops afforded more modular options, such as horns to represent hunting, marches to sound off funerals and weddings, and so on. Rapée's approach inspired the main system of writing and using music for media in the 20th and 21st centuries, called library music—stock themes to be used in film, television, and more.¹⁵ In library music, composers write music for moods and scenery instead of synchronizing to exact events onscreen. Library music is also the current model used by TikTokers to match music to the mood or ideas of the reels they post. In the past as well as the present, short bursts of music do not merely make audiences quickly grasp a meaning. The ways music collides with narrative and imagery in films and on TikTok also invokes cultural stereotypes. Consider the racist tiling of musical themes in catalogs, such as "Oriental Music" and "Mexican or Spanish Music" (figure 2).¹⁶

transformation from a preset to a performance, much like poet and philosopher Paul Valéry describes a poem as a “recipe; the chef who implements it has an essential role to play. [. . .] The poem is an abstraction, a piece of writing that awaits, a law that only lives through some human mouth, and this mouth is what a poem is.”¹⁹ By describing artworks as recipes that are embodied by vessels and activated through performance, Valéry is invoking preset logic.

Presets, like recipes, need to be enacted—and everything around them chosen, just like the use of them in the first place is a choice, as we will see with artist Marcel Duchamp and his readymades later in this introduction. In film, library music themes were a precursor to electronic media’s preset uses, because they offer characters, themes, and motivations to use in a script. These recipes and scripts in library music often smack of stereotypes, though, which tie back to defaults of whiteness, Western privilege, maleness, and more. Cultural stereotypes in music for audiovisual media paved the way for modern mentalities in film composition. What is allowed to be combined in an audiovisual cake mix depends on which preset sounds establish which preset meanings, as well as how they are recontextualized—among sounds, images, and other signifiers.

“NO PRESETS!”: ORIGINAL VERSUS COPY

In a 1986 interview titled “No Presets Allowed,” Hans Zimmer, a digital composer notorious for his use of synthesizers and samplers, refused to buy the prepackaged cake mix of presets. Zimmer was one of the first in a chorus of anti-presetters like the British electronic musician Matthew Herbert, who wrote a manifesto in 2000 about not using presets in his music. As Zimmer said, “For my own projects, certainly I’ll never use one of the presets. You have to start from scratch, make a new sound that fits the piece of music as opposed to something that fits another piece of music, that you stole.”²⁰ This line of thinking is not unfamiliar. Debates about whether one can use presets in music production recall debates about sampling: Can your music still be original if you use presets, or only if you slightly tweak them so that they are suddenly custom (as in boxed cake mix with external eggs)? Is a preset only a gimmick, a shorthand for industry professionals to save time and money?

The gimmick label has surrounded many uses of presets, such as the demo songs that introduced numerous presets on Casio keyboards (see chapter 2). A gimmick, Ngai writes, is an aesthetic judgment that describes something that at once works both too much and too little, is too backward but also too futuristic. For Ngai, the gimmick “names an experience of dissatisfaction—mixed, for all this, with fascination—linked to our perception of an object making untrustworthy claims about the saving of time, the reduction of labor, and the expansion of value.”²¹ Gimmicks unlock contradictory perceptions and uses, the ultimate expression of “I know very well, but nonetheless” self-aware disavowal, because

they can be used in knowing ways that trigger awareness of a cultural reference. In music, presets allow for the inclusion of sonic cultural references much in the same way that samples do.

Presets and samples have an interlocking relationship in *Preprogrammed*. I will cover samples throughout each chapter but most explicitly in chapter 3 when discussing the first digital commercial sampler, the Fairlight Computer Musical Instrument, which coincidentally is the source of presets that Zimmer opposed. Artists' many uses for samples and presets articulate the tension between creativity and defaults: both signal snippets of music in circulation. While this might sound akin to leitmotifs, recall that those musical themes tend to stay internal to a work or a franchise (e.g., composer John Williams's leitmotifs for *Star Wars*), but samples and presets are used externally to their original works—in the case of sampling—and externally to the moment of their manufacturing in the case of presets.

Both samples and presets, because their uses diverge from their original contexts, bring up the vexed status of artwork as an original or a copy in the age of mechanical reproducibility from photography on. For critical theorist Walter Benjamin, "technological reproduction can put the copy of the original into situations which would be out of reach for the original itself. Above all, it enables the original to meet the beholder halfway, be it in the form of a photograph or a phonograph record." Benjamin seems to suggest that the original/copy debate becomes moot in its use and circulation. When artists use presets or samples, they might be using a copy of a sound, but they are also building new contexts around it, encouraging new meanings to emerge. As Benjamin later wrote, "the instant the criterion of authenticity ceases to be applicable to artistic production, the total function of art is reversed. Instead of being based on ritual, it begins to be based on another practice—politics."²² When artists work from predetermined forms, they engage defaults and norms as potential scripts to rewrite: they tweak a normalized setting for a custom purpose. With presets, one might think their result is a given because it is a default, but at the interface, when the artist selects and arranges the preset, an artist's creativity intervenes. Quite often, rewriting presets begins as an avant-garde practice but quickly permeates popular culture, as with Kate Bush, who sampled broken glass on the Fairlight and wove it into pop music. *Preprogrammed* contains several cases in which avant-garde and experimental practices intersect with popular music and media, because presets are implicated in cultural moments of technological change and translation work between aesthetics and epistemes.

Preprogrammed is as much about musicians' agency as it is about technologies' agency. I study the instrumentalization of preset usage as a mechanism of normativity and a reflection of extant power structures. As sociologist George Lipsitz writes, "New technologies do lend themselves to new forms of exploitation and oppression, but they also have possible uses for fundamentally new forms of resistance and revolution."²³ Auto-Tune (chapter 4) presents both sides of this coin;

its pitch-correction technology was invented to keep voices in tune undetectably across the music industry, but some artists, like T-Pain, bend this preset to extreme pitch correction. Unlike Zimmer, T-Pain puts presets to productive uses, both aesthetic and capitalistic, as many musicians have adopted the T-Pain sound. T-Pain's team even marketed an app called I Am T-Pain for consumers to apply his vocal presets to their own voices. Manufacturers often instrumentalize presets to keep people in alignment with normative goals, from the installation of car radio buttons to ensure consumer safety on roads (chapter 1) to the gatekeeping and even appropriation of the Fairlight's global sample library by its white male manufacturers (chapter 3). Musical genres also are hemmed in by defaults; the recording industry has long put working-class people and people of color in genre boxes of country and R&B respectively. These labels still spark debates as the commercial music industry binds up country music with whiteness, despite recent calls by artists and critics to acknowledge country's roots in Blackness.²⁴ Such examples exhibit the instrumentalization of music by larger structures that prescribe cultural defaults: instruments effectively are instrumentalized. I am thinking of instrumentality here as a two-sided coin. On the one hand presets can be controlled and predetermined by societal norms, but on the other hand they can be instrumentalized by their users to very different ends, for greater access to creative forms.

MULTIDISCIPLINARY GROUNDS FOR PRESET STUDIES

In *Preprogrammed*, I interweave multiple disciplines to tell a story about technological and cultural pathways for making and altering musical meaning. This multidisciplinary study intersects with sound studies, technology, film, visual culture, art history, and more. Ultimately, my goal is to bridge diverse disciplines' methods through a sound studies-focused attention to the production of sensations, both material and technological. That is, I show how varied artistic uses of specific instruments and technologies create sounds that are memorable in idiosyncratic ways to listeners, especially when altered by different visual contexts. Presets in technologies are shaped by audiovisual logics, which call for aesthetic close readings and labor and infrastructure histories.

From science and technology studies, I borrow approaches such as path dependence (John Urry, Jonathan Sterne, and Eric Dienstfrey), a concept that tracks how innovations are locked into a certain design due to economics and normative uses. Film sound historian Dienstfrey, for example, shows how the stereo sound system in film was developed from forced linearity into a singular linear path, effectively stifling innovation. Preset studies also is informed by science and technology studies scholars who analyze the inner or invisible workings of music or media production (Kyle Devine and Mike D'Errico), which are the technological or institutional supports for how people make music. This infrastructural turn has also suffused media studies, from Lisa Parks's study of signal towers to Lisa Yin

Han's work on sonar as underwater sonic empire-making. Infrastructure grids the world into having one's cake and eating it too.

Presets are matrices through which we experience everyday life and media. Audiovisual analysis is crucial to the study of presets as experiential interfaces. This book's emphasis on audiovisual logics joins with music and science and technology studies in order to sense and account for preset patterns. To uncover forms of invisible—often racialized, feminized, and classed—labor, I approach objects from multiple angles—seen, felt, and heard—as done in cinema studies in order to consider the object from the ground up and how it refracts forms of society and world-making, from the people and institutions that build things to their multiple use cases.

Media studies, because it both contains and exceeds music studies, is at the heart of *Preprogrammed*: it helps us to think through how technological and cultural presets become normative but also malleable. For example, the queer theorist Karen Tongson treats the suburbs as media by describing them as empire-building but then queering them within a matrix of popular music and freeways; the historian Catherine Gudi's work on billboards is instructive here. I take these infrastructural media forms seriously and with equal weight. In *Always Already New*, media historian Lisa Gitelman shows how technologies afford and attain "a vast clutter of normative rules and default considerations" that she calls protocols. Protocols are not static but dynamic affordances that change with use and mediation. She writes, "Although they possess extraordinary inertia, norms and standards can and do change, because they are expressive of changeable social, economic, and material relationships." Those relationships and changes depend on the context of the use of a protocol—or preset: "As much as people may converse through a telephone and forget the telephone itself, the context of telephoning makes all kinds of difference to the things they say and the way they say them."²⁵ Digital media studies, platform studies, and disability studies also theoretically underpin preset studies; for example, media and disability studies scholar Neta Alexander has recently explored how "non-average users have tweaked, remade, and hacked existing technologies to better fit their needs."²⁶ Much like cake baking, the ingredients to interface interactions might seem tightly controlled, but the way someone assembles them can vary immensely, given factors like their embodiment, experience, and environment.

By tracing how humans work creatively with technology, how technology works creatively on humans, and how these mutually influence each other, I analyze human-technological interdependencies for music- and art-making. For me, the term "preset" navigates the quagmires of technological determinism and anthropocentric analyses because it tracks the actions of both technologies and humans, and it reduces the distance that scholars have often maintained between the artist and the consumer. To bridge this divide, I attend to archival materials such as technical manuals, marketing materials, and audiovisual packaging, following the instruments, musicians, and manufacturers while engaging media archaeology and aesthetics.²⁷

I am deeply inspired by film historian Tom Gunning's pedagogical approach to early cinema and technology, which maintains that "there are no firsts" for any innovation.²⁸ Very likely, the "first" technology or artwork we learn about is merely the most dominant one, created by the white men who were written into history books as opposed to minoritized figures who are sidelined in such histories. Throughout *Preprogrammed*, I provide material and medial contexts and histories that precede and surround these presets. Following ethnomusicologist Deborah Wong, herself echoing Thuy Linh Nguyen Tu, "materiality must be a central site of analysis, rather than simply a context for understanding the cultural text."²⁹ I read beyond each preset to the people, technology, and medial and cultural landscapes that produce it.

Presets are more than a black box or "the music itself" (a form of analysis that tends to neglect how music is culturally produced or circulated). By focusing on music's textual components, including notation, I join feminist musicologists like Amy Cimini, Suzanne G. Cusick, and Susan McClary and popular music scholars like Daphne Brooks and Francesca Royster in making music accessible beyond knowledge of Western notation by identifying sonic features that listeners have heard in their day-to-day experiences of music. I also work to make music and sound familiar to those oriented in visual studies by walking readers closely through what we see and hear from moment to moment in our encounters with media. I focus on the many moving parts of technology and music- and media-making that include minoritized figures and forms to counter culturally dominant histories of technology. Moreover, *Preprogrammed* breaks down binaries between avant-garde and popular, the mainstream and minoritized, and hearing and vision (what sound studies scholar Jonathan Sterne has called the "audiovisual litany") by studying encounters with music technologies from multiple embodied vantage points.³⁰ This book's method at once zooms in closely on the functions and contexts of media and users and expands outward to eras, industries, and infrastructures to track technological transitions and shifts in social attitudes. By balancing these scales, I examine, for example, the mutual influences of avant-garde, mainstream, and amateur artists on the making and use of presets across history. I focus on relationships between materials and makers to show how industries control artists and instruments in preset gendered, raced, and heteronormative ways but also forms of escaping that preset control.

Music production is a laborious process with many actors. For example, my next book assembles new technological histories to break down the myth of monolithic producers like Phil Spector and instead follow artists who self-produce, as in bedroom pop. When presets on technology make shorthands possible that previously could only be accomplished via highly skilled processing of magnetic tape (chapter 2), artists can increase autonomy over their creative processes. Even if they do not know how to use a particular instrument or production tool in a studio, they can either call in someone who does or incorporate presets into their creative processes. Presets offer a way for musicians who do not have formal

training to access certain uses and vocabularies for music-making. They draw on their own experiences of listening to craft sounds and meanings.

Scholars like Brooks, Mark Katz, Lauron Kehrer, and Salamishah Tillet have explored sampling's production of a rich trail of cultural associations, but scholarship has not fully probed their preset function: multidirectional uses of preloaded samples remain underexamined. As music technology scholar D'Errico observes, "By claiming to exemplify sonically the experience of Otherness, these presets, plug-ins, and sample packs bring the unacknowledged labor of nonwhite musicians into the capitalist cycle of planned obsolescence, reifying the idea that any sounds (or people) that don't contribute to the final product should be discarded."³¹ By digging deep into presets beyond their use for efficiency, I consider how default ways of preserving and disseminating music and desire not only influence outcomes of music creation and listening but also have the potential to create queer couplings with cultural and commercial norms. How might different artists and listeners push presets to reroute relationships between technology, art, and meaning in a heteropatriarchal music industry?

This book maps out aesthetic histories in horizontal, overlapping paths, leery of enforcing the top-down ontologies of the instrumental ends presets might have acquired from their manufacturers. I draw from popular music studies—itsself an interdisciplinary field—and art history as the backbone for making observations about users and artworks. Throughout the book, I also draw on art historical movements that coincide with or influence the musical traditions I chart. The most ready-to-hand alignment of presets in music technology and art history precedents looms large in Duchamp's readymades. *Fountain* (1917), a urinal that Duchamp submitted to the Society of American Artists with the goal to display a signed toilet as a piece of art, paved the way for elevating preexisting objects to the status of art in Dada, conceptualism, concrete art, and more. As Duchamp said in a 1961 interview with Georges Charbonnier, "Making something is choosing a tube of blue, a tube of red, putting some of it on the palette, and always choosing the quality of the blue, the quality of the red, [. . .] the place to put it on the canvas, it's always choosing. [. . .] You can also use a ready-made thing, made either mechanically or by the hand of another man, even, if you want, and appropriate it, since it's you who chose it."³² By decentering the final product of art-making as art and recentering the tools an artist chooses, Duchamp anticipates, for example, Jackson Pollock's action painting, where trails of paint in the resulting work are traces of the artist's hand, etching their choices into canvas. Musicologist Nina Sun Eidsheim applies Pollock's action painting to sound and music when she says that vibrations of voices record a singer's bodily action; so, too, does the cinema and media studies conversation about indexes as traces of physical photography and cinematography. These interdisciplinary conversations figure art as a process of action that embodies and records certain choices the artist makes in the artwork. If the readymade is a tube of paint the artist chooses to create with, then a preset also offers options that inspire

artists' choices. But, as art bears the traces of its making, a tangled relationship results in the artwork between both the artist's hand and their tools. Much as Duchamp's *Fountain* came under question for whether it should be valued as art, musical presets and cultural defaults are entangled in questions of aesthetic use and labor.

The word "preset" is fraught with questions of function (functional music, functional equivalents, and more), originality, and exploitation but also productive cultural struggle. As much as *Preprogrammed* is a technological, musical, and visual history of presets, it is also a story of the users and uses of so-called default settings. It questions what and why these become default in the first place, inviting capitalist, queer, and feminist critique. The book's case studies present queer couplings with presets or stories of presets that deviate from the bundles—affordances—of meaning between music and its accompanying images and narratives. These bundled audiovisual meanings are built on years of media and societal conditioning, much like the culturally dominant preset of the heterosexual couple is the expected path to (reproductive) value. As Ahmed theorizes in *Queer Phenomenology* and *The Cultural Politics of Emotion*, bodies get shaped and compressed by norms under the banner of compulsory heterosexuality and more. Presets help path-determine our outcomes, in life as in music creation or listening, but they cannot wholly compel us always to the same result. Likewise, a preset's propensity for deskilling—push a button and watch it work its magic, doing the work for you—often leads to a reskilling from its unexpected outcomes. Queer couplings of the artist and preset or the listener and preset mark out the possibilities for nonlinear choices and novice users, for increasing access and for rerouting and circulating new meaning.

PRESET RECIPES: CHAPTER SUMMARIES

Because presets take shape over multiple types of instruments, genres, uses, and eras, I have organized the chapters of this book in overlapping histories. Since the early 1900s, when the word "preset" was applied to music machines, presets have become instrument simulators, the foundations of repeatable rhythms, and technologies that shape the ways we orient ourselves—do we see the world in Instagram squares? The concept of the preset allows us to think about technological, industrial, and musical norms or standards and how artists push and play with them. Presets, as path dependence, help determine outcomes of music creation or listening—the advertising and industrial language around them says that they save time, money, physical strain, labor, and more. Often, as Sterne notes of the MP3, presets are formed and maintained through conservative norms: "Industry-set standards [. . .] aim to keep the big players big and to render emerging markets stable and predictable."³³ While a preset is something that is bound or boxed and repeatable (supposedly ad infinitum), the magic of playing with and existing within presets is the ability to change—or, to be changed—by what happens between those bounds. In art, a preset is an enabling constraint, which cultural theorist Erin

Manning defines as “a setting in place of a series of conditions that foster a limiting of the field of experience even while they allow the incipient event to remain open to invention.”³⁴ A preset might be seen as stricture, a boxing in, but it is often a structure that allows something to shift, ever so slightly, and open up a new sensory world—like a DJ or media composer who makes a tiny adjustment to a preset to make an immense difference in their sound and atmosphere. Similarly, throughout this book, I engage in rhetorical strategies shared by feminist musicology and science and technology scholars to expand the presets of academic writing. I use personal anecdotes to position my observations and histories and to encourage play and dialogue with presets and the many options they open up for us.

The chapters that follow deal with different sound media whose presets are not merely sonic: artists put them to fundamentally audiovisual ends. Artists encounter presets not only in the visual context of their technological interfaces but also in the music videos and films that subsequently use these presets. In chapter 1, I discuss how the installation of push buttons in car radios starting in 1937 created radio station presets that drivers use to customize their mobile listening experience. Histories of mobile listening typically start from the Walkman and iPod, as in the work of Shuhei Hosokawa and Michael Bull, but the car radio allowed people to listen to music anywhere on a drive instead of on a stationary living room radio set. With push buttons, drivers saved their favorite stations for instant play, encouraging station programming and formats to crystallize, but drivers could still not predict what would play in a station’s playlist rotation. This chapter considers how presets for radio become instrumental to consumers’ driving experiences—pushing a button instead of fiddling with dials enhances their safety, but it also curates their audiovisual encounters as scenery unfolds around them. As I argue, consumers’ power to preset stations and soundtrack the landscape they drive through also created an increase in accidental audiovisual collisions with music in contemporaneous media. Push-button chance encounters of music in cars altered not only drivers’ attention but also contemporary cultural audiovisual experiences: several films from the 1940s–80s generated soundtracks inspired by push-button presets and the ubiquity of mobile radio listening. These films at first reflect the novelty of chance push-button radio scenery encounters in the 1940s–60s but then shift to more curated, leitmotivic uses of music to create a mood or indicate a location or theme. Preset-inspired film soundtracks are precursors to mobile listening playlists that bend external phenomena to a playlist organizer’s preferred logic, much like cassettes, CD players, and aux cords ultimately allowed listeners to curate music in cars.

Chapter 2 spans a similar historical period to chapter 1, studying how artists entwined synthesizers and magnetic tape to create the sounds and visions of what would become presets in synthesizer demonstrations on television. Demos are understudied forms of artist experimentation, public knowledge dissemination, and taste-making, and I show how women synthesizer artists led these efforts,

from Clara Rockmore's theremin concerts to Delia Derbyshire's work on the *Doctor Who* theme and Wendy Carlos's BBC demonstrations of the Moog synthesizer, the latter of which took both classical and electronic music worlds by storm. These women built the sounds that would soon become presets in electronic music from the ground up, inventing sounds not merely from thin air or magic but from tangles of wires and patches. These proto-presets needed to be stored and played on tape and made intelligible to TV audiences through instruments like oscilloscopes, which visually portray sound waves. By discussing artists who introduced visual contexts into unfamiliar but soon canonical sounds, I argue that women synthesizer artists and their demos created a lexicon for aural and audiovisual presets that became conventional in music and media, including horror and science fiction film music (Carlos and Derbyshire), ambient music (not merely synth and preset giant Brian Eno but also Suzanne Ciani), performance art (Laurie Anderson), and more. I use Eno's *Oblique Strategies* in this chapter as a frame for each case study—not to highlight Eno's work but to build a new canon of synth artists that centers women. This dynamic play with preset writing structures leans into a playful bridge between chapters 2 and 3—the drum break. To establish an important drum machine canon, the interlude's structure rocks out with playlist selections across the instrument's history and genres.

If chapter 2 is about how women used music technology to create presets, then chapter 3 is about the technology that made it possible for artists to store and distribute presets as samples—to each other, to manufacturers to change the makeup of sample libraries, and to their own visual media inspired by their music. The first digital commercial sampler, the Fairlight Computer Musical Instrument, is the subject of chapter 3. The Fairlight, which has a piano keyboard hooked up to a computer monitor, used floppy disks and a digital screen to retrieve and alter samples. This chapter examines these two important technological components in turn as presets for modern digital sampling. The floppy disk is a preset for sample libraries, at once calling back to piano/orchestral silent film music catalogs but also heralding the ways artists today sample each another to draw on preexisting musical and cultural meanings. I show how Fairlight artists mailed each other their own custom samples (the Fairlight allowed artists to sample any imaginable sound) on floppy disks, which resembles the ways postwar mail art movements redefined art as a preset in (a) the distance that art traveled from sender to receiver, (b) a preset form such as a postcard, and (c) a horizontal distribution network for art—instead of hierarchical relationships of the artist or their art as untouchable expertise—that the Fairlight also created for music. Then, the chapter shows how the Fairlight's computer screen is a preset for digital audio workstations, where both amateur and professional users can edit sound visually using waveform representations, which continues the impulse to visualize sound in acoustic experiments like the monochord and in musical notation. But the Fairlight's visualizations of waveforms also began to feature in music videos, as

well as the sonic experiments of Peter Gabriel, Kate Bush, and Herbie Hancock. Ultimately, I argue that the Fairlight's visualizations of samples and presets aid in reworking the audiovisual aesthetics of music videos, television, and film, much as portable radio presets did, as discussed in chapter 1.

Continuing with the topic of digital sampling, chapter 4 examines how the pitch correction plug-in Auto-Tune samples pitches that are deemed out of tune by Western music and retrofits them to preset in-tune pitches. Besides correcting pitch, Auto-Tune is also notorious for altering voices in the metallic sheen of Cher or T-Pain, thus altering the preset personas of these pop stars as well. While critics commonly interpret Auto-Tune as an inauthentic gimmick that brings singers back in line with Western expectations for vocal talent, I analyze voice manipulation as a fundamentally audiovisual effect that can transform stars' images and disrupt pop industry norms. Exaggerated uses of Auto-Tune, popularized by Cher's 1998 hit "Believe," have cast pitch correction as antithetical to vocal expression—technology that effaces one's "true" voice—and as a gimmick. While Auto-Tune has a reputation for polishing women's and racialized voices in Top 40 for easy consumption, chapter 4's case studies show how Cher, Jennifer Lopez, Kesha, Charli xcx, SOPHIE, and 100 geecs use Auto-Tune to adopt vocal personas that refuse the music industry's preset of the well-behaved pop star and woman. Their attention-grabbing uses of Auto-Tune inspire imagery in music videos and album art of alternative performances of femininity and human entanglements with non-humans—alternatively figured by critics as cyborgian but even animal in some cases.³⁵ Overt Auto-Tuning thus has an effect of disrupting preset audiovisual appearances of pop stars. Contrary to Auto-Tune's reputation for "correcting" pop stars, its capacity for audiovisual personas creates new models for racial, female, nonbinary, and trans expression. Visual depictions of Auto-Tune, I argue, lay bare not only essentialized preset beliefs about which voices index which bodies but also potential ruptures of the pop industry's bids to conform an artist's voice and image to heteropatriarchal and capitalist ideals.

Chapter 5 analyzes the digital voice modulation software of Vocaloids and deepfakes, which make the voice of a pop singer fully synthetic, not just modulated as in Auto-Tune. The chapter unfolds case studies of synthetic audiovisuality where recent entanglements of popular music with technology become associated with visual motifs of puppets and ventriloquism, including robots, surveillance, and digital mediation (or glitch). Like much of recent AI-produced music and media, the chapter's case studies involve human intervention, from the hologram Hatsune Miku, produced in 2007 from Yamaha's Vocaloid, or voice bank, software to Holly+, the deepfake persona created in 2021 by Holly Herndon, who invites fans to compose songs with her voice and share the credit. A common misconception of synthetic audiovisuality is that voice can be reduced to 0s and 1s, the binary code that suffused automated looms and player pianos. But this misconception obscures the dangerous ways synthetic media like deepfakes boil down

the supposed essence of a celebrity's voice and likeness to make them instantly believable to audiences as the "correct" and true form of that person, as a puppet or instrument of semblance. Vocaloids and deepfakes reveal that synthetic voices can be joined with multiple images and scripts, from anime and fan fiction to propaganda. Thus, synthetic audiovisuality can help us understand default forms of assumed humanity, not just pop stars but also their fans and critics.

In all, *Preprogrammed* considers how technological and cultural norms and givens can be used creatively to new audiovisual ends—that also redefine what it means to be human. To do so, it examines decades of music presets that collide with media and cultural presets but also uncovers running themes of industrial and societal control, predetermination, and facilitation that are baked into presets in general. While music presets impose technological, industrial, and social norms, artists also play with defaults to develop new expressive choices and effects. From push-button radios to iconic voices generated by AI, presets shape outcomes of artistic creation, cultural movements, and what seem at the moment to be ever-constrictive futures.

The following studies of music presets and interfaces, from tropes to software, have myriad extensions to our current era. The 2020s have perpetually redefined "the new normal," from COVID-19 to 2025 executive orders, where rules are overturned and remade seemingly overnight. Given our imbrication with apps, platforms, and AI, our entanglements with presets and norms cannot be ignored. In an age of gender and racial essentialism and religious and political extremism, presets are bound up with ideals intended to keep us in place. Algorithmic technologies maintain biases of economic policies, carceral systems, class violence, and more.³⁶ Bureaucratic systems from paperwork to borders are governmental presets that sanction human rights and manufacture global logistical systems, and machine vision's binary code boxes the world's uncertainties into generalizable patterns. Why do technological presets control capital and certain communities? Conversely, how can artists and activists use presets for aesthetic or radical ends to expose latent power structures in society?

In positioning presets across social, aesthetic, technological, environmental, and political domains, *Preprogrammed* shows how supposedly unchanging, repeatable standards in art and technology often have fortuitous—and potentially reversible—consequences. It is also my hope that this book inspires thinking toward creating new, sustainable presets in academia and in our communities that will resonate beyond those spheres. While a preset is, by definition, pre-set, a preset's use can be shifted, possibly even to shift axes of power—and, like Duchamp did when he declared a urinal art, maybe even overturn the preset social order.

Mobile Music

The Windshield Cinema of the Push-Button Car Radio

In 2024, when I moved west—far west, from Liverpool, England, to Riverside, California—I created a playlist of songs in a preset order for my journey, from general songs about Los Angeles to specific songs I associated with my own arrival there. These included, among other things, songs from Tegan and Sara. (I’ll let you draw your own conclusions.) Such songs kept me company for hours on the open road when I finished my move by driving from Denver to California. The windshield of my electric blue car became a sounding board—and vision board—for my fantasies about life in Southern California. These were preset: if Los Angeles comes up in a conversation, novel, or movie, it often brings up a reference to driving or car culture. In 2006, the automobile sociologist John Urry wrote that approximately half of the land in Los Angeles was occupied by cars.¹

But if I had been driving west in the 1940s–70s, my drive music would have been conditioned by preset stations controlled with a press of a mechanical button (figure 3). Push-button preset radios were installed in American car radios from 1937 on, typically with the ability to save four to six radio stations. When pressed, these buttons would tune the car radio to the station’s corresponding frequency. For decades, push buttons were the default way to tune a car radio; drivers could select a desired station but not a desired song. From the 1970s on, mixtapes and later user-created playlists on CDs and iPods, as well as dashboard touchscreens and satellite radio, usurped mechanical push buttons to give drivers a wider window of music programming. In the 2020s, however, physical buttons have been threatening to make a comeback—perhaps riding the popularity wave of vinyl, flip phones, and iPod click wheels, which produce nostalgia for users who want to touch the past.² As the push-button historian Rachel Plotnick writes, “In the shift from buttons to screens, car makers have sacrificed ease and safety [for cheaper



FIGURE 3. An Australian push-button preset car radio. Photograph by Doug Butler, licensed under CC BY-SA 4.0.

cost] by requiring drivers to look at their dashboard interfaces rather than feeling for them.”³ Previously, drivers had to program presets themselves, using push buttons’ tensile feel in a tactile feedback system called haptics, which facilitates user experience on everything from World War II fighter jet cockpits to Apple iPhones.⁴ Push-button presets were especially multisensory, as drivers felt their way around a visual and sonic interface to navigate the views between dashboard and windshield. Tactile presets for radio not only increased road safety but also allowed drivers to pair audio with roadside scenery. From the 1930s on, consumers could soundtrack the landscape with the press of a button, though with a degree of chance involved: when a driver pushed a country radio preset, for example, the song or commercial that played was determined by the station’s DJ or programming. A push of a preset brought an indeterminate collision of meaning, mood, or atmosphere to their roadside audiovisual experience—conditioned, on the one hand, by the chance of what would play on a particular station and collide with a particular landscape, and on the other hand, by how drivers would attempt to curate musical selections to their visual attention.

This chapter examines the push-button car radio as a haptic interface for managing audiovisual collisions of attention and distraction while driving, in mobile car listening or what I term “automobilic listening.” It also analyzes the effects push-button radio presets had on film soundtracks in the 1940s–80s. These soundtracks incorporated radio into their musical selections on a spectrum (a term I use in homage to Jon Bullock’s work on Kurdish radio, but also to depart from a binary) that began with chance but increasingly moved toward control—much like users’ own mixtapes and CD and iPod playlists introduced more control than chance automobilic listening. Push buttons might seem to operate relatively simply—for example, clicking five preset radio stations on and off—as binary effects. But presets introduced radical styles of automobilic listening, including the ability to customize not only the car’s soundscape but also the audiovisual experience of driving

by recasting the scenery with music, perpetuated by film soundtracks like that of *The Graduate* (dir., Mike Nichols, 1967), which uses Simon and Garfunkel tunes over lengthy driving sequences. This chapter studies dominant users of midcentury radio presets—the youth—and presets’ default *and* unprecedented uses, from broadcasting capitalism in commercials to amplifying queerness in films. Radio and movies have long gone hand in hand, from *Detour* (dir., Edgar G. Ulmer, 1945) to *American Graffiti* (dir., George Lucas, 1973) to *Once Upon a Time . . . in Hollywood* (dir., Quentin Tarantino, 2019). These films and others are important historical records of how push-button presets were programmed on a scale from chance to control. By tracing cultural histories from radio statistics to fictional media, I theorize presets as a grid of potential actions and horizons of experience in automobilic listening, as plentiful as the views outside a car windshield.

A focus on radio presets revises histories of mobile listening that begin with the Walkman and iPod. Car push-button presets introduced musical mobility to armchair living room listening in the 1920s and ’30s. Radio presets’ on-the-go soundscapes probe public/private, outside/inside binaries, as addressed by mobile music scholars like Sumanth Gopinath and Jason Stanyek.⁵ Car listening has been characterized by sound studies scholars Michael Bull and Karin Bijsterveld as a vehicle for privatization and individualization and as acoustic cocooning, respectively.⁶ While drivers are sealed off from public space in a literal way—much as sound and media studies scholar Mack Hagood discusses noise-canceling headphones as privatized listening—they can still see and interact with public space, which shapes how they curate their soundscapes.⁷ I argue that drivers who listen to preset radio stations often occupy a middle ground between sealing themselves off and opening themselves up to the outside world. Similarly, push-button presets slip between a driver’s visual, haptic, and aural attention.

Push-button presets refute the notion that radio only traffics in sound: they entwine car radio listening with a visual interface and moving images. With smartphones and car touchscreens, drivers access stations or podcasts as audio-visual content, which has turned radio into a “screen medium” for radio historian Michele Hilmes.⁸ But the car has been a screen medium since the addition of a windshield mediated the driver from noise, insects, and other unwanted obstacles to driving.⁹ Push-button radio’s preprogrammed interface paved the way for more chance encounters with landscapes *and* soundscapes. With push-button presets, drivers could sample from radio stations to soundtrack their drive, bouncing sounds off of both familiar and unfamiliar sights around them. In this way, push buttons did not divide inside from outside but opened up a grid between inside/outside for drivers to mix and remix songs and visual elements.

Push-button presets created gradients in automobilic listening that also shaped contemporary cultural audiovisual experience beyond binaries of city/suburb, individual/collective, straight/queer, and more. A preset is not merely an on/off switch but a horizon for discovery. Even when a radio preset is switched off, its

programming has “radio resonance”—media historian Isabel Huacuja Alonso’s term for how broadcasts foster discourse networks from gossip to policymaking that affectively connect radio listening to broad publics.¹⁰ But as presets coincided with midcentury US suburbs, they also gridded off certain publics. As media scholar Jeremy Packer writes, “Americans’ relationship to automobility remains embroiled in a host of commercial and governmental claims regarding freedom, convenience, and safety”—especially for people of color, gender minorities, and both the young and old.¹¹

Radio presets condition the audiovisual experience of the driver, who must manage the car and the road while also being managed by the sights and sounds that collide unexpectedly with the drive. The hybrid assemblage of automobile and human driver has been called the “car-driver” (Urry) and the “driver-car” (sociologist Tim Dant), where humans negotiate road signs, steering wheel vibrations, and rumble strips as second-nature sensory inputs for mobility.¹² While scholars have cataloged how the car drives our senses, we must detail how push-button presets on car radios both divide and refocus our attention on the road. In the car, we are split between the dashboard, windshield, and both desired and undesired glimpses of the vehicle’s interior, like a glance at a phone, a pet, or a snack while driving. The haptic turning and tuning of buttons allows drivers to integrate radio programming with those views, either further dividing or recombining their attention. Familiar sights and sounds can preset driving experiences and also leave them open to chance. Our senses collide at the interface of push-button presets much like cinema continuously redirects our attention to visual, haptic, or sonic phenomena, depending on our recognition of film and media codes, whether conscious or unconscious.

Since their 1930s introduction to radio, push-button presets have increased cinematic collisions of music and media, from billboards to avant-garde art to Hollywood films. I introduce a “collision model” in audiovisual media that puts automobility and more generally mobile sound-image combinations on a scale from chance collisions to fixed curations that function like road signs for cinemagoers. I begin with a car radio history that focuses on push buttons’ developments as interfaces for specific consumers in automobiles and even in suburban infrastructure design, considering how musical selections on push-button programming clashed with midcentury idealism. From composer John Cage’s 1950s radio works that operate through chance, I move to genre and avant-garde films set in the 1960s–80s, which incorporate push-button presets into their soundtracks on a spectrum from chance-based to curated, figured by developments in the technology itself. These film analyses offer a glimpse of how drivers preset audiovisual experiences through the look, feel, and operation of the push-button preset interface but especially of how those experiences altered cinematic soundtracks. Initially, push-button presets inspired radio sounds in films that played with the chance of what would air on a given station. But as technology changed to cassette tapes in the 1970s–80s, CD players in the 1980s–2000s, and mobile phones and iPod aux cords from the 2000s on, both

drivers and films took more control of their programming, such that soundtracks for the road—and road movie—became increasingly curated. Through varied uses, push-button presets mobilized shifts in audiovisual culture, paving the way for tape/CD/digital playlists to be new presets of automobilitic listening. The backstory of push-button and cultural operations is one of an increasing means of control.

PRESS ANY BUTTON TO START:
A BRIEF PUSH-BUTTON HISTORY

The origin of push buttons in the age of industrialization conditioned the effects of push buttons on car radios and on audiovisual experiences. In the late 1800s, push buttons were installed in typewriters, telegraphs, elevators, and car horns as modern developments in human-machine efficiency. For Plotnick, push buttons illuminate late 1800s power struggles in domains of labor, transit, and transmission. When the Eastman Kodak Company debuted its Kodak with the slogan, “You press the button, we do the rest,” it promoted ease of use by hiding the very operations that made the camera work. By packaging a human-machine interaction into an on/off switch, engineers created a binary of “a limited palette of choices to users that made unfamiliar burgeoning electrical technologies more approachable for novices.”¹³ These mechanics presaged midcentury white middle-class male tinkers and hi-fi enthusiasts. The popularization of push buttons not only amassed capital through faster productivity but also brought additional labor classes into the market, such as the youth, who both constituted a significant portion of radio listeners and were crucial to automobilitic listening culture as well.

The increase in car radio’s many teen listeners in the midcentury United States was prefigured by earlier industrial decisions to enforce control in interface use via push buttons, as Plotnick explains:

Sectors of society from educational institutions and the press to electricians and parents asked children to habituate themselves to the daily gestures and sensibilities necessary for pushing buttons, to imagine their bodies as powerful and capable by employing mechanisms for machine control. As children increasingly “tuned” their hands to perform this control, their acts of touch simultaneously threatened the norms of quiet, order, and hierarchical power relations, which dictated that children should only use their hands in those contexts that adults viewed as fit for their use. In this regard, the Industrial Revolution produced a struggle to combat out-of-control bodies even as so many campaigned to put bodies in control.¹⁴

Control has long been a keyword associated with push buttons, whether they operated electric chairs, secretaries’ call buttons, car horns, or TV remotes. For midcentury youth, control of the body was tantamount to effective social reproduction under the rule of (parental and heteronormative) law. Suburban children’s first toys were—and, in many cases, still are—push-button ones predetermined by

their parents. As such, push buttons' deceptively simple binary operations unveiled an enforcement of cultural presets including "proper" behavior of nuclear family offspring. The on/off switch of push buttons encoded whether children were "in tune" with the cultural presets of expected social behaviors. Their parents' desire for quiet is a cultural default of white-picket-fence America, and the family radio set in the living room was its key emblem. However, when smaller and cheaper versions of the radio like postwar transistors enabled families to own multiple radio sets in their homes, the radio's tuning to socially acceptable stations became uncontrollable in multiple spaces, as adolescents could hide radios under their pillows or blast radios in parking lots or on beaches.

As this radio history hints, and which Plotnick and technology historian Jason Robert Puskar also argue, even a simple on/off switch triggers several possible actions, not just the binary operation for which it was built.¹⁵ This is also evident in cultural theorist Walter Benjamin's observations of the optical unconscious that the camera shutter could capture beyond human intent.¹⁶ For Plotnick, Benjamin, and other haptic interface theorists, push buttons made possible relatively simple uses but unleashed potentially exponential chance operations that surpassed the efficiency and ease touted by manufacturers. Such was the case with push-button tuning in car radios, unleashing chance events on musical, cultural, and visual frequencies.

PUSH-BUTTON RADIO PROGRAMMING: FROM BINARY TO SPECTRUM

From its invention, the car radio sparked debates about distracted driving—despite, or maybe because of, its exponential popularity. Car radio launched in the United States in the 1920s. By 1930, there were 34,000 sets produced; by 1937, when push-button tuning was introduced into car radio, up to five million sets were in use.¹⁷ When a 1937 Idaho bill proposed banning auto radios to reduce traffic accidents, the Radio Manufacturers Association (RMA) countered that radio was "a safety accessory of an automobile [because it] actually results in safer driving, safer highways and reduction of accidents [when used] to promote attention, wakefulness, interest and alertness."¹⁸ In 1937, the standard car radio tuning mechanism was still dial-based, typically with one or two dials. The significant attention spent on the tuning mechanism in the Idaho House of Representatives hearing reveals just how crucial a more driver-friendly tuning system would be to car radio safety debates. In 1939, for example, the Philco auto radio introduced one button that could program up to five stations, eliminating a five-button panel for ease (figure 4). As the advertising copy went, "Not even a glance at the dial. Quick, simple, effortless. No fumbling, no groping." Such a mechanism addressed concerns about car radio dials, which, as even the RMA admitted in the Idaho car radio ban case, were typically tuned before one started driving.

PHILCO *creates* a new kind of AUTO RADIO!

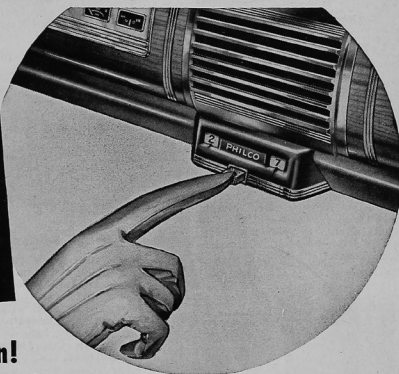
Again Philco leads in radio progress.
Engineers develop New Convenience
in Auto Radio Tuning.

ONE Push-
Button Tunes
5 Stations!

New Sales-Making Invention!

At last, the perfect way to tune a radio in a car! Instead of several push-buttons, you tune in five favorite stations with just a single button! Each time you push the button, a new program comes in instantly... and you choose the one you want to hear. Not even a glance at the dial. Quick, simple, effortless. No fumbling, no groping. The easiest, most convenient auto radio tuning ever invented!

Here's your opportunity to put pep, punch, novelty—and dollars into your auto radio sales. Feature the new Philco Model 933 with this sensational new invention. It's a perfect "step-up" weapon to increase your unit sale and boost your auto radio profits. Get full details from your Philco distributor today—write, wire or phone!



PHILCO
AUTO RADIO
MODEL 933

\$39⁹⁵

Single Push-Button Tuning for 5 stations. Regular dial tuning of all stations. 6 newly-invented Loktal tubes. Powerful Superheterodyne. Electro-Dynamic Speaker. Automatic Volume Control. Bass Compensation. Tone Control. Full-Wave Vibrator. Choice of 3 speakers, for built-in speaker grilles, for under dash mounting, for Chevrolet cars.

Other New Auto Radios—\$29.95 to \$69.95



PHILCO ALL YEAR'ROUND

APRIL, 1939

25

FIGURE 4. *Radio Today* 1939 Philco auto radio ad. Courtesy of the Media History Digital Library, https://lantern.mediahist.org/catalog/radiotoday5unse_0041.

Push-button tuning promised enhanced safety and fewer distraction risks to drivers who wished for music to accompany their travels. But it also did much more. As an article from *The Radio-Electrical Record* proposed in 1932, “The entertainment of the car radio, far from lulling the driver to sleep on long trips, helps materially to keep him awake for it relieves the monotonous noise of the motor. [. . .] Because it can be reached easily, the driver can tune in programs without diverting his attention from the road ahead of him.”¹⁹ Being easier to use than tuning dials, push-button presets opened up a whole world on a windshield, allowing instantaneous musical—and subsequently audiovisual—curation of drives. This preset play, though, required capital and class privilege for pleasure-riding that could engage in radio accompaniment at one’s leisure. By increasing entertainment access at the press of different buttons, radio presets extended the upper-class individual experience of driving into that of collective listening and into the chance of developing new tastes. Drivers and passengers alike could alternatively select their favorite stations, filling the seemingly private, closed-off car with a world in sound from another place or a familiar DJ’s favorite tunes and station-sustaining advertisements. For pop music scholar Amy Coddington, a radio station not only introduces listeners to music but also is “a cultural producer, selling the attention of a specific audience (most often defined by race, gender, and age) to companies that place ads on the station.”²⁰ Through curated music, ads, DJ patter (conversation that bridges varied content), and more, individual stations built a collective audience that targeted common demographics and music or entertainment tastes.

A 1938 illustration in *Radio Today* shows how far-flung stations could be programmed as presets that, in turn, engaged drivers in sporting events, ventriloquism with dummy Charlie McCarthy, and big bands (figure 5). In this image, the spectrum of programming possibilities for listeners was figured as just that—a spectrum, or a palette of diverse tastes, at least in content. However, the spectrum of content represented is overwhelmingly white, cishet, and male. Even while opening up choices in listening, car radio stations perpetuated cultural defaults, often reflective of the country’s contemporaneous xenophobic and heteropatriarchal frequencies.

Push-button radio opened up a spectrum of stored station data that was ready-to-hand, again figured literally by the advertisement: choose your frequency with just one touch, instead of fiddling with a dial. However, what is ready-to-hand is not usually by chance but often is figured by culturally dominant tastemakers—which, in 1937, were predominantly cishet white men. The segregated stations of radio’s “Golden Age” forced Black actors to replicate white-scripted, stereotyping dialect, which, for sound studies scholar Jennifer Lynn Stoeber, perpetuated a sonic color line in midcentury America. The 1947 invention of the transistor, which miniaturized the car radio, would make push-button tuning’s array of options for mobile programming—and chance encounters with music and the world of the windshield—an even wider spectrum, while still segregating sonic color line frequencies.

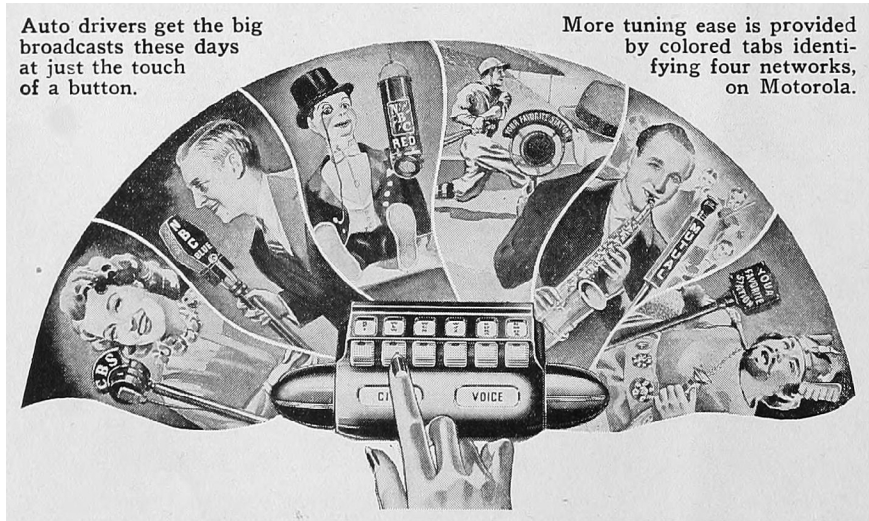


FIGURE 5. An imaginative visual push-button radio spectrum depicted in the lower left corner of the page in *Radio Today*, April 1938, p. 12. Courtesy of the Media History Digital Library, https://lantern.mediahist.org/catalog/radiotodayo4unse_0226.

THE TRANSISTOR RADIO'S NEW LISTENING GENERATIONS

The transistor radio's eventual miniaturization of the car radio granted automobilic listening a portability that would contribute greatly to preset use. Transistors are tiny on/off switches that power our computers and smartphones; they were discovered in 1947 Bell Labs experiments that used silicon and germanium crystals to amplify radio signals. Subsequently, the transistor replaced prior portable radios' bulky vacuum tubes; Texas Instruments in the United States marketed the Regency TR-1 radio at the end of 1953 (figure 6), and Sony in Japan introduced their TR-55 in 1955. Two years later, Sony made the TR-63 that could fit into a shirt pocket and used a more energy efficient nine-volt battery. The more portable transistors became, the more they caught on in US households but even more so on the roads. By the mid-1950s, 83 percent of US cars were sold with radios. With nine million transistor radios sold in the United States in 1961, the transistor had made radio cheaper and more portable than ever. Cars even began to supplant the home as the chief location of radio listening.²¹

But the technology of the transistor was not the only force that shifted radio listening from stationary to mobile. Increasingly, listeners surfed local independent formats over national radio stations, and a postwar youth audience trotted out the radio on beach trips and car rides. To the canon scholars have built about listeners' increasingly mobile transistor use after World War II, I add the accessibility of preset radio programming on cars as crucial additional context that precedes and augments the dominant story of transistor radio and mobility and youth culture.

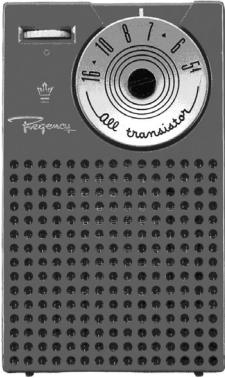


FIGURE 6. Regency TR-1 transistor radio. Photograph used with permission of the National Capital Radio & Television Museum.

Using presets to think about listeners' preconceived notions affords historicized and sustained theories of music listening across multiple devices and timescales. Pre-set analysis guides us past novelty and exceptionalism narratives, like the assumption that midcentury US radio had largely collective listening; as radio historian Alexander Russo argues, radio audiences have always been both individuals and collectives. The accessibility of the push-button tuning, portability of the miniaturized transistor, and growth of US radio stations from 1,000 to 4,000 between 1945 and 1965—coupled with exponential audience growth—led to more extremes at both ends of these binaries.²² These factors shaped the stations drivers chose as presets.

By 1965, a majority of radio stations were independently run, a far cry from the national broadcast syndicates pictured in figure 5. “While the networks organized by ABC, NBC, and CBS had been built upon series and serials of mixed programming with nationally recognized radio stars,” radio scholars Tim Wall and Nick Weber write, 1950s and 1960s “independent radio used blocked programming aimed at diverse groups, often based upon cheaper formats of music using recorded and live music popular with the target audience.”²³ Regional and national programming were both directed to the individual listener, hailing what media scholar Jason Loviglio calls radio’s “intimate public,” which enabled individuals to feel connected to broadcasts on a scale from regional to global.²⁴ As Russo argues, with push-button tuning, listeners were able to “instantly move among stations, moods, and locations, thereby extending the feeling of self-determination and mastery associated with the automobile.”²⁵ But these midcentury ideas of belonging and control were afforded to predominantly suburban citizens with means, as media broadcasting perpetuated cultural defaults of racism and classism. Only a privileged individual driver could control the way they experienced the space and time of their drives.²⁶

Take, for example, my road trip in my used car, with its radio that had been programmed in Denver. As I drove to California, some of the presets registered as static; others linked to Spanish-language radio stations, and some to the same national stations I had programmed previously. The chance that relevant stations would align with my listening habits through the used car’s chance selection of

presets was no accident; both national and local programming aim to appeal to individuals across various subsections of culture and taste. Still relevant today is a mid-1950s shift in radio programming that catered to what Wall and Webber describe as “the idea of distracted listeners using radio as a secondary medium: one that involves them while they do something else.”²⁷ The three main categories of the distracted listener that Wall and Webber characterize—industrial workers, middle-class housewives, and youth—address distinct individuals within a collective and different set of distractions. Class, race, and gender mattered a great deal to types and programs of automobilitic listening. Youth music consumption, seen as leisure, particularly courted new forms of attention.

ROCK AND YOUTH

In the 1950s and 1960s, stations appealed to radio audiences shaped by the postwar baby boom, with a 50 percent increase of 20–24-year-olds in the 1960s. New marketing demographics arose for music, media, and automobiles, such as the 1964 Ford Mustang, which was linked to youth culture.²⁸ Teenagers yearned to tune in to the rock stations that were cropping up across the country in the latter half of the '50s. In many suburban homes, parents refused to play this “unruly” genre on the family table radio. But transistors equipped with earphones, as historian of technology Michael B. Schiffer explains, “solved the rock and roll problem. By bestowing these radios as gifts, parents could wall off the offending music, insulating themselves from its erotic drives. [. . .] Teenagers came to believe that they were screening off the rest of the world and creating their own.”²⁹ For teenagers, portability was a portal to the music of rebellion and independence. Empowered to choose their own music, teens used mobile radio to create a wall of sound that separated them from their parents.

The case of rock makes evident that new generational listening was not precipitated by portable technology alone. Early disc jockeys not only managed programming for stations but also built a persona for their station, choosing advertisements and delivering them in a manner that aligned with the station's preset atmosphere. DJs cultivated independent AM rock stations nationwide, such as Alan Freed, who popularized the term “rock and roll” on New York's WINS in 1955. At first, teens tuned in to rock stations late at night in their bedrooms. But these independent beacons soon permeated more public spaces: as transistor speakers improved, teens not only could rebel against their families but also could unite as social groups who listened to rock and roll outside the home. WINS and other stations across the United States played Top 40 hits that became the soundtracks heard around high schools, drive-in movie theaters, and beaches. Thus, the transistor's symbiotic relationships with independent programming and rock and roll helped to make the emergence of youth culture audible—especially through the automobile, a crucial vessel for suburban life. As radios became wired to cars, teens could broadcast their aural identities on car rides and in parking lots.

No film has captured the effects of radio on the youth market quite like *American Graffiti*—set in 1962, a year when Americans age 34 and younger were listening to nearly double the amount of car radio as those 55 years and older.³⁰ As media scholar Susan Douglas observes, “The powerful fusion of cars, young people, rock ’n’ roll, and the radio meant that teenagers could—and did—use broadcast music to [. . . seize] territory that wasn’t really theirs by blanketing that space with rock ’n’ roll.”³¹ From storefronts to beaches, teens signposted their independence through music that adults at the time viewed as dangerous and sexualized through the activity of cruising—wandering by car in search of romantic partners. *American Graffiti* is entirely structured by the radio blaring from teenagers’ cars. Rather than flipping through radio presets like I did on my westward road trip, the movie has a default channel—a single station, DJed by the real-life legend Wolfman Jack—tuned to teenage cruising, especially teenage boys blaring Wolfman Jack’s rock selections from their cars while they drive around attempting to pick up teenage girls. The film opens with “Rock Around the Clock,” as does the similar teenage angst film *Blackboard Jungle* (1955—that director/screenwriter Richard Brooks discovered the song on car radio is crucial to this history³²), and it sets the tone for a teen deciding whether to stay in California because a mystery girl in a T-bird said she loved him but then drove away to go to college back east. In a movie about (straight) cruising around the clock, *American Graffiti* flits between defining relationships and selfhood, presenting a mode of chance-but-control automobilic radio listening that many films (some covered in this chapter) would replicate.

Rock became a siren song of seduction via the prevalence of presets set to Wolfman Jack and other DJs. As a 1971 survey of teenage girls reported, rock’s “sexual overtones either in the lyrics, the orchestration, the style of presentation, or the rhythms [. . .] frequently evoked romantic feelings which were sexually exciting.”³³ The mobile radio allowed teenagers to cruise around town to pick people up with like-minded interests: as teens broadcasted rock in cars or at the beach, these sites merged aural and sexual promiscuity. Both *American Graffiti* and the 1971 survey depict scenes of “aural cruising”—a term I borrow from media scholar Lucas Hilderbrand.³⁴ While *American Graffiti* is a heteronormative version of aural cruising, this listening model could also be queered along the lines of queer cruising—that is, coded interactions to solicit sex in public that predated car culture worldwide. As music critic Eric Weisbard argues, each button on a car radio could carry “a separate music format” like Top 40 “whose basic qualities a regular listener could anticipate even before pushing the button,” thus generating “multiple mainstreams: distinct, if at times overlapping, cultural centers.”³⁵ In this way, rock radio formats that sprung from push-button radio presets also became presets for cruising of many kinds, presetting divergent values and roles.

Aural cruising raised a potential use of transistors, auto radios, and push-button presets to form queer communities in predominantly mainstream spaces. For performance studies and queer theory scholar José Esteban Muñoz, in *Cruising*

Utopia, “queerness is essentially about the rejection of a here and now and an insistence on potentiality or concrete possibility for another world.”³⁶ The mobile radio offered many ways to create worlds within worlds: teens’ private listening could screen off the adult world and create a room of their own. As youth—and auto radio—led the drive to reclaim public spaces, subcommunities flourished, such as queer cruisers who could broadcast their pop tastes to signal others with common interests to join their beach-going or biker groups. For 1960s queer communities, the transistor amplified connections between sound and sex: aural cruising opened up more overt ways to cruise the beach for chances of sexual activity. These sonic rays paralleled Muñoz’s depiction of queer futurity “as the warm illumination of a horizon imbued with potentiality.”³⁷ With its portability and mutable preset programming, the transistor auto radio could transmit sonic spectrums of queer illuminations. Radio presets would enable not just aural but also audiovisual cruising—turning up the queerness in the background of 1960s hits until it was foregrounded on the horizon of the windshield and in the imagery of films. In the remainder of this chapter, I invite readers to do their own “aural cruising” through case studies of films, which often envelop queer or other minoritarian experiences.

FROM THE THEATER OF THE MIND TO THE THEATER OF THE WINDSHIELD

In automobiled listening, the push button entails chance—a preset station plays preset song lists that drivers cannot control—but also can be curated by listeners, as is demonstrated by the filmmakers to follow. The music we play often is preset, but we shape its context by choosing our environment or vice versa—that is, the right music for the place or mood, creating not just aural but audiovisual flow. Hollywood films of the 1930s and ’40s mobilized automobiled logics of mood curation, using music in travel montages to speed up the audiovisual flow. But the generic orchestral music that accompanied travel montages, as in *Detour* and *The Hitch-Hiker* (dir., Ida Lupino, 1953), did not reflect the radio stations listened to by those in the car; film soundtracks needed to adopt the sporadic whims of push-button preset users.

The car’s new midcentury audiovisuality was generated by drivers who shifted radio stations with push-button presets and projected images from their programming that affected the landscapes through which they drove. In 1959, a radio spot emphasized radio’s contiguity to both the home and the road: “Like Aladdin with his magic lamp, you can summon this electronic wave instantly. [. . .] You don’t even have to stop what you’re doing. All you have to do is listen. These same radio waves go with you in your car . . . wherever you go. To the store, to work . . . on a [. . .] vacation trip across the continent. Radio goes where you go . . . to serve you, to entertain you, to keep you company, to keep you informed.”³⁸ Much as radio creates its own flow through station management, the transistorization of mobile car radios shifted the terms of flow onto radio listeners, who used push-button

presets to program and increasingly control automobilic listening. They curated music for a particular moment and mood, shifting through the radio presets to find the appropriate artist, lyrics, melody, tempo, and rhythm.

However controlled, a driver's chosen music prompts listeners to project a scene based on their whims in front of them. Car radio is not mere background music but the grounds on which mobile imagination can unfold: push-button radio presets are selected by drivers intentionally to create a soundscape and, with that, an immersive experience. Even "a fleeting but satisfying glance" out the car windshield, public historian Kathleen Hulser explains, affords "submerging oneself in an experience."³⁹

Numerous scholars have compared viewing the world outside of the windshield to cinematic or televisual experiences. In 1933, the radio scholar Rudolf Arnheim related automobiles to television as experiences of "cultural transportation."⁴⁰ Cultural theorist Margaret Morse also compared cars to television and malls, calling the freeway "a realm of passage, both over the outside world and from inside an idyllic, intensely private, steel-enclosed world of relative safety. At the same time, the sociality with the outside world that has become physically impossible inside the automobile is re-created via radio, disc, and tape."⁴¹ Notice how Morse introduces inside/outside, public/private binaries only to trouble them immediately. For example, music and sound inside the car reinvest it with "outside" life.

From the advent of presets, the car windshield and landscape became a screen upon which drivers could project their audiovisual imagination: the driver's experiences met those of the world speeding by around them—including billboards. As historian Catherine Gudis observes, "An image, a logo, and a few words [. . .] provided a sensation of speed that did not disrupt the actual speed of travelers yet still delivered its message. Though usually the aim of advertisers is to attract attention, the strategies of an aesthetics of speed assumed distraction."⁴² With the visual landscape drastically preset in advertising "buyways" (Gudis's term), push-button radio presets played a key role in drivers' assumed distraction. While billboards were silent, radio metaphorically projected images in listeners' imaginations, especially in 1930s–50s radio drama called the "theater of the mind."⁴³ With the radio on, these images and moods vied for drivers' attention across the theater of the windshield. Like a movie screen, the windshield coupled with automobilic listening at once connected drivers with a reality and a *view* on reality, much like cinema represents reality—viewers project the moods, people, and places of radio programming onto their view. Musicologist Berthold Hoeckner describes preexisting music in media that jogs listeners' memories of their previous encounters with songs—like a couple's wedding dance song, or a politician's campaign song—as "double projections," where images on their mental screens juxtapose with the film's images onscreen.⁴⁴ Similarly, push-button presets and their use in films shifted radio from the theater of the mind to the theater of the windshield—and the movie theater.

Cinema helps us to *see* automobilitic listening and aural cruising in action. Push-button presets not only radicalized automobilitic listening to transport drivers' imaginations but also translated tenets of automobilitic listening into cinema, allowing a distinct mode of audiovisuality to emerge on a spectrum from chance to control. Consider the use of contemporaneous music or local station programming to transport listeners to a particular time or era in road movies like *Radio On* (dir., Christopher Petit, 1979) and radio- and pop music-inspired movies such as *American Graffiti* and *Once Upon a Time . . . in Hollywood*—or through projects that tune into global broadcasts like the audiovisual map furnished by Radio Garden. The car's portable presets influenced an audiovisual aesthetic in filmmaking that uses popular music heard on the radio to mimic drivers' experiences of soundtracking their own windshield cinema with push-button presets. Many films cast radio as a pervasive but background character, from the use of *American Graffiti*'s single station that permeates the film to the use of citizens band (CB) radio to facilitate the plot in *Smokey and the Bandit* (dir., Hal Needham, 1977). Deriving from push-button radio's ready-to-hand property, CB uses interactive push-to-talk mode and dial-in channels based on radio presets.

In *Smokey and the Bandit*, CB radio—a two-way alert system initially developed by the Federal Communications Commission for communicating public safety alerts between dispatchers and motor vehicles and then expanded more publicly for motorists and roadside services—allows Bandit (Burt Reynolds) and his friend Cledus (Jerry Reed) to run Coors across state lines at a time when beer was illegal in the American East. For the entire film, drivers and locals on CB radios alert the outlaws to a pursuing sheriff (the titular Smokey) using handle nicknames, slang, and preset channels for communication. CB radio drives the film's plot but also its contradictions, which for historian Art M. Blake are embodied in the title “citizens band,” “invoking concepts of legal personhood bound to a history of white supremacy”—which is seen in *Smokey*'s undeveloped female and Black characters.⁴⁵ For example, Bandit's love interest, the runaway bride Carrie (Sally Field), says, “I'm about to be killed in this moving CB radio show, and I . . . I don't even have a handle.” Carrie is literally run off the map of her predetermined life course by Bandit and Cledus, who, like Packer says for CB truckers, “produced their own surveillance network: a visual/audio cognitive map of the highway system. Truckers had to map their trajectories against those of sighted smokeys, situating them according to crossroads, highway markers, speeds, and reputations.”⁴⁶ Through CB presets, drivers gridded the roads into new social—and frustratingly old gendered and racialized—relations.

In a similar vein, *Once Upon a Time . . . in Hollywood* uses archival snippets from the Los Angeles radio station KHJ, like songs and ad spots, to transport audiences to Los Angeles in 1969. While the film is packed with A-list actors, the movie relies on the pervasive background actors of the radio and cars. For example, when washed-up actor Rick Dalton (Leonardo DiCaprio) and his stunt double, Cliff Booth (Brad Pitt), drive to a movie set, a Tanya Tanning Butter jingle

plays on the Cadillac radio. DJ Robert W. Morgan intones, “I only want you to listen to this commercial if you’re under 25,” a moment that mocks these has-been 40-somethings. In Tarantino’s films, ironic uses of preexisting music at once taunt and invest in the film’s setting, era, and characters, especially in this film’s suburban culture.⁴⁷

While not strictly cinematic, it is worth a detour to San Diego, where postwar Chicano lowrider culture—the design of cars to go “low and slow” (*bajito y suave-cito*)—defied the grids of whiteness locking into Southern California. The state attempted to ban lowriding through preset codes wherein car parts could not be lower than a wheel rim’s lowest section. But the ordinance only stoked a counter-culture, akin to but substantially more diverse than the one shown in *Easy Rider* (dir., Dennis Hopper, 1969). For lowrider scholar Denise M. Sandoval, “Many car customizers used their vehicles to express resistance to the culture of conformity that existed in the 1950s,” including whiteness and suburban growth. “The speed, the look, and the sound of one’s car became a symbol of cultural resistance [. . . a] ‘Chicano Disneyland,’ a playground for *barrio* youth” that marked out a grid for redlined Mexican Americans.⁴⁸ Lowriders and onlookers packed cruising spots especially on weekends and usually left women out of the driver’s seat, colliding with gendered presets of masculinist car culture.

Lowriders’ engagements with push-button radio remain understudied, but they may have parallels with other alternative automobile movements such as 1960s boom cars. Much as the reduced speed of lowriders flouted standards, the heightened audio systems of boom cars make them “tool[s] for unmistakably *being* somewhere,” for writer David Z. Morris, deploying “mainstream technology in ways that both challenge marginalization and create pretexts for authoritarian action by police.”⁴⁹ Like boom cars and their descendants, lowriders re-gridded space and even time, driving slowly, expanding the audiovisual reach of their cars with hydraulics and high-octane radio listening. DJs and artists captured these presets in music, from Miguel Molina’s Bay Area radio program *La Onda Bajita* to songs like Thee Midniters’ “Whittier Blvd.” (1965), about a major lowrider cruising spot. This song elides preset pop songs’ predominant lyrics with honks and laughter that cajole a driving, jangling groove, unmooring the idea of a pop song needing to “go” anywhere. Similarly, War’s “Low Rider” (1975) insists that (s)low riding is joy riding. These examples of modded car culture correlate with how filmmakers from the midcentury on play with programming from push-button presets.

FROM ALIGNMENT TO COLLISION: PRESET MODELS FOR FILM SOUNDTRACKS

In existing paradigms of film soundtracks’ audiovisuality, synchronized music is often predetermined in one-to-one alignments of melodies and symbols—recall the introduction’s discussion on silent film music encyclopedia presets, such as horns for hunting, marches for funerals and weddings, and more. By “in

alignment,” I mean a direct match of emotional tone, literal meaning, overlapping context, and so on. I call these “alignment models” of sound synchronization, which prioritize mainstream film’s long-standing associations with sounds that are determined by genre and cultural codes. Such associations especially took root in Classical Hollywood, where music is a subordinate, often invisible commentary for what happens onscreen.

But new ways of making audiovisual meaning result when filmmakers break apart one-to-one alignments of expected meanings to mash up disparate preset material for new, unexpected sound-image combinations—inviting viewers to audiovisually cruise. These collisions of sound, image, and meaning can defy cultural defaults like heteropatriarchal values, which will be illustrated by later case studies. The term “collision” may sound familiar to film sound/music scholars, as it is adapted from musicologist Nicholas Cook’s term “contest,” which “implies an element of collision or confrontation between the opposed terms” of media images and music.⁵⁰ I pick up “collision” in Cook’s definition to stress the importance of car radios and mobile music to this audiovisual aesthetic. The term “collision” most readily evokes vehicular collision, acting as a mnemonic for my installation of car radios in mobile music history before Walkmans and iPods.

Moreover, collision over contest more concretely describes the relationship between the binary logics that occur in push buttons and mobile listening: they do not just contest each other, as in the conflicting sound-image relationships championed by Soviet synchronized sound cinema in the late 1920s; they overlap, sometimes with recognizable presets. In the collisional model, the image and sound tracks both often work as separate elements that each have different meanings. Similar effects occur when a driver punches in a radio preset to project a country music station over a city gridlock. When these sensory tracks collide, they produce simultaneous, often incongruent meanings that vary according to a spectator’s references.

Collisions especially occur in cinema and media with radio-inspired or radio-made soundtracks. As a rather literal example, the TV show *Mad Men* (season 2, episode 5, 2008) depicts a 1962 car ride where Don Draper and Bobbie Barrett listen to Percy Faith’s “Theme from a Summer Place” on the radio before their car crashes. Barrett attempts to seduce Draper by asking about his favorite things and says she feels “great,” to which Draper responds, “I feel nothing.” With this dialogue, the sunny strings of “Summer Place” at first align with Barrett’s mood and then collide with Draper’s; then, the car crash seals the collisional deal. In another literal example, *Born in Flames* (dir., Lizzie Borden, 1983), a speculative fiction film where the United States has become a social democracy, collages of documentary-esque footage of New York collide with broadcasts that reimagine the social order. Collisions of radio and depictions of a supposed status quo appear across avant-garde and mainstream films that use broadcasts as multifaceted

orienting devices, as in *Good Morning, Vietnam* (dir., Barry Levinson, 1987).⁵¹ Collisions also occur when a SoCal driver like me is stuck in traffic but hears radio news delivered rapidly or plays calm music to reduce stress. Preset analysis helps us to traffic in audiovisual collisions, to slow down each sonic and visual element before it crashes into the next. Because collisions often happen by chance or unexpected diversions, avant-garde musicians and filmmakers in the 1950s–70s were particularly important in establishing collisional models—often by playing with presets outside of standard operating procedures.

The rest of this chapter fleshes out automobilitic listening on a spectrum from cruising channels by chance to intentionally curating sound for one's view or experience. I show how radio-inspired media works and soundtracks have developed alongside features and uses of the push-button car radio. I begin with chance, which foregrounds avant-garde contributions to loosening alignments and introducing collisions.

JOHN CAGE PLAYS THE RADIO: PRESET DURATIONS

John Cage is often the name most critics associate with chance operations in mid-century musical modernism, concrete art, and more. Chance operations are external constraints that attempt to distance or even completely erase the artist's hand in the resulting work. Cage's most (in)famous chance-operation work is *4'33"*: a composition named for its duration, where the score contains three parts and nothing else—no notes are provided to the performers. Instead, the performers (most often) sit in silence while every rustle, cough, or whisper produced by the audience becomes a part of the composition. For John Cage, the preset of sound is silence, which he describes as “the aspect of sound that can be either expressed by sound or by its absence.”⁵² By treating bodily sounds as music in *4'33"*, Cage changed the preset definition of music from organized sound to an embodied production of textures and durations. In this era, Yoko Ono and other artists from Fluxus—a transnational postwar network that sought to reduce hierarchies between art and artist—also created scores that avoided preset musical notation by providing concrete instructions. These instructions often hinged on duration, like La Monte Young's two notes “to be held for a long time” by any combination of performers (Composition 1960 #7), that made concerts a collaboration with audiences' sounds. Duration became the default setting for Cage's compositions, a preset time (4'33") functioning as a container for both sound and silence.

The recasting of music as duration was paramount in Cage's chance operations to achieve “the giving up of intention” to “compact technological boxes, inside which all audible sounds, including noise, would be ready to come forth at the command of the composer.”⁵³ He used electronic technology, specifically the radio, to intervene in “the limits of silence, the limits of embodiment.”⁵⁴ With duration as

a precondition for music-making, the signal static of radios could become music. In Cage's 1951 *Imaginary Landscape No. 4* for 12 radios, chance operations determined the sections of the written score and also its performance. Two performers operated each radio, one to tune it and the other to control the volume and texture of the radio sound. No two performances were ever the same due to the differing content of live broadcasts over time and place. As a precedent for the later affordances of scanning and seeking in car radios and of shuffle functions on CD players and iPods, the music was completely left up to chance. Even though Cage admitted he "never enjoyed the sound of radios," the portability and changeability of midcentury radios made them a compositional tool to musicalize preexisting sounds in the room and those made dynamically by the audience—not just the performers.⁵⁵

Cage mobilized presets of music technologies as discrete units of electronic music performances, like Wendy Carlos would forge J. S. Bach pieces from synthesizer patches, the analog predecessor to digital synthesizer presets (see chapter 2). Composer Robert Worby described the 1951 premiere of *Imaginary Landscape No. 4* as "one of the first concerts of electronic music, although Cage didn't really think of it in those terms at the time. But the sounds coming from the 12 loudspeakers were a random mix of the everyday along with the glitches, bleeps and fizzes now associated with electronica."⁵⁶ Worby's evocation of fizzing is a metaphor for the collision model of audiovisuality and presets' enabling constraints: sounds and their atmospheric contexts expand to fill the air and duration like gas in a container. Gas molecules collide into the bounds of that container, affirming its shape, but also into each other, affirming chaos. This visual model helps us to see binaries of familiar/unfamiliar, everyday/chaos at work in chance-operation music, as well as chance-operation mobile radios.

Much like car drivers with push-button tuning remixed everyday sounds with the chance element of uncertainty of what would be playing on a chosen station, several avant-garde filmmakers in 1963 collided chance radio play with chance images. In Jack Smith's *Flaming Creatures*, drag queens preen to a soundtrack that mimics AM radio. Tango and Latin dance sequences add playful realism to a fake ad where men apply lipstick as innuendo for oral sex. In Ken Jacobs's found-footage film *Blonde Cobra*, a live radio is placed in the audience and "the exhibitor [is instructed] precisely when to shut [the radio] on and off, how to wiggle among the channels, and when to drift into the white noise of static."⁵⁷ For art historian Ann Reynolds, *Blonde Cobra*'s "familiar ambient sounds, such as live radio, can serve to collapse distinctions between cinematic and viewing temporalities and spaces [. . . or have] the opposite effect, underscoring the distinct difference between the time and place of the film and the time and place of the radio sound."⁵⁸ Such radio play collapses the binary of familiar/unfamiliar experiences of audiovisual space. This is the collisional model at work—the separate acts of production and reception collide in radio soundtrack and allow

spectators to form distinct interpretations based on their own perspectives and familiarity with media references.

AUTOMOBILIC LISTENING AND CHANCE IN
BARBARA RUBIN'S *CHRISTMAS ON EARTH*

Also in 1963, the little-known filmmaker Barbara Rubin put the radio into the audience and played it live in *Christmas on Earth*—a 30-minute, nonnarrative film that screens queer sex acts in kaleidoscopic color and sound. On the one hand, Rubin was inspired by the ways push-button radio presets cycled through stations to do the same with cinematographic standards. On the other hand, she used avant-garde practices in musical chance and indeterminacy to produce audiovisual collisions of straightlaced pop and polymorphous sexuality. When she paired chance radio push buttons with her footage, a capacity for aural cruising turned into audiovisual cruising—for spectators of the film as well as the audience around them (much like a driver's surveying gaze).

The idiosyncratic visual experience of Rubin's film aids in viewers' audiovisual cruising. *Christmas* screenings shatter the typical black box of the projection booth behind viewers by putting a projector among the audience: reel A is shown as the film exhibition preset, shown from the projection booth to fill the screen, while reel B is shown from the mid-theater, centered inside reel A and filling a third of the screen (figure 7).⁵⁹ Projectionists also pass colored filters over the projector lenses in improvisatory light play. Consequently, each screening is an unrepeatable event that emphasizes the numerous possible sex acts that can occur between a panoply of body parts, genders, and more. *Christmas* shows sex acts up close, approximating touch—what media scholar Laura U. Marks calls haptic visuality—through viewers' mimetic impulses to have bodily reactions to visions of sex. In Marks's erotic haptics, the “viewer is called on to fill in the gaps in the image [. . . and] relinquishes her own sense of separateness from the image.”⁶⁰ Marks's claim idealizes an impulse to slip into another's skin—an impossibility, for both the film's actors and the viewer's body remain discrete objects. But in form and content, *Christmas* mixes bodily entities. The projectionists cue colors for certain moments in the film to trigger euphoria or entropy, as impromptu as a silent film pianist's choice to switch from a wedding march to a tremolo when a villain suddenly appears. But unlike the library music catalogs accompanists traditionally used to match preset themes to moods, Rubin's film refuses alignments in favor of spur-of-the-moment collisions of sounds and sex acts. Light, color, and motion bifurcate spectators' attention, exceeding the preset screen of a film. More like a moving image installation, Rubin's reels encourage viewers to audiovisually cruise the roving images and sounds.

Christmas's screenings boost viewers' active engagement instead of passive reception—they encourage haptic encounters with the body's inner and outer



FIGURE 7. A still of the reel-inside-reel superimposition and chance lighting in *Christmas on Earth*, 1963. Courtesy of Anthology Film Archives, New York, NY.

drives, much like drivers' interactions with radio presets and the car's windshield. In her own preset play, Rubin instructed projectionists to hook a radio "up to a PA system, with a nice cross-section of psychic tumult like an AM rock station, turned on and played loud."⁶¹ Through this "aural cruising," Hilderbrand writes, "the radio brings the outside public world into contact with the interior private space of [Rubin's] film."⁶² In *Christmas* screenings, the soundtrack clearly emits from a source that is separate from the film, subverting the typical moviegoing experience of prepackaged sound in a film, as in aligned soundtracks. Instead, *Christmas's* image and sound tracks are two separately produced experiences that each have their own stakes, moods, and motivations.

Much like the chance operations of push-button presets, experiences of this film differ greatly between today's audiences and Rubin's contemporary audiences due to preset qualities of AM radio in the '60s, like the differing physicality of AM versus FM radio waves. Much as loudspeakers facilitate raving, AM (amplitude modulation) produces tactile waves that are sometimes disrupted by lighting waves (also amplitude-based).⁶³ Rubin similarly used the physicality of AM radio waves to flout mass culture, adding new scenes of listening and living to pop songs' heteronormative associations in the 1960s. But modern exhibitors struggle over Rubin's radio instructions. Do you play a radio tuned to today or to

the '60s—or do you not play a radio at all? Most projectionists choose the latter: at a McGill University screening I attended in 2014, Rubin scholar Ara Osterweil assembled an iTunes playlist with Top 40 hits from 1963 that paralleled a live radio set list. For a different screening, Hilderbrand similarly curated iTunes soundtracks of pop hits, and the 2019 Film-Maker's Cooperative restoration's soundtrack simulated an AM station with brief interjections of DJ patter, ad spots, and even a PSA from musician Ravi Shankar, who asks listeners, "Why not get high on life itself without using any drugs?" Each screening betrays a rift between preset images and a chance soundtrack that is impossible to replicate due to the differing modern presets of radio playback. In this way, Rubin's instructions for sound/image/sex collisions remain collisional, often due to chance scoring's ties to technological obsolescence and its aversions to mass production.

Christmas reroutes aligned paths of sound and vision in screening spaces, making radio collide with the same air the audience breathes. The film's spatial collisions bring everyday radio listening into the film experience, collapsing inside/outside divisions like radio preset projections playing out on a car windshield—which collapse past/present ones as well. Push-button chance operations collide film scenes with the multiple geographies of various radio stations that could transmit in any given theater. Rubin presaged the low-power radio art of Tetsuo Kogawa, where "the action of transmission itself can be considered as a collective performance art."⁶⁴ She turned the film screen into an active transmitter for audiovisual cruising, rather than a passive receiver of a cultural product. As author Hans Magnus Enzensberger writes, "Every transistor radio is, by the nature of its construction, at the same time a potential transmitter; it can interact with other receivers by circuit reversal."⁶⁵ Rubin rewired the radio to be a live performer that resonated with sexual liberation and queer discourse, igniting the topography of the body together with that of radio and image transmission, offering a roving mobility to spectators' imaginations. This film, other experimental films, and especially museum moving-image installations provide variable visual gradients in which to study users' chance push-button preset encounters. Such push-button radio play generates haptic feedback loops that traffic in continual audiovisual collisions.

CHANCE ENCOUNTERS OF PUSH-BUTTON PRESETS IN MAINSTREAM FILM

Audiovisual cruising also shapes mainstream films, as several films with soundtracks inspired by the radio have opening sequences that feature the act of radio scanning with push-button presets. One example is Steven Spielberg's horror road movie and feature film debut, *Duel* (1971). The film largely features only a faceless antagonist driving a truck who tries to kill the protagonist (Dennis Weaver) by running him off the road in several ways. At the beginning of the film, a lengthy opening sequence introduces the viewer to the protagonist's car and to

his listening habits. He switches between stations with audible clicks of his push-button presets until he lands on a lengthy story about the US census survey, perhaps airing the protagonist's concerns about not being man enough in his house. As a later phone call with his wife reveals, he failed to support her at a party when she was sexually harassed, making default qualities of manliness a major stake in the film. At that point, the man is already being chased by the faceless trucker. Soon after that phone call, he shakes the trucker off his tail and punches the preset button in victory, cueing up glib jazz to match his glee. Not only is the man able to use presets to celebrate his victories, but also the film as a whole, minimalist in its cast and plot, is able to add intrigue with a soundtrack that aligns with its aesthetics. However artsy the preset play might seem, though, the radio is largely a driver of the plot, given the census information it provides to affirm ideals of heteronormative masculinity. Its sonic foreshadowing veers more toward 1930s–40s Classical Hollywood travel montages with generic washes of classical music, instead of 1950s–60s uses of popular music, as in the aforementioned 1950s rock films and in 1967's *The Graduate*.

Much like *The Graduate* uses radio-inspired music to hint at the protagonist's introspection, however, *Duel* employs the protagonist's invisibility in the first five minutes to add suspense through visibility/invisibility power dynamics. Another horror movie by a mainstream director also used radio presets to play with the line between invisibility, agency, and power. In John Carpenter's *Christine* (1983, based on a Stephen King novel), set in California in 1978, the antagonist Christine is presented as an anthropomorphized and feminized car, a 1958 Plymouth Fury, but she seemingly can kill of her own volition. Whenever she is about to kill her victims, her radio lights up and plays music, specifically 1950s rock and roll—which a character nods to in the final scene as she expresses a hate and fear of rock due to Christine. Christine audiovisually cruises herself, syncing music to her victims' deaths. For example, "Not Fade Away" (Buddy Holly and the Crickets) accompanies Christine's first murder of a Black autoworker on an assembly line in Detroit. The lyrics simultaneously register Christine's ability to self-regenerate, but this steadfastness now ironically collides with America's dying auto industry—as well as the legacy of postwar Fordism. By presenting in medias res snippets of songs as the needle drops, *Christine* has its cake and eats it too, working in songs by chance but also locking in proliferating meanings.

Much as drivers operated push-button radios on a fulcrum between freedom and control, succumbing to what was already playing even though they could choose a station, films also programmed soundtracks along the chance/curation binary. As scholar Umberto Rossi writes, US broadcast history has "struggle[d] between freedom and control, where conflicting concepts of both terms have repeatedly clashed, and where freedom has often been turned into a prop in another fundamental component of American history and society—that is, the spectacle."⁶⁶ Push-button radio preset selections at once contributed to general

transportive feelings in road movies but also transported viewers to particular times, places, and meanings. Automobilitic listening and audiovisual cruising soon started to shift from chance radio scanning to DJ-like curation.

THE CURATIONAL AESTHETIC IN FILM SCORING: BEHIND-THE-SCENES DJS

Some midcentury radio-inspired films were obvious about their song curation: “Rock Around the Clock” was used as a theme song to introduce *Blackboard Jungle*, *Rock Around the Clock* (dir., Fred F. Sears, 1956), and *American Graffiti*. In these mainstream films, the semblance of radio scanning and musical randomness gave way to intentional, musically curated views. Part of this shift was due to changes in push-button preset technology: the installment of scan functions to flip between preset stations, like in the General Motors’ Wonder Bar radio, automated preset scanning in ways further developed by playlists in both cars and soundtracks. While both modes of producing musical and visual collisions involved twiddling the dial to calibrate meaning, the propensity toward narrative in mainstream film led creators to lock them in as understandable presets for audiences, not unlike silent film leitmotifs. Curation won out as the default scoring method over chance because it gave more auteur-style control to directors, both mainstream and avant-garde.

While Rubin’s chance synchronization of music relied on contingent encounters much like push-button presets, her film enacted mobile presets in form, as a theatrical performance event. Another film made in 1963, *Scorpio Rising* (dir., Kenneth Anger), did not use chance presets in form but rather played with them in content, airing queer images for preset heteronormative love songs. The cultural default of compulsory heterosexuality installed default ways of looking at and listening to love in the 1960s. In 1963, the queer avant-garde filmmaker Kenneth Anger paired the antics of a homoerotic Coney Island motorcycle gang with hits that buzzed from nearby beachgoers’ transistors—just one example of the frequent collisions between queer and heteronormative culture. *Scorpio Rising* is a fundamentally queer film that uses preset love songs against their default settings: by curating audiovisual cruising, Anger insinuated erotic relationships between bikers and between bikers and their bikes.

This case study extends automobilitic listening and audiovisual cruising to other vehicles, though Anger also considered cars in his 1965 short film *Kustom Kar Kommandos*, which lasts the length of the Paris Sisters’ 1964 cover of Bobby Darin’s 1959 “Dream Lover.” *Kommandos* queers this preset FM radio song through the Paris Sisters’ gender-bending of Darin’s original lyrics, changing a female object of desire to a male one. In Anger’s film, a man in powder blue clothes lavishly polishes a car that is a stand-in for another man. Anger’s choice of the cover song highlights his film’s double entendres, displacing the common label of she/

her given to vehicles by cishet men and hinting at the simmering homoerotics of automobilitic culture. Anger's twisting of the "Dream Lover" cover reveals just how culturally entrenched the preconception of an "original" is; he highlights the actions and prior singers' traits that a cover singer takes on in the preset, especially if they alter the lyrics from the original version. When singers step slightly askance from the preset, putting a half-spin on a lyric, they highlight the power of Muñoz's disidentificatory critique—refusing to identify with a heterosexual love song. By using radio hits as a preset template for films, artists can critique both musical and cultural defaults. As spectators connect their memories of songs to the reinterpretations offered by the screen's imagery, they are primed to form additional attachments to hits, colliding with new meanings.

In *Kommandos* and in *Scorpio Rising*, Anger was a behind-the-scenes DJ with a playlist. He curated pop songs for images that drew out desires closeted in mass culture, shifting pop from heterosexual norms to gay cruising. For film scholar Juan A. Suárez, Anger's queer gaze onto mass cultural products results in "a defamiliarizing reading that 'outs' the repressed homosocial and homoerotic significations of these specific popular texts."⁶⁷ Visual pop cultural references abound in *Scorpio*, including to *Rebel Without a Cause* (dir., Nicholas Ray, 1955). But Anger's use of 13 '60s pop songs in *Scorpio* especially cues up views onto the world and perhaps mirrors the motorcycle's lack of windshield in openly ironic ways (much like the contrapuntal sound techniques of filmmaker Sergei Eisenstein). Against the defaults of heteronormative pop, *Scorpio* expresses queer desire and exposes suburban conservatism. Anger's edgy montage traffics in audiovisual intersections of queer desire and mass cultural clichés. His collision model emphasizes this clash of competing interests.

Anger remixed seemingly preset images, words, and sounds to form a new language of desire in *Scorpio*. Remixing automobilitic listening's typical byways, Anger impressed this language upon spectators with literal renderings of images and lyrics but also solicited chance by encouraging spectators to see and hear between the lines of the freedom/control binary. Like music videos, *Scorpio* references visual culture through costumes or current events and does so in similarly contrapuntal quick-cut associations of images, rhythms, and lyrics. But Anger incorporated whole pop songs in order to disrupt default associations, like heteronormative love and mass culture, with popular music. Anger spent \$8,000 to secure the song rights, even though this "about doubled my budget." As he explained, "The music was an integral part of what I wanted [. . .] as an ironic commentary on what's going on in the picture."⁶⁸ His intercut images and overlaid pop songs often refuse alignments of signs with symbols. Unlike commercial music videos' typical function to sell the song's emotional experience and singer's stardom, contrapuntal sound provokes diverse personal collisions with images. Viewers' wandering eyes and ears mimic the automobilitic listening that was the inspiration behind the film soundtrack's creation.

In *Scorpio Rising*, Anger plays Top 40 hits back-to-back and orients listeners' experiences as a DJ does. DJs curate set lists from listener feedback, building communities through an invisible voice that functions as an intimate guide to regional popular hits. Much as a driver customizes their presets to communal programming, listeners can believe that DJs choose songs only for them, as song lyrics and moods readily align with individual thoughts and feelings. Anger used preset sounds and images to build connections but not over-program alignments of bikers with parties and queer icons; it would be more accurate to call him an audiovisual cruise director. In cruising radio presets, Anger mimicked the way his fellow Coney Island beachgoers—as well as Rubin's chance instructions—found ideal songs to set moods. Like a DJ, Anger made a playlist, sometimes intentionally and sometimes inadvertently, from public tastes.

A playlist is a natural outgrowth of presets, even if it does not involve pushing the buttons on a car dashboard. As musicologist Arved Ashby writes, the term playlist “has been around for some decades, originally referring to the preset record-spinning schedules at radio stations.”⁶⁹ Anger co-opted this logic, using “Blue Velvet” in a male dress-up sequence by chance—much like Rubin's preset play. As cinema historian P. Adams Sitney writes, he “turned on his radio and exercised his will. Out came Bobby Vinton's ‘She wore blue velvet,’ which when joined to the episode created precisely the sexual ambiguity Anger wanted in this scene.”⁷⁰ “Blue Velvet” is a space of sexual reverie, colliding motorcycle maintenance not only with the zipping of jeans and buckling of belts but also with the gender play of “*she* wore blue velvet.” Anger created a playlist of songs loosely connected by characters and narratives and themes, resulting in “enigmas to be figured out.” But as he asserts, “My films are based on my lifelong research [. . .] if you can pick up on the results, fine; it's all *there* if you want to explore it—but you may have to do some research of your own.”⁷¹ At a 1967 screening of *Scorpio*, a *New York Times* reviewer noticed a gray-haired woman “apparently oblivious to the homoerotic charm of the [“Blue Velvet”] scene [who] mused, ‘So you see this guy putting on his shirt [. . .] what's to see?’ Her husband shrugged noncommittally.”⁷² The woman struggled with what, to her, was a collisional tuning in to queer desires that did not fit with her mental playlist.

Although *Scorpio* predated the 1970s phenomenon of mixtapes, the 13 songs that set different tones for 13 different scenes accord with critic Matias Viegner's description of mixtapes as “predigested cultural artifacts combined with home-spun technology and magic markers [that] turn the mix tape to a message in a bottle. I am no mere consumer of pop culture, it says, but also a producer of it. Mix tapes mark the moment of consumer culture in which listeners attained control over what they heard, in what order and at what cost.”⁷³ Anger's images are Viegner's “magic markers” that curate a playlist of pop songs to carve alternative paths through cultural phenomena. Like the queer communities that created homosocial spaces on Coney Island with automobilitic listening, Anger's playlist

operates with the mixtape logic that people can broadcast or exchange musical tastes. Anger made each filmgoing experience a mixtape that cued up images and moods for certain songs—as preset as they might seem. By using songs as the organizing principles or presets for his films, Anger created controlled frames within which to solicit chance responses, much like Ray Johnson’s mail art does in chapter 3.

FROM CHANCE TO CURATION IN AUDIOVISUAL CRUISING AND PLAYLISTING

Scorpio Rising shows how push-button programming foreshadowed playlisting for not only drivers who put together playlists on tapes, CDs, and phones but also for radio station managers and DJs to consistently brand their stations. From inspiring “Rock Around the Clock” as a theme song in several films, to encouraging artistic opening sequences that would establish suspense in genres like film noir and horror, push-button car radio presets paved the way for a more customizable competitor, the 8-track, which had an undeniable effect on incorporations of pop music in films and studio editing through its increased portability, personalization, and materiality compared to push-button presets. The storage capabilities of magnetic tape alone replaced chance radio presets with whole-song presets. Cassette and CD players followed suit, then wired mobile phone and iPod connections, then Bluetooth. These technologies increasingly allowed drivers to make preset playlists to further soundtrack their lives—and for filmmakers, their media. The social fabric of playlisting was indelibly marked by push-button presets, as they invited listeners to cruise across channels, city and country grids, and queer and other desires. Where fingers once pressed buttons, they would perform similar operations on digital screens.

From the 1930s to the 2020s, three iterations of push buttons shaped automobilic listening and film viewing, demanding different levels of attention from drivers and moviegoers. Car radio presets evolved from mechanical buttons to electronic buttons without moving parts to digital buttons that became part of touchscreens. First, feeling the tension on the button and issuing a mechanical process through touch protected drivers from visual distractions. But as push-button presets became electronic, introducing the automated seek function to flip presets, automobilic listening became a more visual process for drivers and moviegoers to navigate. Finally, the digital subsuming of push buttons into screen buttons—as with the 2017 car I took on my road trip—makes touching the preset visual to the point of distracting drivers’ attention from the road. These technological developments preset the driving experience itself. While these attempts to automate presets ostensibly were made to smooth out automobilic listening, drivers’ attention collided in inopportune and often unsafe ways. Here I am thinking of the giant dashboard screens in Teslas and other car features that divide our attention. Or

consider the noise added to electric cars that are otherwise noiseless when backing up or passing pedestrians, which is a safety feature broadcast outside the car to make it audible to pedestrians. All of these multisensory car technologies raise a question: How do presets condition us and impact our everyday experiences?

This chapter's case studies have shown how seemingly binary choices render automobilitic listening as an audiovisual experience—sometimes as chance and sometimes as curation, from the CB radio and the audiovisualized surveillance of feminized and racialized figures to queering compulsory heterosexuality. How do listeners and artists alike push back on the very binary oppositions of on/off—in radio presets and beyond—to imagine other possible worlds? From the movie seat to the car, “the stage and the street, like the shop floor,” Muñoz observed, “are venues for performances that allow the spectator access to minoritarian lifeworlds that exist, importantly and dialectically, within the future and the present.”⁷⁴ By exploring presets from the past in this chapter, we see how push buttons, at first seeming to offer only binaries of on/off, inside/outside, public/private, distraction/focus, and danger/safety, have the possibility to disrupt preset notions of cultural barriers, especially in visual, sonic, and tactile registers. Given this chapter's reframing of push-button binaries to a spectrum unfolding over the windshield's horizon, we might now turn, as Muñoz did, from the past to the present and the future.

From mechanical, electronic, and ultimately digital push-button presets, automobilitic listening largely has moved away from radio's chance encounters toward listener-centered curation. Today's satellite and internet radio often use preset streaming playlists that are organized according to mood music. Listeners similarly select a song or artist on Spotify or Pandora, where autoplay functions tend to continue the vibe long after listeners have heard a song—turning time into profit for these companies. Such vibe-setting emulates the alignment of housewife-targeted radio programming and Hollywood cinema's one-to-one sound-image meanings: endless same-but-different playlists position listeners as conduits for streaming's aligned flow.

But streaming's vibe-setting can be rerouted like presets tipped between chance and curation in midcentury films, as users can self-curate musical experiences when they control the playlist interface. For my SoCal drive, I arranged my playlist in a particular order of chosen songs, but I sometimes disrupted this preset order through shuffle play. Like the chance of ideal music coming from the press of a preset button, tunes fleetingly but powerfully charge listeners' moods and environments, like Rubin and Anger used radio presets to inspire films' images. While they interpreted radio presets in different ways, Rubin and Anger used them as psychological bridges to carry emotive qualities into their films and to urge audiences to take up audiovisual cruising. In their films, and in the creative opening sequences of mainstream genre films, capitalist alignment models ceded to collision models of audiovisuality. The collisional model favors plurality over singularity, chance orientation over predetermination, and active over passive spectatorship. In the

various ways that images and music technology collide, these films become hybrid radio/film memory banks that broadcast changing forms of public life.

The synchronization—and de-synchronization—of radio push-button presets with hegemonic meanings helps us to tune into new models of audiovisuality distinct from the classical Hollywood paradigm. Collision models arise in other films and music videos that operate with a hidden DJ, live radio, or mixtape logic—like *Shrek* (dirs., Andrew Adamson and Vicky Jenson, 2001), which infamously curated and reinterpreted pop songs that mean different things to my fellow millennial viewers and to my Gen Z and Gen Alpha students. Even when their meanings seem set in stone, preset songs resonate with different cultural defaults according to those brought by their viewer. The multiple types of sound-image relations in media with preexisting music are specifically informed by the materiality of the presets that produce them and the people using and receiving them. Push buttons play with presets in haptic, visual, and sonic ways, affecting agency, control, and imagination.

Two

Synthesizer Studios

Demos, Gender, and Labor

I remember the first time I was conscious of a preset as a preset (at least, I think I was still too young to have used the microwave popcorn button). I was 10, at a friend's house in Iowa, playing their Casio keyboard. Well, it is more accurate to say that I would "play" the demo button again and again, shrieking with delight as the popular home entertainment keyboard roared to a life of its own. The Casio demos churned out melody after melody to showcase different synthetic presets. Some Casios even had light-up keys each time a note was played. Countless Gen Xers and millennials recall this audiovisual preset play; pop music and media scholar Alyx Vesey refers to her friend's Casio preset of Wham!'s "Wake Me Up Before You Go-Go" as a "sense memory." It is not only the sound of a preset but also its visual and haptic light-up keys that increase our emotional and musical attachments to keyboard presets.

When I first encountered the Casio demo, I was struggling with my violin after taking off its fingerboard tape—training wheels for visualizing pitch, much like the frets of a guitar. The Casio's keys lit up as each note and preset sounded, but the violin's default state, lacking visual markers for each note, was a black box to me. I learned to match pitch to where my finger pressed the string by visual, haptic, and aural cues, but I would freeze up when any musical passage got too technical or too fast. As I later learned, an instrument's appearance and interface shape performers' and spectators' interactions with it—especially in the case of electronic instruments with keyboards and presets like the synthesizer.

Countless times, manufacturers and performers have negotiated synthesizers' visibility and accessibility; they are hard to pin down as devices that take many forms. A synthesizer converts electric signals into sound, and its midcentury interfaces featured an alluring array of dials, knobs, and patch cords. As musicologist

Theodore Gordon has argued, the synthesizer was once the musical epitome of a black box.¹ Now it can fit in your pocket as an app on your phone that, despite its size, can give you access to thousands of different types of sounds. But in some ways, the logic of the black box still holds.

At a concert, a musician will most often play a synthesizer like a piano, but that image only shows the tip of the iceberg of the work they have done in order to program the synthesizer with the ideal presets for a song. The magic of synthesizers far exceeds the now-familiar keyboard for playing it—the interface, which affords visual and haptic modes of user interaction, allows musicians to create distinct presets for any sound they can imagine. The innovation of adding a keyboard to the synthesizer helped to familiarize audiences with the imaginative instrument, demonstrating path dependence: as music sociologists Trevor Pinch and Frank Trocco argue, the piano's more familiar interface versus an electronic box made people more likely to buy and play it. But while scholars have studied the technological development of synthesizers, the ways in which artists have shown their musical applications to the general public in demos have been understudied. This chapter argues that artists' labor and skillset to program and familiarize the public with synthesizer modules in demos led to presets being stored in both patch and social memory. As Pinch wrote, the path from synth keyboard to Casio especially was facilitated by presets: "By pressing the correct button, it is possible to emulate virtually any other instrument or reproduce a range of prestored specially selected electronic sounds for live performance."² But before such button-pushing reproductions of sound could happen, a significant amount of groundwork was laid by women who produced iconic sounds through labor-intensive processes. In other words, this chapter puts the "pre" in *Preprogrammed*, discussing the techniques and practices that codified presets.

Presets would not be so ubiquitous today without two key inventions in music creation and production: magnetic tape and synthesizers. Both arose in the mid-1900s, the former sourced from Germany during WWII and the latter descended from electronic instruments in production since the turn of the 19th century. Many histories of the recording studio discuss these technologies separately, and yet their use *together* is what established electronic presets in the midcentury years. If synthesizers generated what pop music scholar Paul Théberge calls "any sound you can imagine," then tape afforded the cutting and pasting of sound into music, which led to sampling and many experiments that fundamentally changed music-making. Presets codified new sounds and forms of music-making, and tape and later digital memory codified presets by making them storable and retrievable. To historicize preset sound codification, much of this chapter discusses proto-preset work. One landmark example is Wendy Carlos's monumental album *Switched-On Bach* (1968), where she created unique timbres for each note by patching different circuits on the synthesizer, painstakingly recorded each sound onto tape, and then pieced Bach's complex layers back together. The whole process took over 1,100

hours. As Bob Moog says of the album, which topped Billboard's classical charts for three years, "We witnessed the birth of a new genre of music—classical music, realized with impeccable musicianship on synthesizer and tape recorder."³ A few years earlier, Delia Derbyshire, the synthesized sound programmer of the *Doctor Who* theme, also used magnetic tape to make her electronic music lexicon. These women laid the groundwork for creating a wide range of sonic and visual signification for electronic music. It is no coincidence that they also made crucial BBC demos of synthesis, which made electronic sounds familiar to wide audiences.

But achieving ubiquity of synthesizers and of electronic sounds in an array of genres today, from popular music to media music, was an uphill battle. Carlos and Derbyshire created several iconic preset sounds of synthesizers from largely invisible and onerous mechanics that were a far cry from the Casio presets that instantaneously switch from piano to harpsichord to drum. They also had to challenge the 20th-century default of cishet white male musical innovators in avant-garde and electronic music. While feminist/queer/trans activism and work like Lisa Rovner's documentary *Sisters with Transistors* (2020) have exposed how synthesizer innovation often defaulted to cishet white men, still more work is needed to turn the historical record of synthesizer presets back over to their rightful, oblique slant. Oblique means "diverging from a straight line or course" (*OED*), much like critical theorist Sara Ahmed describes queerness as twisting away from heteronormalized linear paths.⁴ Attention to the early demonstrators of instruments from the theremin to the Prophet-5 often reveals bodies beyond the default. These demos uncover the queer, audiovisual, emotional, political, and other uses of presets.

In this chapter, I amplify three mediators that have helped audiences understand how presets came to be and came to be used: demos, oscilloscopes, and women. As music and media scholar James Buhler writes about virtual instruments, "Demos illustrate the potential of the software by de-individualizing the music; that is, these demos are constructed to show the potential of the instrument but are sufficiently blank and characterless to allow the target audience to hear themselves in the music."⁵ Capitalism is the cultural default of demos, which are designed to sell attractive sounds and images. I consider the politics of hearing and seeing oneself reflected in new sounds that became codified in repeated audiovisual motifs in genre film and television, representing electronic sounds as futuristic or otherworldly, like *Loki*'s (Marvel, 2021) abundant use of the theremin. Early synth demos were not blank or characterless but tone-setters of new electronic sounds and images. Demos also were responsible for creating functional equivalents, or imitative sounds and images in design and usage, which are key to presets.

In demos, synths' functions were demonstrated particularly by oscilloscopes and women synth virtuosi, who are crucial mediators themselves. Oscilloscopes were the centerpieces of synth demos in their early years; they are voltage-measuring devices that visually represent sounds in shapes from waves to squares. These shapes helped lay audiences form analogies between a flute-like sound and a curvy

line, or sine wave; by showing functional equivalents of sound as vision and back again, women artists from Derbyshire to Carlos used oscilloscopes to make synths understandable and even begin to sound familiar to audiences. Like feminist music scholars from Tara Rodgers to Amy Cimini, I foreground women electronic musicians because they led early demos of electronic instruments. Women synthesizer demonstrators are artist-laborers who show how the preset sausage gets made. Like Rodgers observes that John Cage's legacy obscures important actors in similar lineages of music, I show how women made these imaginative instruments legible to broader publics beyond experimental music.⁶

To chronicle the instruments and the key artists who developed and codified presets, I deploy the *Oblique Strategies*, developed in 1975 by Brian Eno and Peter Schmidt. The *Oblique Strategies* are a deck of cards with open prompts that can stimulate creativity. These one-liners at first glance may resemble map directions but have less predictable possible outcomes, such as "Do the washing up."⁷ The prompts were created by synthesizer musician Brian Eno—known for his collaborations with Roxy Music, the Talking Heads, David Bowie, Coldplay, and many other artists—and the painter/artist Peter Schmidt. I use their prompts not to elevate Eno, an outsized figure in synth history, but to build a coalition of women synth artists whose work differs significantly from Eno's presets. These women use "the master's tools" (Audre Lorde's maxim that the master's tools will never dismantle the master's house) to build a different house.⁸ By examining artists from Derbyshire and Carlos to Suzanne Ciani and Laurie Anderson, and, to a lesser extent but no less important, Herbie Hancock and Stevie Wonder—whose virtuosic demos irrevocably changed music by firmly placing synthesizers in the context of cultural and communal life—I show how feminized and racialized figures shaped electronic music far beyond Eno. Women and Black musicians labored on unfamiliar instruments to generate new presets that configured not only new music and instruments but also new modes of listening and creative discourse. The lens of presets makes these feminized and racialized figures the main characters in electronic music's story, bringing them together when they are often forced apart due to their musical genres or historical eras. Derbyshire, Carlos, Ciani, Anderson, Hancock, and Wonder created demos and demoed presets that forever altered electronic music.

Here, as with other chapters, I work through binaries of chance/control, invisible/visible, instrument/machine, and manual/automatic to rematerialize synthesizer sound-making through the labor and work of hands at the machine. As I explore the ubiquity, visibility, and mediation of synthesizer presets through the demo, I show how presets are constructed and used—often to defy cultural defaults, especially that of the white male electronic musician. I test our understanding of presets as, in writer Jan Kedves's words, "essentially demo modes, intended not so much for actual use and more as a means of showcasing the complex possibilities offered by a tool or piece of software."⁹ Those possibilities are as

deeply visual, haptic, cultural, and emotional as they are sonic vessels for listeners to fill with their own desires; these demos also allow artists to set the tone for new instruments. But when a preset becomes too ubiquitous for some music aficionados—makers and listeners—its use is emphasized as a perceived lack of skill or seen as gimmicky (as in chapter 4). Before one waves their hands and says, “No presets!,” we need to learn how they were formed, the immense labor involved to create and then recreate them, and the demos that codified them.

A PREHISTORY OF SYNTHESIZERS: FROM INVISIBLE STRINGS TO KEYBOARDS

*Ghost echoes*¹⁰

Long before the Casio keyboard, early electronic instruments were created through experiments in synthesizing sound. This study of instrument interfaces, particularly revealed through artists’ demos, is crucial for understanding how sound-making and emotional norms became baked into electronic instruments as presets. Take, for example, the Hammond organ (Laurens Hammond, 1929), which became a major preset sound in Stax Records’ bands (such as Booker T. and the MGs) as well as a mellow but no-nonsense sound for solo players like Jimmy Smith. Prior to the Hammond organ, the vacuum tube powered early electronic instruments, including the theremin (Lev Termen, 1924). As in chapter 1’s discussion of binary push buttons, the vacuum tube is an on/off switch to control electron flow—it was a kind of primitive, and much larger, transistor. Its electronic collisions similarly precipitated artistic innovation but in even less predictable ways than the radio’s audio-visions.

Honor thy mistake as a hidden intention

The theremin is notoriously difficult to play: one’s hands invisibly shape voltages into volume and pitch, so that electric signals wail with any sudden movement of the hands. The theremin is key to myths around synthesizer presets—black boxing, otherworldliness, and more—partly because it was invented by accident. In the 1910s and 1920s, Lev Termen (Leon Theremin) was doing research for the Russian government on proximity sensors, or devices for detecting pressure changes amid electromagnetic fields. When he set up two proximity sensors, he realized that moving his hands between the L-shaped antennae produced sound, shaping the electromagnetic field, much like synthesizer knobs control or modulate oscillators (generators of electric currents). Shifting from state surveillance to synthesizer, Termen applied his hobbyist musical knowledge to, in Eno’s and Schmidt’s words, “honor thy mistake as a hidden intention.”

Termen’s happy accident required a demo, both aural and visual, for audiences to understand the instrument’s magic. While the 2020s have theremin influencers like Carolina Eyck, 1920s audiences needed a known artist to debut the theremin.

Enter virtuoso violinist Clara Rockmore, whose musicality and proficiency in playing the stringed instrument created an instrumental precedent for an invisible instrument. While men dominate electronic music, women have long been technicians of sound, albeit behind the scenes. As sociologist Venus Green has researched, telephone companies chose women operators for their supposedly nimble fingers, which also would translate to synth patches and wires.

Rockmore reinterpreted Western art music written for violin, cello, and voice to create the presets of theremin repertoire and standards by which the instrument would be both played and heard. Rockmore “had to make—and then meet—[her] own standards” as well as those of Western art music.¹¹ The commercialization of the theremin by the Radio Corporation of America (RCA), and later, Moog, also made it increasingly approachable. A 1929 RCA advertisement proclaimed it was “the only instrument which may be played without being touched [so that] anyone who can hum or whistle a tune can learn to play.”¹² But the theremin gained ground when it became viable as not just a reproducer of classical music. John Cage complained that the theremin was “capable of a wide variety of sound qualities, obtained by the turning of a dial, [but] Thereminists act as censors, giving the public those sounds they think the public will like [in the form of “masterpieces from the past” . . . instead of] new sound experiences.”¹³ Cage disputed the theremin’s preset use of other acoustic instruments rather than creating new presets. The latter happened when the theremin’s eerie sounds were used in film scoring; in 1931, Dmitri Shostakovich used the theremin to depict a threatening snowstorm in *Odna (Alone, dirs., Grigori Kozintsev and Leonid Trauberg, 1931)*.

By the mid-1940s, the theremin had become a preset sound for the unknown. From its use in several science fiction films like *The Day the Earth Stood Still* (dir., Robert Wise, 1951) and suspense films like *Spellbound* (dir., Alfred Hitchcock, 1945), the theremin has been accepted into a media scoring lexicon of supernatural sound, now known for ghost echoes (Eno and Schmidt) over cellos. Its wail even punctuated pivotal moments in the score to Marvel’s *Loki*. The theremin’s gradual acceptance through visual cues, from the sight of Rockmore’s demos to film and television scoring that matched eerie sounds with eerie images, popularized the invisible instrument.

Rockmore’s demos and the theremin’s sounding of the unknown in certain media genres expose critics’ undercurrent default fears of the “other.” In Rockmore’s 1934 debut, she performed with a sextet of Black male singers (Rockmore, who was white, also toured with Paul Robeson in the 1940s), perhaps chosen to leverage the unfamiliar instrument with the more familiar spiritual. As voice scholars Jordan Hugh Sam and Craig L. Robertson write, Black vocal performance is entangled in “the tension between preserving [spirituals’] traditions and resisting essentialization, the fear that [singers’] Blackness will be confined to performing in a particular genre and vocal style.”¹⁴ The African American weekly newspaper *Amsterdam News* likened the theremin to Black vocal expressivity, but the theremin also was

accompanied by crystallizing notions of Black vocality and technology. Alongside the theremin's "other[ing]" in a specifically white, specifically feminine way," musicologist Kelly Hiser explains, "critics were especially concerned with the theremin's timbre, projecting onto it their hopes and anxieties about the potential impact of technology on their musical world."¹⁵ Another example is the Hammond organ, described by the pipe organ community "as lifeless, jarring, and monotonous," but recodified by African American congregations "as voicelike, expressive, and literally moving."¹⁶ The preset of early electronic instruments as always otherworldly is a shifting signifier across different people, times, and places. While a preset may take root with a default meaning, like the theremin as eerie in science fiction, that meaning can change with different contexts and for different makers and spectators. A preset's supposed sonic "blankness" always can be filled, pushed, and pulled in multiple directions.

Make a blank valuable by putting it in an exquisite frame

In 1956, Bebe and Louis Barron made an all-electronic film soundtrack for *Forbidden Planet*. The Barrons crafted their own electronic circuits, some of which created unpredictable sounds much like the theremin, resulting in a dance where the circuits had more agency than the composers—not unlike the relationship between push-button radios and drivers. To add to this chance experimentation, the couple would overload circuits' voltage and eventually burn them out to create their supernatural sounds, which meant they could not repeat a sound once its corresponding circuit was destroyed. Much like stop-motion animation, where clay or figurines never can be positioned in quite the same way, these circuits were single use: they created iconic sounds but then were irrecoverable. Before patch memory—the computing capability to store and retrieve presets—electronic sounds first were recorded onto magnetic tape and then edited into a composition. These sounds may have been the opposite of presets in storage capabilities, but their memorable nature formed the bedrock of preset sounds to come. By adding special effects of reverb and delay, the Barrons produced an entire ethereal soundscape for the titular forbidden planet. The film's success helped to couple electronic soundscapes with science fiction films going forward. The Oblique Strategy of crafting an exquisite frame, especially for what might be perceived by new audiences as blank or meaningless electronic sound, was valuable currency for fusing electronic instruments and science fiction films.

In expressing unknown entities, electronic sounds were not just suitable for science fiction films but also for horror. Perhaps this is why the American composer Remi Gassmann pitched Alfred Hitchcock the idea of using electronic music as "a new dimension in film production."¹⁷ Electronic music was also economically and logistically sound. Hitchcock could maintain his infamous auteur control by making a sound script—"to describe a sound effect accurately," Hitchcock said, "one has to imagine its equivalent in dialogue"—noting his desired "style and the nature of each

sound” in every reel and then having a musician reproduce it.¹⁸ In Hitchcock’s horror film *The Birds* (1963), the Mixtur-Trautonium instrument made not only music but also voices and animal sounds. Invented by Friedrich Trautwein around 1930, the Trautonium added oscillators and filters to the theremin and ondes martenot (Maurice Martenot, 1928). Trautonium players moved their hands on a single wire stretched over a metal plate to make sound. Trautwein designed the Trautonium to parallel human speech production, generating unique timbres that are analogous to mouth shapes that produce vowels, or formants. In a 1986 demo, musician Oskar Sala, who performed for *The Birds* in consultation with Hitchcock, demonstrated formants by tapping on his hollowed cheeks as he pronounced different vowels.¹⁹ The formants were presets for many sounds suited for film scoring, from sounding like acoustic instruments to mimicking speech, all varied with oscillators and noise generators. Thus, when Hitchcock wrote a sound effect like dialogue, Sala played the film reel while marking his sound script and used formants as presets to create exquisite frames around moldable electronic sound.

Experimentation became the default of the Trautonium, and the score to *The Birds*, like the Barrons’ for *Forbidden Planet*, used electronic music as the ground for which any sound could emerge. *The Birds* has classical Hollywood underscoring, bird screeches, and even what sounds like the voice of the protagonist, Melanie (played by Tippi Hedren), in a late scene of an attic bird attack. Composing a score entirely on one instrument enabled Sala to finish in mere weeks and to add any sound that was needed, even an approximation of human voices. But science fiction films that showcased theremins as expressions of the supernatural in media created a future where electronic sounds would become exquisitely framed presets for faster, cheaper, and wider possibilities for media scoring and cultural movements. Even though the Trautonium was short-lived, its uses from Nazi-funded modernist music to film scoring reveal notorious political and aesthetic variance before it was eclipsed by instruments that demanded less specialized training from their players.²⁰ As with the theremin, the Trautonium’s haptic flexibility of tone production loosened the constraints of contemporaneous acoustic instruments, ideal for shaping blanks into exquisite frames.

WOMEN, DEMOS, AND ELECTRONIC PRESETS

Bridges -build -burn

It was only by the end of the early 1960s that entertainment audiences recognized electronic sound more as music than noise. As sound studies scholars have noted, an enduring hierarchy of aesthetic perception regards music as pure and appreciated, then sound as largely ignored, then noise as discordantly irritating. It took decades for electronic proto-presets to be counted as music, not merely as technological shorthand. The Barrons were not even credited as musicians in *Forbidden Planet* but as designers of “electronic tonalities,” despite the hard work of burning

out circuits.²¹ Given this lack of credit, musicians' charges of using synth and sampling presets as "lazy" or "not music" has a long history. But as the Barrons and Sala showed, proto-preset work was uncompromising, laborious, and often uncredited because it was not considered music.

The *Doctor Who* (1963–89, 1996, 2004–) theme, iconic for its probing, siren-like sounds, similarly is only attributed to Delia Derbyshire through cultural memory, since the BBC Radiophonic Workshop kept her name anonymous. As musicologist Louis Niebur recounts, Derbyshire's radio and television scoring is "almost completely unacknowledged" despite the fact that she rendered composer Ron Grainer's *Doctor Who* theme into electronic timbres that "put the Radiophonic Workshop on the map, achieving a cross-over success between the esoteric 'scientific' art music world and a sputnik-era populist fascination with futuristic electronic sound."²² The BBC Radiophonic Workshop, established in 1958 by fellow woman in electronic music Daphne Oram (along with Desmond Briscoe), initially created abstract sounds for radio programming but soon generated soundscapes for television too. Derbyshire worked in the studio beginning in 1963, the same year she made the *Doctor Who* theme. Each sound was handcrafted in postproduction, not in a live performance, and, as with many pre-polyphonic synthesizer electronic media scores discussed in this chapter, had to be recorded onto tape and spliced together.

Derbyshire's recordings of test-tone oscillators not only sounded otherworldly—the default connotation gained through electronic instrument media scoring—but also had a real-world referent. Growing up in the city of Coventry, which was heavily bombed during WWII, Derbyshire attributed her "love for abstract sounds [. . . to] the air-raid sirens. And the sound of the all-clear: that was electronic music." She continued, "I was moved to Preston. The sounds of clogs on cobbles must have been a big influence—that percussive sound of all the mill workers going to work at six in the morning."²³ Derbyshire took preset sounds from the world around her, from bomb sirens to everyday sounds, to realize Grainer's instructions (much like Sala realized Hitchcock's notes), which had labels like "swoops" and "wind bubble." As *Doctor Who* composer Murray Gold remembers, "She was really uncompromising as an artist. [. . .] You don't even get that in rock'n'roll."²⁴

Derbyshire's unwavering artistry shines in a 1965 demonstration on the BBC program *Tomorrow's World*. Two years after she created the *Doctor Who* theme, she is eminently comfortable operating the abstract buttons and knobs and translating them for audiences. But this job was hard-won; she wanted to work in sound engineering for years and had studied music and math at the University of Cambridge, but she was refused employment at Decca Records because recording studios did not hire women. In the midcentury, few women worked in sound production, excepting Barron, Oram, and the demonstrators of electronic music (but, of course, they did not hold the title of engineer). And that bias tinged Derbyshire's

BBC demonstration and can still be seen now in online forums with nasty comments about her teeth.²⁵ Reddit and Gearspace (formerly known as Gearsutz, which music scholars Eliot Bates and Samantha Bennett have shown to be a place where men often fetishize and feminize music technology²⁶) users have mocked Derbyshire's teeth, engaging in the common phenomenon of criticizing women's appearances over lauding their clear expertise as artists.

In Derbyshire's demo, the creators positioned her as a transparent mediator of the *Doctor Who* theme, much like the BBC Radiophonic Workshop all but erased her contribution. The demo is a rare exception to her going uncredited, but it matters that the demo was met with such gendered reception still today, and that much of the work she had to do in the demo was to translate this unknown technology for lay audiences. That is, of course, the work of most demos, from political to product, as sociologist Claude Rosental argues: "The point is to bring something into the presence of a public: an exceptional phenomenon, a device in action, or a capability, something that is presumed to be not obvious at first glance, something abstract if not intangible."²⁷ The purpose of Derbyshire's demo, as well as Rockmore's for the theremin, was to make intangible qualities of music, and likely never-before-seen (or even heard) electronic instruments, tangible.

Derbyshire is seen as a mediator of the technology through her dial work: she calibrates knobs and buttons to the sounds she desires to demonstrate and shows off the instrument as clearly as possible to her audience. To make those sounds familiar, she also uses the dials of the oscilloscope, a device that is a close cousin of electrocardiogram (EKG) machines that monitor heartbeats. Like EKGs image the heart's electrical pulses, the oscilloscope displays electrical sound signals in a similar way to the sound waves that are imaged on a digital audio workstation (figure 8). The oscilloscope visualizes sonic oscillations in analogous shapes. The taller a wave is on the screen, the more amplitude, or volume/loudness, it has. The distance between waves represents pitch; when they are closer together, the pitch of the sound is higher. And the curves of these waves denote timbral and textural qualities of sound: the oscilloscope shows changes of phase on an x/y axis, which the ear cannot hear. But we can derive frequency from those phase changes, which the ear can convert into pitch. This virtual process of visualizing sound produces recognizable shapes out of an instrument most audiences have never heard before. It is a machine of analogies, much like oscillations help us think in analogies beyond sound, where "oscillations of electric and magnetic fields enable radio waves, x-rays, visible light and the rest of the waves found across the Electromagnetic Spectrum."²⁸ Oscillators are the sound sources of analog synthesizers, allowing users to control the frequency/pitch by dialing the voltage up or down. Voltage control also creates different waveform shapes that are crucial timbres in music-making.

In the demo, Derbyshire demonstrates the sonic building blocks of electronic music—sine wave, square wave, and white noise. These sound waves have



FIGURE 8. An oscilloscope hooked up to a synthesizer. Photograph by Lauri Rantala / wstryder, Flickr, licensed under CC BY 2.0.

corresponding shapes. For example, Derbyshire explains that square waves' box-like edges come from high harmonics, or vibrations that accompany a pitch. She also shows how she made tape loops by recording electronic as well as acoustic instruments and found sounds on pieces of tape and then running them through the tape machine at different speeds to achieve varied pitch. (This is related to a technique called *varispeed* used by the Beatles and Alvin and the Chipmunks, discussed in chapter 4.)

In the demo's interplay of synths and magnetic tape, Derbyshire's hand is at the center. As artist-scholar Aura Satz, who showcases women in electronic music through the literal presence of their hands on instruments, writes, "The hand on the frequency dial of an electronic synth is interpreted as a radical gesture of feminist instantiation, inventing new soundscapes, and, in turn, new ways of listening. The dial becomes an emblem for recalibration, an indicator of the micro-perceptual

act of sound-making and fine-tuned listening.”²⁹ Satz puts her finger on the enormous labor required to move dials and sounds—a wider gradient than push-button radio. In one of the demo’s most wondrous parts, Derbyshire syncs tape machines, which demands fine-tuned timing and precision. Derbyshire shows us the key ingredients of a pre-synthesizer preset: recording a particular timbre from sound generators onto magnetic tape, cutting that tape, and splicing and storing it as a loop—a physical piece of tape that is repeatable in playback.

But the wonder of Derbyshire crafting sounds that later would be codified in presets is overshadowed by her being the only woman in the studio on this segment; the program presents men as default music-makers. A mere five years later, a demo by Wendy Carlos would further question the male genius complex in electronic music.³⁰ These women were not just building a new sonic language that would create commonly used presets in music and media. They also were defying the defaults of hegemonic art-making and culture.

A line has two sides

Derbyshire’s oscilloscope use may recall Rockmore’s debut of the theremin with images of violin playing conjured by the virtuoso, as a classical and instrumental precedent for the invisible instrument. But besides the technology, critics both contemporaneous and contemporary were wary, as Hiser observed, that feminized bodies could be in control of new technologies for art- and sense-making. In this context, criticisms of Derbyshire’s teeth seemed like attempts to control the default body of electronic music-making or experiments with new technology as white, male, cis, and able-bodied. Wendy Carlos, a trans electronic musician responsible for making the synthesizer a household name, grappled with this default in more ways than crowd stigma.

My purpose here is not to discuss gender essentialisms and Carlos’s trans identity, as she has stated her wishes against such discussions of her work.³¹ Rather, I focus on her experimentation and demos that developed presets and also broke the established defaults of modernist/avant-garde music and men as the only musical innovators at the time. Like composer-scholar Jack Dubowsky, I argue that Carlos must have a rightful place in synthesizer history as a composer in her own right, amid the backdrop of such professional defaults and cultural defaults, especially transphobia, she endured. Facing the gendered status quo of the recording industry, Carlos made the Moog synthesizer a household name with her release of the album *Switched-On Bach* (hereafter *S-OB*) in 1968. But it was particularly the two BBC demos she did in 1970 and 1989 that put on screen her immense behind-the-scenes labor with the synthesizer on the album. Out of respect for Carlos’s privacy and right to control her image and representation, I focus on the creation of proto-presets in her demos and the defaults she defies in them.

As feminist music scholars like Rodgers have shown, women in electronic music are overshadowed by white middle-class male tinkerers. Recent efforts to

redress this history include the 2020 documentary *Sisters with Transistors*, where Lisa Rovner highlights women from Clara Rockmore to Pauline Oliveros as revolutionaries in electronic music. But Rovner glosses over Carlos in this story, merely using early BBC demo footage to paint Carlos as a recluse and ignoring the challenges of being trans in 1960s America. While *S-OB* topped the classical charts, Carlos appeared little during the following decade. She grew increasingly uncomfortable performing masculinity out of a default necessity to promote her music because she had not yet transitioned publicly. After a 1970 live performance with the St. Louis Symphony, Carlos refused to subject herself to this trauma again. She released albums from her studio and scored two Stanley Kubrick films, *A Clockwork Orange* (1971) and *The Shining* (1980), though she had to bend to Kubrick's intense infatuations with preexisting music rather than compose her own score, and told Moog that "it was very disappointing that [Kubrick] could not get past his old way of working."³² Carlos and her collaborator Rachel Elkind, a sound engineer and jazz singer, spent two years working for few royalties given how little of their score Kubrick used. As Carlos told LGBTQ+ activist Arthur Bell (over tapes that he then published without explicit permission in *Playboy* in 1979), "The fact that I couldn't perform publicly stifled me. I lost a decade as an artist. I was unable to communicate with other musicians. There was no feedback."³³ But Bell stressed her transition over her skills as a musician, failing like Rovner's film did to redress the discrimination that forced Carlos's reclusion. Carlos wished to be accepted as the skilled composer she was instead of being perceived as at fault with the default.

Moreover, music scholars like Pinch and Trocco emphasize the sounds that Carlos made over *how* she performed as an artist. As media historians Kate Lacey and Michele Hilmes have observed, women's bodies often are reduced to symbols and "their voices, words, and soundmaking have often been muted or marginalized at best, and censored or silenced at worst."³⁴ Much as Derbyshire's teeth brought discriminatory stereotyping, Carlos faced social pressure to conform to electronic music's male-dominated scene—a scene that clung to musical vocabularies like serialism that Carlos, even despite having parallel interests in physics and math that informed serial tone rows, rejected in favor of melodic-driven textures and layered voices in music. As Carlos said, academics "turned their backs on an awful lot of the best parts of music and taught us to purge them from our music, too. [. . .] Not unlike how prejudice operates—racism, sexism: with an obliviousness and perpetual denial that anything 'unreasonable' is in effect; 'who, me?!' It's seldom conscious—but subtle, over time, signaled by exclusion and casual presumptuous [*sic*]."³⁵ Carlos describes the contemporaneous default of musical innovation, which, for some institutions, still holds true. Dubowsky argues that Carlos thought the standard sonic language "tended to 'mask' composers' personalities, as it prevented them from writing other types of music."³⁶ As musicologist Nadine Hubbs has argued, composers' incapacity for self-expression in music often stems from oppressive systems wrought by heteropatriarchal norms. So, too,

were the politics of visibility to which Carlos had to adhere, which have obscured full acknowledgement of her work.

As the foundation to her work, Carlos's interdisciplinary education—an undergraduate hybrid major in music and physics at Brown University, and an master of arts in music composition at Columbia University, plus a job editing tape and engineering recordings at Gotham Recording Studios—gave her the skills, discipline, and funds to operate and purchase her own gear. Her work introduced her to Bob Moog, and in 1966, she bought her first Moog synthesizer, installed by Moog himself. With her math and physics background, she deeply understood how the synthesizer worked, to the point of problem-solving several aspects for and with Moog. When she explained the Moog in a 1970 BBC demo, she was not simply a “technological exhibitionist,” a term coined by Bates and Bennett. Technological exhibitionism describes “the excessive staging of gear conflating technology, history, display, and public access that when combined invites and facilitates primarily male socialization. There is often, but not always, some effort to canonize technologies at play, too.”³⁷ Carlos helped canonize this new technology, but she did so from a deep knowledge of how to shape every note. This kind of nuanced labor and expertise has not been the main commodity appreciated in recent gear demos on channels such as YouTube and Gearspace. As Bates and Bennett further explain, “Technological exhibitionism transposes the male gaze onto gear and projects masculinist fantasies on both the look and/or feel of technological objects. It might be individual, or it might be social. It is most often found constructed in professional domains for aspirational consumption by amateur and semiprofessional agents.”³⁸ In the 1960s, electronic music was dominated by cishet white men, a backdrop Carlos negotiated with audiovisual demonstration.

After *S-OB*'s 1968 release and the follow-up *The Well-Tempered Synthesizer* in 1969, Carlos appeared in a “Music Now” segment that aired on the BBC in 1970. Since Carlos's sound engineering was so intricate on *S-OB*, it could not be reproduced live, but demos allowed her to show her prowess as well as her process. In this demo and others, she explained how to create one's desired sounds. Like Derbyshire, she told audiences the building blocks of sounds and the ways they can combine. She also demonstrated multitracking on tape machines. Even though Carlos quickly threaded patch cords to make extraordinarily distinct sounds, it was impossible to place patches at Bach's breakneck speeds, so *S-OB* had to be built one note at a time.

Carlos's demos showcase open curiosity as a way to approach an “unknowable” instrument and what she crafted as proto-presets—to find the variables of knowability but also to embrace the unknowability of an interface. As she explained, “What would it sound like if? I ask ‘if’ myself all the time, for example, when trying alternative tunings and new timbres and synthesized hybrid instruments.”³⁹ Curiosity created new sonic scripts. Carlos had clear arguments for advancing the synthesizer beyond the baseline set for its electronic instrument predecessors of

reproducing Western art music. While she first landed on the classical musical charts, she also opened up the possibilities for the synth as a tool for avant-garde musicians, rock musicians like the Beatles, film composers, and more. In a key contribution to synth presets' use in these contexts, Carlos showed that electronic music could exceed replicating a flute or oboe and create "a range of sounds that lie outside of simple binary categorizations," as Dubowsky writes. "It would be possible to create a sound that is neither flute nor oboe, but imitates qualities of both, or lies somewhere between the two; the Moog itself might even encourage the user to experiment with such liminal sounds. The Moog can thusly be seen as a movement away from the rigid categorizations of traditional instrumentation."⁴⁰ Carlos worked to make the Moog produce the timbres and textures she desired, suggesting hardware to add to the synth and helping Moog implement it. She laid important ground for presets to take shape, expanding the legion of available sounds. As she told Moog in a *Keyboard* interview, "I think people ought to know more of what's happening in the hardware, and where the tradeoffs are. This is the same old line that I've been famous for in the past. I always want to peek and see how the magic trick is done. But I think that's fair, because musicians are magicians. Our shop talk ought to be about how the illusion is produced, with no holds barred."⁴¹ Beyond exposing a synth's hidden mechanics, she also helped introduce its name, which was difficult to pronounce for some; producers cautioned Carlos against using "synthesizer" when promoting *S-OB*.⁴² But Carlos deftly explained complex terms and concepts in her work as a performer, technician, and demonstrator.

In the 1970 demo, Carlos translated an immensely intricate instrument into concrete depictions that visualized her innovations in sound. Carlos had an eye and ear for music engineering that was ideal to translate this instrument for the public. Certain touches made this demo eminently accessible, from a doll perched on a speaker near the synthesizer to her oscilloscope use. As Derbyshire demonstrated, the oscilloscope's wave transcriptions encourage a more visual understanding of music in its analogies from voltage/electrical signals to sound waves, from the gentle, fluty sine waves to the buzzier sawtooth. Carlos's handling of the oscillators, knobs, patches, audio generators, and more engages a tactile sense of timing and virtuosity. But at the root of the synthesizer's manipulations is a third space for sound, heard and interpreted somewhere in between electronic signal and sound. As sound scholar Roshanak Kheshti explains, Moog players can "feel sound waves—both literally as vibrations moving against and through [the] body and as a transmission of electronic affect."⁴³ The oscilloscope thus helps us to see Carlos's operations of the synth not as ethereal but as a concrete sounding board for millions of new ideas in sound.

Like the oscilloscope, Carlos visualized sound from early on out of necessity. She was born in 1939 to a working-class family that could not afford a piano but wanted her to take lessons. Her father drew a keyboard on paper, so she had to use her imagination to make the 2D instrument 3D as well as sonic. As

with Rockmore and the theremin, Carlos had to relate to an abstract instrument in an embodied way. The oscilloscope helps us see how tightly Carlos and the synthesizer are linked in her decisions, touches, and expressions. The wavering lines that result are not just representations of pitch but also of how Carlos relates to the instrument, to binaries and muddled middles between sight and sound and gendered defaults.

The term “wavering line” comes from trans scholar Eliza Steinbock, who follows Susan Stryker’s call to critique “the conditions that cause transgender phenomena to stand out [. . .] and that allow gender [or sex] normativity to disappear into the unanalyzed, ambient background.” As Steinbock insists, the conditions of the background must be analyzed for why transness becomes foregrounded. For Steinbock, transness oscillates between foreground and background, heard and seen in fluctuating relationality and embodiment as opposed to “a selfhood [. . .] entirely ensnared in pressed out, imaged figural forms”—or representational defaults. While Steinbock does not theorize the auditory explicitly, they ask, “What if we skipped asking what trans looks like, to consider what trans sounds like, or texturally feels like?”⁴⁴

Steinbock’s method can be joined with sound studies, through Nina Sun Eidsheim’s theory that listeners judge what they hear according to culturally coded figures of sound. The figure of sound abstracts sensory and physical aspects of sounds and restricts their meanings to hegemonic value judgments. One example is the Western classical music adherence to A=440 Hz, the standard pitch the oboe plays to tune the orchestra, which is a “culturally derived” yardstick that makes instruments in or out of tune.⁴⁵ The oscilloscope also is in danger of figure of sound—like abstractions. Its wavering lines denote frequency, an objectifying measure of sound—being in tune, which occurs in a similarly preset way when listeners classify sounds made by others as gendered, raced, classed, or sexualized. As Eidsheim writes, “A culturally derived system of race renders a given vibrational field attached to a person as a *white voice*, a *black voice*—that is, ‘in tune’ with expected correlations between skin color and vocal timbre.”⁴⁶ Following Eidsheim, if we take the oscilloscope waves in Carlos’s demo at face value, we may think the synthesizer only produces a few different shapes of sounds.

But the demo’s shots of sawtooth and triangle waves on the oscilloscope translate Carlos’s sounds into recognizable shapes for new listeners, which form a visual episteme in recording history. In *The Sonic Episteme*, Robin James analyzes neoliberal uses of “resonance” that govern who can gain power from the sonic episteme, such as a company that runs on vibes. Similarly, the visual episteme of the oscilloscope’s shapes make electronic music accessible but within a limited range of representation that hews to ways serialist composers like Karlheinz Stockhausen perceived early synthesizers as almost scientific instruments of precision for controlling sound—and as controlled by cishet white men. Carlos’s demo defied defaults from midcentury paradigms for modernist musical composition to

knowability and narrow conceptions of presets, instead making room for accessibility, curiosity, and wonder.

The oscilloscope's wavering line provides a metaphor for the critics and record label that forced Carlos to conform to the visual iconicity of a male synth master. The oscilloscope's oscillations between foreground and background offer an alternative to dominant figures of sound in the foreground. As Eno and Schmidt phrase the oblique strategy, "A line has two sides." This model of the wavering line tunes in to the many decisions that a synth artist makes with their hands to alter tone, texture, and timing. Musicologist Judith A. Peraino describes culture itself as "a synthesizer, patching together sonic, visual, and behavioral signals to form identity categories, sometimes allowing for deviant combinations."⁴⁷ Extending Peraino's metaphor to the oscilloscope, Carlos used it to make waves in "objective" worldviews of electronic music's boys' clubs and anti-trans societies. The oscilloscope's wavering line is one that Carlos both created and walked herself, including its muddy middle.

The oscilloscope also urges attention to how much image and sound must be taken together in preset studies and popular music studies—in both, audiovisuality is a default mode of production and reception. Looking and listening closely to the demo shows Carlos's labor and virtuosity in both foreground and background. As critic Sasha Geffen observes, "While Carlos was busy training her monophonic synthesizers to articulate new sounds one painstaking note at a time, she was also working to articulate her own embodiment in the world."⁴⁸ In 1979, Carlos said, "I make electronic music [. . .] the way the Walt Disney studio made its animated motion pictures. I construct in sound what Disney did in visuals. He worked frame by frame, drawing by drawing. The synthesizer is a one-note instrument and, consequently, I work note by note, color by color. Disney used special optical processes to give depth and perspective to his drawings. I also work with foreground elements overlaying background elements."⁴⁹ Dubowsky describes Carlos's use of sounds as somewhere in between two established sounds, as Carlos works in layers—mechanically, with presets she creates on the oscilloscope and tape, and metaphorically, to cast presets as in between so-called known sounds. Through the mechanics and metaphors of Carlos's wavering lines, a preset becomes layered until one must strain to hear it as that bespoke preset anymore. These recontextualized layers are also produced in the technique known as "Frippertronics" by Brian Eno and collaborator Robert Fripp. In Frippertronics, a gradually decaying tape loop results from recording on one tape machine and then playing that recording on a second tape machine, then back again, ad nauseam. Repetition and context set these presets' tones for how they might be recontextualized by artists and listeners.

Carlos noted the complex interplay of preset and artist. For her, the Moog synthesizer "was just a collection of fairly limited sounds extrapolated from what had been available in the 50s, put together in one extremely nice package with

a nice consistent interface and a keyboard. [. . .] The rest had to come from you and your own background and other pieces of equipment. [. . .] Today things are so different.”⁵⁰ Much has changed between synthesizers’ manual playing and automaticity—predominantly, preset play. Carlos’s painstaking layering of tracks on *S-OB* constantly negotiates a “real” preset sound instrument (in the sense of flattening an oboe’s rich array of sounds to a film organ stop) to new horizons for imagined sounds on instruments. For example, Carlos’s friend, the composer Laurie Spiegel, worked at Bell Labs making computer musical instruments. In 1986, she created the Music Mouse program for Macintosh that mapped music on grids by manually pushing notes up and down with computer keys and algorithmically adding harmonies. For Spiegel, algorithms are “descriptions of musical procedures encoded in logic, of process descriptions written in artificial languages as instructions that machines can follow,” which make a system of roving rules for composition that often produces happy accidents: automation as innovation.⁵¹ In 2026, Eventide Audio and Spiegel reintroduced the software as a cursor-driven system that increases haptic controls and also adds synth presets—increasing its preprogrammed possibilities.⁵² While the ways Spiegel plots sound on computers differ greatly from Carlos’s manual layering, Carlos’s formation of new sounds also derives from experimenting with planes of background and foreground—or, read through preset terms, default and innovation, which can coexist in productive ways, as shown in Carlos’s second BBC demo.

In 1989 on the BBC Two science program *Horizon*, Carlos patiently took viewers through sonic transformations by beginning with the building blocks of waves (sine, square, sawtooth, etc.) and then used patch cords, switches, and dials to filter those fundamental frequencies in different ways. She demonstrated how a tone simultaneously can be a default as well as altered, gaining new tone colors from manipulations of dials and switches that acoustically affect frequencies to present different timbres within a given pitch. In the demo, Carlos says, “We passed these bright waves into a filter which in this case literally like your tone controls in a hi-fi set literally remove portions or boost portions of the sound. We can make it sound very dull . . . quite pure . . . or very bright, and you can do this dynamically in time.”⁵³ As with the 1970 demo, Carlos is extremely effective at boiling down complex phenomena into a familiar analogy. She describes the layered ways in which she alters preset sounds in very concrete, understandable terms for lay audiences.

Approximately two decades after her first demo, when consumers were just discovering the synthesizer, Carlos was seen and heard in the 1989 demo in the roles of composer, instrument performer and builder, engineer, and more. Using a digital synthesizer, she explained how to create a xylophone sound by layering harmonic sequences of the same notes, replicating the overtones of an acoustic xylophone. But that preset sound was not quite a dupe, so Carlos added “a bit of

noise” and marveled at the digital synthesizer’s capacity to produce this xylophone sound. She showed how preset sounds can create radically different worlds, given even minute adjustments of tuning, timbre, contexts, and more.

By explaining new technologies with concrete use cases and curiosity, Carlos’s demos reveal her enormous talent to break down difficult concepts to introduce innovative methods of music-making to the world. Her explanations make the synthesizer more accessible and material by using visual analogies that involve virtuosic performance. Carlos artfully walked the line of foreground and background in electronic music, both sonically and visually. She shaped each note from beginning to end, attack to decay, to articulate sounds as lived corporeal reality. Each was a journey, much like her own, of an empowering wavering line to create instrumental presets.

Mechanicalize something idiosyncratic

Between Carlos’s demos was a 1980 landmark synth demo by Suzanne Ciani, who was called “America’s first synth hero” even though she rose to fame a decade after Carlos. By 1980, when Ciani appeared on *The David Letterman Show*, the synthesizer did not have to be introduced as a brand-new instrument but could garner an American hero. This begs the question: Do both electronic and pop music desire cover girls, as in cases like Clara Rockmore serving as Termen’s muse? Ciani’s demonstration of the Prophet-5 synthesizer at times wowed Letterman, but mostly provoked extremely gendered treatment toward her.

At the beginning of the segment, Letterman used cue cards to introduce Ciani as an “electronic wizard” and said she has “won award after award” while getting distracted by Ciani’s manipulated microphone that she dubbed “a voice box,” which pitches up and distorts (it contains a vocoder) their voices as they talk. Letterman says, “This looks like a normal keyboard and then all of this other stuff appears to be computers.” Ciani shrugs off that reduction by introducing the synthesizer as a Prophet-5 (an analog synth with full preset memory) and explains what is in the voice box, and Letterman says, “That means nothing to me.” He performs in the mode of a self-reflexive talk show host, but it does not come off as charming, nor does it facilitate a platform for the audience’s discovery of the guest’s skills, especially when he says, “You’re going to demonstrate right now” in a throwaway tone. Ciani fearlessly takes the mic and changes the pitch and distortion to sound gendered in different ways, ending up with a little girl voice that she has Letterman speak with as well. Displeased with sounding infantile, Letterman quips, “A couple hundred dollars so you can sound stupid in your own home. It’s an unbelievable breakthrough in electronics.” He brings up capital as if it is the only possible application of the voice-modulation equipment (see chapter 4 for discussions of gimmickry and voice manipulation). He stands extremely close to Ciani and says:

Letterman: Make the thing make noises for us. Why do you have this stuff?

Ciani: Well, this is how I make a living.

Letterman: You don't go door-to-door saying, "I'll make you sound goofy."

Ciani: No, they call me.⁵⁴

Ciani's glib retort might hint that she knows Letterman is trying to make light of her exploration of electronic sounds. But she puts his remarks in their place by expressing her expertise. Ciani explains the range of sounds she uses for television commercials, which founded her career. She brings her own personality to the demo, not quite boiling down the building blocks of sounds like Derbyshire and Carlos did but still distilling complex synthesis into familiar sounds that Letterman's audiences may have heard, including what she calls "PBS-type sounds." She demonstrates the oblique strategy "mechanicalize something idiosyncratic."

Ciani's mechanicalized preset of something idiosyncratic "sounds like the whole studio's going to explode," in Letterman's words. When Ciani presses a key that delivers Letterman's desired sound, her rapid reaction shows immediate recall of the preset she designed, which is instantly familiar but also layered and complex. The sound he was referring to is the THX sound. Ciani did not design it (James "Andy" Moorer did) but could instantly replicate it. Letterman seems to pick up on her dexterity on the instrument, yet he asks, "Are all of these sounds prerecorded or made right there?" She merely presses a key in response, and he immediately launches into a playful "Why I oughta . . ." She laughs charitably, the whole time playing along, but his impression of Ralph from *The Honeymooners* only further locks her into the gendered role of the annoying wife.⁵⁵

As journalist Kate Hutchinson summarized Ciani's demo, "Her live television performance, to an incredulous-looking David Letterman, in 1980, underlines how, even then, [. . .] her talents were seen as bizarre. 'Nobody even understood that the sound was coming out of the machine, it just didn't compute,' [Ciani] says. 'It was so unknown that the connection couldn't be made.'" ⁵⁶ But Ciani fought that human-versus-machine bias long before Letterman because she had played an even lesser-known instrument for decades—the Buchla, the Moog's main competitor, which has been overshadowed by the Moog due to path dependence: Moog's addition of a keyboard to the synthesizer in its nascence created a public perception of the synthesizer as being a closer relative to the piano than to polymorphous circuits. For Don Buchla, inventor of the Buchla synthesizer that long lacked a keyboard, "If you go into a retail store and say I want to see some electronic instruments, they'll send you to the keyboard department, because a synthesizer is a keyboard instrument by default."⁵⁷ That default is a default for a reason, as synthesizers caught on when the Moog, which also did not originate with a keyboard, added one for familiarity and marketability. Keyboards soon became standard on synths because of this economic and developmental path. Ciani's career also involved path dependence—as a graduate student at Mills

College at the University of California, Berkeley, she met Buchla, who hired her to solder modules. But as the sole woman in the room, Ciani labored to even participate in a male-dominated synth world.

Ciani asked Buchla to teach her how to play synthesizers because she saw potential in working autonomously from the male-dominated electronic music world Carlos also endured. One day, while using the women's restroom at UC Berkeley, Ciani realized: "Oh my gosh; with electronic music I'm in control. I can create the pieces and there's nothing between me and hearing it. I don't have to solicit an orchestra or try to get somebody interested in my music so that I can hear it."⁵⁸ Yet Ciani was still controlled as a Buchla cover girl who needed to differentiate the keyboardless Buchla from the Moog synth: "I was proselytized by Don Buchla, and I was aware of the danger of perception. [. . .] I wanted to communicate his vision, I didn't want to confuse anybody, so I didn't touch a piano [for] ten years [despite playing since childhood], there's no picture of me playing a keyboard."⁵⁹ Given that Ciani did not work with what a synthesizer has defaulted to today, how did she create presets on a more amorphous instrument than the Moog, one favored for avant-garde composition over classical arrangements and rock groups, as Gordon has argued?⁶⁰ When Ciani moved to New York to meet with record companies, they were unfamiliar with the Buchla, given the Moog's—and keyboard's—dominance. As Ciani recalls, music executives wondered where her band was. "They said, 'Why don't you sing?'; 'Where's the guitar?'; 'You're a girl', you know, 'You must sing'. There was no opening for it, and that's how I got into commercials."⁶¹ Such gendered treatment by Letterman and others forced Ciani to forge a nonstandard path. But the chance meeting of the Buchla and commercials created unexpected presets that would reinvent the cultural default of women in marginalized positions in bands (largely not there at all), merely seen as singers, not instrumentalists—a formulation that has been much discussed in popular music studies.⁶² The Buchla gave Ciani the ability to work autonomously, which then allowed her to be successful with the Buchla. Ciani then was able to contextualize the ephemeral Buchla within realms of even more popular media than the Billboard classical charts: commercials.

In the late 1970s, Ciani was living gig to gig in New York City until she came up with the Coca-Cola sound. The sound of electronic bubbles, followed by her voice saying, "Coca Cola pop and pour," was her major breakthrough in not only commercial spaces but also for compositional sound design. Yet she developed the sound in minutes, after making a meeting happen that had been previously canceled three times by Billy Davis, a Motown record executive who was working on the Coca-Cola radio spot when Ciani visited him. Ciani later reported that she wanted to create "a sound that doesn't have a key center, and the idea of the bubbles came to me because they're musical but they're not pitch-centered. [. . .] I made the fizz, and that was just frequency modulating white noise. You know, the Buchla is so adaptive to sound design."⁶³ Like Carlos, Ciani breaks down complex

sonic processing for lay audiences. But Ciani is also frank about the motivation behind her malleable programming: earning capital, as Letterman alluded to. As Ciani wrote in a 2016 Gearspace forum, “My brain calculated that if I did something that had no pitch center, it could possibly work in any number of musical situations and keys [. . .] thus resulting in more residuals.”⁶⁴ Ciani created distinctive presets that would be malleable for multiple uses, the very definition of “mechanicalize something idiosyncratic.” She was already thinking like a library music or jingle composer, of how one preset sound could fit many use-cases, especially for optimizing capital.⁶⁵

Ciani’s mechanicalize-something-idiosyncratic design not only capitalizes on sonic blankness to create a temporally and contextually mobile frame, but the jingle also works because it is still heard as innovative. The Coca-Cola jingle reaches back to the first principles of sound design. As Ciani reflected on sound design in the 1970s, “If you recorded someone biting into a potato chip, it was dull, boring and flaccid. If I made a potato chip sound, it included several evolutions of the bite and also the sound of the salt spraying . . . it was poetry . . . it was heightened reality . . . [. . .] a created sound could operate on many more levels than a ‘real’ sound . . . you could tune snowflakes, you could sing like a fur coat . . . it was poetry.”⁶⁶ Ciani, like Carlos, layered sounds to give them concrete appeal. In this way, what may strike the ear as experimental or avant-garde maintains a pop bent because it has thoroughly suffused popular culture. And in 2026, Coca-Cola is still incorporating elements of Ciani’s experimental jingle. In a Coke Zero Sugar commercial I saw in 2025 in the jury duty waiting room, “symphony of bubbles” was the label for a portrayal of Coke as an ocean. As of 2026, Ciani is still performing and is also known for her film scoring, finally receiving credit as a woman composer for a major Hollywood film, Lily Tomlin’s comedic science fiction film *The Incredible Shrinking Woman* in 1981. In film scoring, Ciani applied the same knowledge of creating malleable presets but distinguished herself from the stereotypical library music scoring discussed in the introduction by eschewing what she called “this preoccupation with copying existing timbres.”⁶⁷ Ciani neatly summarizes her interest in creating new sounds that could become malleable for many use-cases—never-before-heard sounds could have exquisite frames.

Ciani loved demonstrating and creating electronic music despite and because of its complexities and the defaults of electronic music boys’ clubs. As she said of the former, “It’s complex to perform [the Buchla] live. Is there ever a perfect performance? No. But it’s not like I don’t know what’s going to happen when I plug this sequencer into this oscillator. And you *have* to know, because if you don’t have an expectation, you can’t control it. You’ve got to constantly be setting the parameters that you want.”⁶⁸ These words echo that seemingly quotidian moment in the UC Berkeley bathroom that changed the course of her life as an independent woman in electronic music. As writer-producer Hanna Bächer analyzed Ciani’s 1980 Letterman demo, she saw “two things. A) how new this was for [Letterman],

and B) him being almost insecure, surprised, or, you know, just not used to standing next to a woman who is doing technology, and who knew technology a lot better than him. [. . .] How was that for you, being the only woman in the room with the machines?” Ciani replied: “I was lucky that I was doing something that nobody understood. You know? That definitely gave me the edge. [. . .] I think it worked for me as a woman because [. . .] there weren’t even any guys doing this, really [. . . and] being unusual, gave me visibility, but even that wasn’t enough to change the gears of the music business in any way. We’re still in the process of changing those gears a little bit.”⁶⁹ Even while Ciani was inventing new gears, she had to grind down old ones. Her demonstrations as well as her presets would create new industry baselines, but they involved complex layers of avant-garde and pop techniques, as well as those of default cultural expectations and setting new ones. Derbyshire, Carlos, and Ciani took something familiar in their demos—the *Doctor Who* theme, Bach, and jingles—and twisted it into an oblique slant. The next step for these synth artists was to create oblique music out of defaults, reducing the familiar and making room for new presets.

Discover the recipes you are using and abandon them

When in doubt, make up your own rules. That credo resonated with the British musician David Bowie when he collaborated with Eno in the 1970s. As Bowie recounted, they were “throwing [synthesizer] manuals away so we had no idea how the damn things worked, and it was the mistakes that they made that we found more interesting. Because these things are programmed by high-tech buffs who really don’t have any sensibility of what can be done musically, so they put in the stuff that they believe musicians would want to use [. . .] fake strings and things like that.”⁷⁰ The duo was interested in happy accidents, honoring mistakes as hidden intentions. And for Bowie, there was no greater use of synthesizers than having circuits produce “crackles and farts.”

Bowie mixed avant-garde music and pop throughout his career, much like Eno produced a fusion of art and pop, sound and vision. Bowie and Eno both had enough cultural cache to chart the interstices of intermedia (a privilege not extended to many artists in the 1980s, unless they had the cultural defaults in the pop and media industries of capital and white skin), the conditions through which one could more readily reinvent the rules in media. As Eno said in 2011, “There were no rules for playing synthesizers, so nobody could tell me I couldn’t play one. Nobody else could play one either. It was an instrument you made up yourself . . . its role was waiting to be invented.”⁷¹ Such rule-breaking typically is sustained only through financial and cultural capital. As Eno’s fame grew, his language of disengaging controls extended not only to synthesizers but also to traditional roles for producers and band members who might only stick to one instrument. In 1982, Eno declared that the “role of the producer is to use the studio as an instrument,” which characterizes the situation of many bedroom pop artists and podcast producers

today.⁷² While music listeners might be inclined to think of a musician as a piano or guitar player or singer (as Ciani faced), many artists use tools that are first thought of by some fans and critics as technologies or machines. Eno's first instrument was a tape machine; he was a synthesizer player in Roxy Music before adopting the instrument of the entire recording studio. In *Another Green World* (1975), Eno named the Oblique Strategies as instrumental to his third studio album, which nixed the preset of having predetermined material ready to record in a recording session. The Oblique Strategies help musicians to relinquish certain cultural and musical defaults by disrupting preset processes. During the recording-now-producing session for *Another Green World*, Eno said, "I found myself playing around with a new instrument or new sound[.] This led to the later Ambient series, in addition to forming the catalyst for an interest in scoring film."⁷³ Eno's Oblique Strategies led to new presets, not only for his own career but also for entire genres of music.

Many fans and critics consider Eno a forerunner of ambient music, a genre that extends from Muzak meant for improving workers' efficiency in factories to new age, bedroom pop, and EDM. In his study of these genres under the banner of "ambient audio," pop music scholar Victor Szabo emphasizes the overlaps of pop and art music and the underacknowledged role of race, gender, and class on the genre "before and beyond the music and influences of Brian Eno."⁷⁴ Perhaps, then, it is more apt to think of Eno's contribution not to ambient music sum total but as building *systems* to make ambient audio. The writer Eric Tamm memorializes Eno as "inventing systems and setting them in motion [. . . for] the infinite play of musical possibilities [. . .] generally working within a relatively narrow range of expressive possibilities for any given piece, and accepting happy accidents at any stage of the creative process."⁷⁵ But Eno was not the only artist who created systems for producing an expansive range of outcomes from enabling constraints. Cage did, as discussed in the previous chapter, and many of Eno's collaborators also made new recipes for presets in pop. One who worked with the most quotidian—yet profound—material was Laurie Anderson.

Trust in the you of now

Laurie Anderson is an artist of time, using music, storytelling, and performance to preset and reset time and, in related ways, systems. Anderson has worked to unblack box the technological aspects of music, which Eno did to some extent with his iPhone app Bloom, created with musician and software designer Peter Chilvers and launched in 2006 to user-generate music and accompanying images. But Anderson considers technology not just to be external to us, available in devices, but also within us. She uses synthesizers not as objects but as actions: her art and practices live in the verb "to synthesize"—to put together. Her work foregrounds binary entanglements—visible/invisible, human/machine, chance/control—as not fixed entities but dynamic relationships that play out over time. As a feminist performance artist, she frames her body and voice—and the instruments she builds and modifies—as audiovisual presets for study and manipulation.

From the late '70s and early '80s, Anderson used presets to provoke questions about gender, race, and puppetry—all cultural defaults discussed in this book. She shows audiences how technology can generate new defaults through make-believe; like Ciani's demonstration on the Letterman show, Anderson has a demo video where she speaks in different voices, revealing the functionalities of her presets. Anderson also champions new presets for human voices. In a late '80s home studio tour, Anderson speaks into a microphone with a low-pitched, satirical voice. "This filter here is a voice of authority," she says, demonstrating for audiences how they, too, might use this voice as "a guy who's trying to sell you an insurance policy you don't really want or need." She then explains how her backup singers come from "boxes": "these are some girls," she says glibly, referring to a set of voices (as boxes, like Ciani did) that she uses in recordings and concerts. To make these presets, she is most inspired by "being in the clutter of my house [. . .] there's just a lot of good junk."⁷⁶ Accessibility is again the shared key to synthesizer demos, particularly by the women in this chapter. And accessibility is a keyword overall for this avant-garde artist, labeled in 1983 by critic Don Shewey as having "something no other performance artist has ever had: popularity." For Shewey, Anderson's work as a performance artist "recombin[ed] speech, song, images, movement and modern technology in new ways" in a decade when computers could "convert all forms of information into bits of electronic 'memories' that can be stored in and quickly retrieved from a magic machine, [and] modernism has broken down the individual art forms into a pool of elements available to all artists, whatever form they favor."⁷⁷ Anderson is unafraid of boxes and bricolage, knowing that they are raw materials for storytelling and re-gridding time, making a happening into a "happening now" or an "anything can happen."

Aided by the quick storage and retrieval of digital synthesizers and recording systems, Anderson's art recombines presets—from car horns to characters' voices—into prismatic hybrids that make people think about how they engage with those component parts. Her most commercially successful piece (hitting number two on the UK charts), "O Superman" (1981), in particular aligns with 1980s feminist and posthuman critiques, from film scholar Laura Mulvey's theory of the male gaze that often framed women as objects in media, to anthropologist Donna Haraway's cyborg manifesto about hybrids of gender, bodies, and technology. The song features a relentless beat of "ha's," a tape loop of Anderson's voice that becomes a preset rhythm. Anderson's cyborg hybrid of voice and body in "O Superman" is aided by the vocoder, explained by the *OED* as synthesizers "originally developed as a means of recreating recognizable human speech over telecommunications [. . . and] now frequently used in music, where they are applied to various types of audio signals to create a distinctive effect"; it mechanicalizes human speech.⁷⁸ Anderson's is an art of constantly fluctuating inputs and outputs, objects that become actions, and actions that become objects of contemplation.

In the "O Superman" music video, Anderson knowingly displays her body in spotlight tableaux as an object, like her voice, to orient the audience toward the

mediations that inanimate objects like the vocoder can impart. In the spirit of Ciani's mechanicalize-something-idiosyncratic Coke jingle, Anderson's vocoded voice becomes a kind of oracle or messaging service—a vocal version of the US Postal Service, which features heavily in the song's lyrics. This song and video take systems' bureaucracy and inequities to task. As pop scholar S. Alexander Reed writes, "When we focus our lens to see networked agencies as fallible, discrete, and not just the 'way things are,' then what other systems duly come into view? What kinds of glitches might reveal the secret functions of folklore or pop music?"⁷⁹ The music video's shots toggle between Anderson standing at the vocoder—a device her lyrics frame as an answering machine—and framed in a spotlight, using her bent arm (the shots linger for an extraordinarily long amount of time on her elbow) as a prop and technological assemblage. Her performance of her body and voice as/through technology is a persistent shadow of America's military-industrial context, which she discusses in lyrics about moms and American planes. Her robotic voice and body underscore the inextricability of these national and human defaults. Presets come undone and are redone in this video, much as Sara Ahmed's queer phenomenology of objects approaches them not as *things* but "as a way of saying something."⁸⁰ This is just one example of Anderson approaching synthesis and systems as verbs, not just nouns. Anderson's preset play instrumentalizes herself and makes the vocoder an element of audience participation—like the aforementioned demos do. Anderson undoes vocal and human presets in ways I will further discuss in chapters 4 and 5; her synthesized art is one of actions toward objects and people.

In one of her earliest pieces, Anderson shows the malleable audiovisual *and* temporal dimensions of her verb-based approaches to presets and synthesis. Her performance art piece "Automotive" (1972), later called "Road Rave," is an outdoor piece for car horns, rhythms slapped out on windshields, and slammed car doors. The outdoor setting made it apt for COVID-19 lockdown performances, as people were isolated in separate cars as if at a drive-in movie theater. During the COVID-19 "Road Rave" edition, Anderson conducted the cars akin to a Cagian aleatoric score, letting people honk as much as they wanted within her and the timekeeper's cues. She pushed the presets of car push buttons into a musical composition, generating new systems for those presets. For example, a car's turn signal became the beating heart of the composition, not unlike the car key beeps that generate the driving beat of Olivia Rodrigo and Dan Nigro's 2021 smash hit "drivers license." There were even appreciative breaks for an ice cream truck melody. On a visual and aural level, one can read this performance as a happening that harkens back to lowrider or avant-garde meetups, as discussed in chapter 1. "Automotive"/"Road Rave" extends and bends time and landscapes not unlike the push-button car radio did. But Anderson's update of a work from five decades ago in the 2020s might also provide a model for updating the Oblique Strategies for today—to "trust in the you of now" as Anderson's work is wont to do.

Much as Anderson turns the spotlight on everyday objects like elbows and car horns, she also rebrands Eno's and Schmidt's message of stymied creativity and appreciation of minimal changes as a more radical position of wonder at one's own context in the world that they then reflect back to audiences. In many ways in 2026, we are living the Oblique Strategies all the time with the popularity of texting, short-form social media, and, for some folks, AI prompting; the short form of the original card deck is not so novel. But Anderson's impulse for storytelling makes the ultimate update to the Oblique Strategies for both artists and art appreciators: she shows us we can go back to a preset or system and either reflect or innovate upon it. For example, especially since 2024, Anderson's work has showcased time more explicitly; she asks, how do we exist in a time, our time, and be responsive to it? Time has been preset by calendars, sundials, and religion; it is gridded by the systems Anderson long has questioned in her work through her synthesized body. Through it all, Anderson has wielded the technology of storytelling, of framing action: storytelling is not just telling, after all. It is also asking—what the material needs, what the audience needs. In whichever medium she is working, Anderson makes a point of asking these questions: "Is it complicated enough? Is it simple enough? Is it crazy enough? Is it beautiful enough? And finally, Is it stupid enough?"⁸¹ Stories are in the asking, the seeking, the question of how to adapt a musical or technological or artistic preset into a function ripe for storytelling. The ultimate oblique strategy is not a statement but a question. And while Eno's and Schmidt's deck has some of those, we need more. In 2026, we often have more questions than answers. We could use a little more demo mode.

Repetition is a form of change

The demos of Laurie Anderson, Suzanne Ciani, Wendy Carlos, Delia Derbyshire, and Clara Rockmore make synthesizer technologies accessible because they introduce functional equivalents—a concept used in linguistics and computer science as well as sound studies to describe relatively exchangeable objects in a given system. Applying this concept to sound studies, Jonathan Sterne calls the horn of a phonograph or phonograph a functional equivalent of the human ear that hears and captures sound. Functional equivalency describes the evolutions of sound/audiovisual technology as progressions, not big bangs, much like Anderson shows her voice and body interfacing with the vocoder: this technological and artistic development is a shift, not a jump, of a preset sound into a new context or use. Like Anderson maintained the human form of delivering a message with her voice but slid it over to mechanize it with the vocoder, the synthesizer demos I have covered in this chapter often operated through functional equivalents. Ciani recreated the sound of an explosion, and Rockmore translated violin skills to the theremin. Derbyshire's and Carlos's oscilloscope demos turned sound into vision and back again as functional equivalents of waves and vibrations, giving amateur or hobby musicians new sonic *and* visual languages with which to access new synthetic technologies.

Functional equivalents operate visually, like the oscilloscope's waveforms translating sonic ones. They also operate aurally. For example, Stevie Wonder told a prominent recording artist that the strings on "Pastime Paradise" (1976)—which were sampled in Coolio's "Gangsta's Paradise" (1995)—were recorded by the London Philharmonic, but they were from a string preset on the Yamaha GX1 (1973). In 1983, presets as functional equivalents were the main draw of the Yamaha DX7, an FM digital synthesizer. The jazz legend Herbie Hancock demoed it that same year on French TV, where the show's host quizzed him on the DX7's functional equivalents.

On the demo, the French host asked Hancock an age-old question when it comes to synthesizers and samplers—whether he no longer needed a piano. Hancock responded, "No, I definitely need a piano, although they do have some pretty good piano sounds, like this one, which is not bad for a synthesizer [*demonstrates*]. But if I really wanted to do some very serious piano work, I would use the acoustic piano."⁸² In the demo, Hancock lays out his use of presets for certain purposes and acoustic piano for others. The "pretty good piano sounds" he refers to include E. PIANO 1, which for music theorist Megan Lavengood is the quintessential sound of '80s music, from the pop hit "Careless Whisper" (George Michael, 1984) to Jerry Goldsmith's science fiction film scores.⁸³ Rather than replacing the piano, then, the DX7 provided new iconic sounds to which many musicians would flock. By enlarging their sonic palette, musicians in turn made enriched music—a far cry from the claims of simplicity and lack of labor launched at the DX7.

In Hancock's case, he said, "The fact that I wanted my music to change meant that I needed a synthesizer. [...] Even though I may be searching for one sound or two sounds or five sounds, I may hear 30 or 40 different sounds, and I may hear some others that might inspire me to make changes in my music."⁸⁴ Hancock's exploration of the synthesizer involved FM synthesis, the synthesizer's process of creating sounds, but he still took inspiration from the presets. Yamaha also marketed its synthesizers this way. After congratulating new owners in giant block letters, the first page of the DX7 manual proclaims, "Extensive microcomputer programming control makes it possible to edit existing voices to change their character, or produce entirely new voices. New voices can also be created 'from scratch.'"⁸⁵ In other words, the synthesizer's programming capabilities make possible the perhaps infinite customization of presets. The Native Instruments software developer Mike Daliot remarked that "the DX7 was complex to a level where its capabilities to shape sounds were infinite. I mean that literally. Still it had a sound."⁸⁶ The DX7 was an instrument that offered functional equivalents to a range of acoustic sounds and promised to allow similarly infinite control over them. These functional equivalents were perhaps designed to appeal to synth novices; as the manual reads, "Whether you're a beginner or a world class performer, you can enjoy the large library of preset sounds that come with the DX7." The DX7 came loaded with 32 factory preset sounds but had options for more: "Literally hundreds of exciting sounds can be at your fingertips with just the press [of] a few selector

buttons.”⁸⁷ The manual takes care to make those presets easily accessible, as the interface lacks knobs, oscillators, and filters—in other words, all of the interface aspects that made commercial sales and music-making inaccessible to a general public and that Anderson, Carlos, Ciani, Derbyshire, and others worked so hard to demonstrate. The DX7’s programmed presets were functional equivalents that were relatively easy to access compared to the oscilloscope required in earlier demos and painstaking note-by-note recording. As if to emphasize that increased access, the authorized product manual says, “You don’t have to program a single thing . . . unless you want to. Presets won’t handle every job, and there’s nothing that says you have to use ours. You can make your own voices.”⁸⁸ It is a fascinating libertarian claim in the late twentieth century US/UK conservative era.

Yet all of these claims of infinite adjustment and independence were only for those who had significant skill and capital; even Hancock has said that the DX7 is notoriously difficult to program.⁸⁹ Most users of digital keyboards, pop scholar Paul Théberge observes, buy them for their preset sounds and often do not edit them.⁹⁰ To this end, the musician and film composer Vangelis—known for his work on *Blade Runner*—damningly called the DX7 “a nice, commercial little toy, at a reasonable price” and suspects that people purchased it because “it has such a clever library of sounds.” Vangelis favored the Yamaha’s earlier synthesizer, the CS-80 (1977), with a keyboard that “needs a lot of practice if you want to be able to play it properly. [. . .] Today, the only thing that matters to synth makers and synth players is the supply of different sounds—nothing else. [. . .] If all you do is use synths as a source of sounds, you’ll never be a complete performer.”⁹¹ Vangelis wanted synthesizers to be the functional equivalents of keyboard instruments that require skillful playing, but the majority of users desired synthesizers’ presets as functional equivalents of the sounds they sought. Rather than an elitist criticism of people who never edited presets, I argue that by placing presets in new contexts, artists were creating new sonic (and often visual, in the case of demos and music videos) languages. And by asking questions about instruments’ purposes, sounds, and sights, Black musicians and women shaped synthesizers’ demo modes, tracing new presets in the air, with their hands, with oblique strategies of world-making, not just for individual creativity. By demoing, these musicians foregrounded feminized and racialized labor as the presets of new sonic, visual, aesthetic, and political paradigms.

Courage!

If, as Jan Kedves wrote, “presets are essentially demo modes, intended not so much for actual use and more as a means of showcasing the complex possibilities offered by a tool or piece of software,”⁹² before the popular use of synthesizer presets, Rockmore, Derbyshire, Carlos, Ciani, and Anderson had to make their workings legible, at the cost of several comments about their bodies. It is a societal default, especially on network television, to police representational politics that threaten to

obscure the radical work artists do with these functional equivalents and oblique strategies. These women had the courage to try. In these demos, artists created new sounds and images, even new languages, but these were not just novel; they also endured, from Ciani's Coke commercial, to Carlos's reinterpretations of classical music, to Derbyshire's samples in rap tracks including 1968's "Pot Au Feu" used in 2016's "When It Rain" by Danny Brown and 2014's "Real" by Freddie Gibbs and Madlib. These rap tracks are like preset nesting dolls, recycling Derbyshire's presets for new rap tags and refrains. Ethnomusicologist Davindar Singh, who told me about these twice-baked presets, also informed me of the Casio preset developer Hiroko Okuda, whose reggae presets like "Sleng Teng" quickly became ensconced in riddims, or Jamaican percussion patterns.⁹³ While Casio developers had default classical music backgrounds, Okuda made popular music inroads to Casio presets that would make home keyboard demos largely pop-forward—much to my adolescent delight back at the turn of the millennium.

I end this chapter where it began: with play. At the Synthesizer Museum Berlin in July 2025—which opened about four months prior—I played with over 50 synthesizers, including the Yamaha CS-80 and DX7, Prophet-5, and Buchla Electronic Music Box. As a novice synthesist, the most fun I had with only a short time to acquaint myself carefully with these instruments was with the Roland TR-808 Rhythm Composer drum machine. The presets were easy to locate, incorporate, and instantly replay. Everything was sequenced as numbers that played out in 12-part equal blocks of time, rather than on the keyboard interface; the ability to program a preset drum by pairing it with a number was relatively simple. And yet, my experience at the Synthesizer Museum Berlin raised questions about the cultural and historical conditions this "replacement drummer" arose from and created. Drum machine predecessors emerged in the 1930s–50s—including Henry Cowell's and Lev Termen (of the theremin)'s Rhythmicon, Harry Chamberlin's 1949 Rhythmate, and the 1959 Wurlitzer Sideman; the first and third worked as a rotating disk inside a wooden frame like a music box, and the second used tape loop beat patterns sampled from a live drummer. This tension between automation and human reliance ratcheted up in the 1960s, when drum machines began to be produced and proliferated in early synth pop and hip hop. The relationships between humans and drum machines have been quite complex indeed, waging a battle between self and other, nature and artifice, and agency and control. I turn now to a "drum break" interlude as a bridge between synthesizers and samplers, since drum machines used both synthesis and sampling to produce drum sounds—but also because they reveal the human embeddedness in creativity and control of a so-called music box of presets.

Interlude

Drum Break

On Drum Machines as Presets

Prohibitions against presets, seen from the likes of media composer Hans Zimmer in the introduction to composer Matthew Herbert's no-longer-available manifesto that forbids the use of premade sounds, saddle preset users with sentiments of cheating and laziness.¹ An extreme example of the no-presets camp is a meme reposted on Reddit, which the composer-scholar Tara Rodgers has called "the slippery slope from sampling to goat farming":²

I thought using loops was cheating, so I programmed my own using samples. I then thought using samples was cheating, so I recorded real drums. I then thought that programming it was cheating, so I learned to play drums for real. I then thought using bought drums was cheating, so I learned to make my own. I then thought using premade skins was cheating, so I killed a goat and skinned it. I then thought that that was cheating too, so I grew my own goat from a baby goat. I also think that is cheating, but I'm not sure where to go from here. I haven't made any music lately, what with the goat farming and all.³

Circulated in 2014, then in 2019–20, the meme also accords with people who searched for hobbies to replace their commutes and social time during the COVID-19 pandemic. Musicologist John McGrath calls the great wave of sourdough baking and knitting "the return to craft," a folksy phenomenon that he attributes not only to the pandemic but also to "neoliberalism, homogenization, austerity, and the anxiety brought on by climate change. [. . . It] arises as a reaction to turmoil, offering the familiarity of a mediated past, often one that never existed in reality, an imagined utopian ideal, and a reconnection with the supposed 'old ways,' with nature, and the wild."⁴ The return to craft also smacks of the analog versus digital

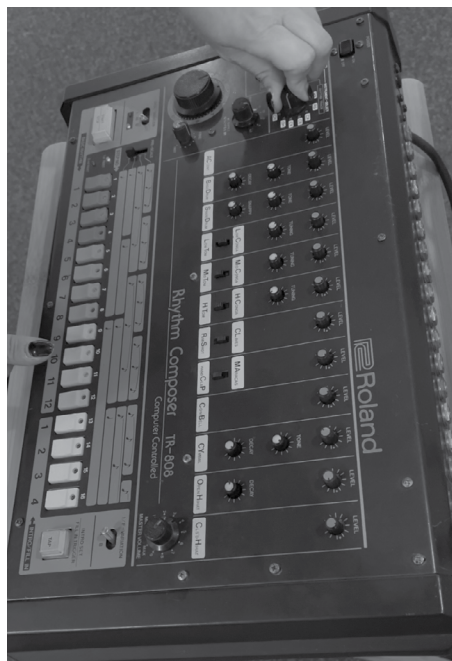


FIGURE 9. A musician operates a Roland TR-808 Rhythm Composer drum machine, Synthesizer Museum Berlin, 2025. Photograph by the author.

debate in gear culture—the fetishization of vinyl and of equipment that people buy because of their auras for particular uses and times. All of these valences are in the background of presets too.

This brief bridge between chapters on synthesizers and samplers analyzes drum machines, which show off presets in a crystalline yet complex light. Presets are the building blocks of beats and riddims—a sound or rhythmic pattern, very often both, sets the tone for what gets repeated by a DJ or machine. As DJ Grandmaster Flash described his process in the early 1980s, “My main objective was to take small parts of records . . . maybe forty seconds, keeping it going for about five minutes.”⁵ By playing a particular break on loop, DJs and amateurs alike could perpetuate a mood, a vibe, a concept, an aura. Such was the aim of drum machines, which preceded 1980s DJ sampling; the proclivity to loop found its groove with early technologies and practices, originating, of course, with drummers who kept time and pulse themselves (figure 9).

To facilitate the brevity of this drum break, I have paired sections with songs that are crucial to the drum machine canon. I invite you to listen alongside, between sections, or after reading this interlude according to your preference; this playlist’s sounds and lyrics speak to the story I tell about drum machines and presets. The playlist, as a structuring preset format, invites play into this discussion and intentionally emphasizes the inextricability of drum machines with synthesizers, organs, sequencers, samplers, and loops. Tape loops—which were used

by midcentury avant-garde composers like Pierre Schaeffer, Éliane Radigue, and Steve Reich—offered two principles that combined in drum machines: first, they facilitated time-stretching with repeated and altered flows of sounds (coined “tuning time” by Mara Mills and Jonathan Sterne⁶), and second, they were repeatable presets. Tape loop presets also led to the creation of samplers, or keyboards that could play back and manipulate recorded sounds: before digital samplers like the Fairlight Computer Musical Instrument (chapter 3), the 1950s–60s Chamberlin and Mellotron tape organs played unique tape loop samples as presets on each key of the keyboard, such as the haunting flute sounds the Beatles used on “Strawberry Fields Forever” (1967). Digital sequencers (e.g., MIDI, Musical Instrument Digital Interface) combine these instruments, whether tape loops, drum machines, or samplers, in a composition. In this drum break, these devices often overlap, as they all raise questions about the cultural defaults that link to different presets throughout this book—the roles and labor of humans and machines, the consequences of time and repetition, and legacies of innovation.

“In Time,” Sly and the Family Stone, 1973

In Sly and the Family Stone’s track “In Time,” the Maestro Rhythm King MRK-2 can be heard in all its preset glory in the first several seconds. But listen carefully—Sly added live drums to what DJ and writer Harold Heath describes as the MRK-2’s “hissing hats, quaint bongos, blocks, and claves playing on those rubbery beats [that] were front and center on Sly’s magnum opus.”⁷ The early 1970s saw the use of drum machines across multiple genres, such as the 1967 Vox Percussion King used in Kraftwerk’s iconic *Autobahn* (1974). While debates around drum machines in scholarship as well as music criticism have centered around their authenticity and aesthetics—like the meme of beat-making leading to goat farming—preset thinking allows us to trace the many rhythms made by drum machines back to the age-old traditions of music-making referenced in the title and lyrics of “In Time.” Drum machines keep time to dance rhythms like the waltz (three repeating beats danced as three repeating steps, with an emphasis on the first beat/step) or Latin dance steps like the cha-cha and mambo (think the drum machine opening of Blondie’s “Heart of Glass”). These are all preset rhythms for dances that various cultures long have kept as temporal traditions.

If our feet can reproduce the sounds of dance rhythms, do drum machine reproductions of presets really cheat? When I searched for the drum machine/goat farming meme online, the suggested searches read, “Is using samples and loops cheating?” and, more existentially, “Is the thought of cheating cheating?” But drum machine preset use is not so existential as cheating, contrary to music critics’ complaints. Drum machines instead help us reproduce the steps and sounds that our bodies long to recreate—much like the Casio demos of the previous chapter. Charges of laziness might stem from how simple some early drum machines were to operate. With the MRK-2, for example, there were 18 preset rhythms, but there

was no functionality to program additional ones, only to vary them with difficult-to-time haphazard twists of the volume and tone knobs. As a result, presets often ruled the production.

*“Computer Game (Theme from the Invader),”
Yellow Magic Orchestra, 1978*

Presets dominate Yellow Magic Orchestra’s “Computer Game,” which, listened to with a present-day lens, sounds like the score to a horror film, a persistent ringing like a telephone against sounds from the computer game *Space Invaders* (1978), with drum machine programming faintly in the background. This could just as easily be a present-day soundscape that sounds off the collisions of modern distractions. For music technology scholar Mike D’Errico, drum machine presets have served as functional equivalents for both aesthetic and industrial ends: the machine was “a supplemental, yet intimate, partner to the human musician, [. . . and] rhythmic presets [were . . .] a core mechanic of the instrument. The preset provided an impetus in the commercialization of music technology, as well as a marker of big data’s effect on the maximalist and accumulative nature of contemporary music production.”⁸ Drum machines certainly saturated songs and the pop market, but as D’Errico and drum kit historian Matt Brennan are careful to differentiate, humans were imbricated with, not replaced by, drum machines. And that was especially true when drum machines came equipped with memory to make and store their own preset beats.

“In the Air Tonight,” Phil Collins, 1981

In 1978, the Roland CR-78 (CompuRhythm) incorporated a programmable microprocessor that could store four beats in memory; it came with 14 sounds and 20 presets. Its beats were heard on “Heart of Glass” by Blondie that same year and on “In the Air Tonight” by Phil Collins in 1981. On top of using the CR-78’s Disco 2 preset on this track, Collins became known for a special drum fill in the last third of the song: he plays acoustic drums, which are then compressed, a feature that artist Cory Arcangel dubs “the gated snare thing.” Something certainly was in the air, which Arcangel discusses as a mystery effect that musicians are still trying to reverse engineer; he says, “even with old gear there’s new ideas.”⁹ Here, again, is the collaborative nature between humans and drum machine effects, between people and gear, and between old things and new ideas. Collins’s discovery of this spectral combination—a tireless drum machine preset layered with a timeless effect that has become a holy grail still sought by musicians—brings together complexly layered labor, in that Collins found an ideal combination of a relentlessly ticking time bomb, the drum machine, plus a sudden-death, game-time new element that turns ears still today. Yet, as you will notice, this machine-human union still relied on acoustic drum playing and production to some extent to change its sound. To make presets fully programmable beyond the improvements in memory made by

the CR-78, Roland would turn to materials at the heart of chapters 1 and 2: transistors and synthesizers.

“Raga Bhairav,” Charanjit Singh, 1982

In 1980, Roland released the TR-808, which, as TR indicates, used transistors to achieve its drum sounds. The 808 deviated from other contemporary drum machines on the market that sampled acoustic drummers; Roland’s team turned to synthesizers to reproduce the functional equivalents of drums, like the sizzle of hi-hat, the throatiness of toms, and the low thrum of the kick drum. The latter became perhaps the most iconic 808 sound; as DJ Jazzy Jeff explains, “The sound of the 808 kick drum became synonymous with hip hop. The idea of young people driving down the street with big boomy subwoofers was largely because of the 808 tone. And that connection stuck.”¹⁰ Like Jazzy Jeff observes, path dependence was a crucial part of the 808’s story, which threads up to Kanye West’s album *808s and Heartbreak* (2008) and beyond.¹¹ But beyond a tone becoming a functional equivalent, a single preset sound can inspire whole genres, as Sterne discusses: “Old guitars, drum machines, or drum sets come to be associated with certain music and musical sounds. Even software instruments now conform to this pattern, as when a representative of Native Instruments explained that the company’s software synthesizer Massive remained in version 1 because of its importance to the genre of Dubstep.”¹² Sterne describes the added qualities technologies take on, invested with, on the one hand, capitalism, and on the other, increased efficiency and access. Like Sterne, I argue that the supposedly instant processes of presets have lasting consequences for art, work, and power.

For the 808’s genre crossing, listen, for example, to the Bollywood musician Charanjit Singh’s “Raga Bhairav”—its relentlessly repeating drum machine aligns with the often extensive durations of Bollywood film songs. Then listen to Grandmaster Flash and the Furious Five’s “Scorpio” (1982)—a hip hop track that broke the 808 from its secondhand market, initially passed over by musicians. Hip hop artists sought out the 808’s iconic kick drum sound, as well as its clave, cowbell, and handclap sounds. But they also bought the 808 for the adjustability of its presets; rather than needing to recontextualize the way a sampled drummer had played a preset—layering over it like Collins had done—808 users could layer in different dimensions of desired drum sounds. As DJ Jazzy Jeff said, “This one machine could sound a hundred different ways.”¹³ And so it did—on Marvin Gaye’s “Sexual Healing” (1982), Whitney Houston’s “I Wanna Dance with Somebody” (1987), and even Usher’s “Yeah!” (2004).

“I Didn’t Mean to Turn You On,” Cherrelle, 1984

In the aptly named Cherrelle track “I Didn’t Mean to Turn You On,” rip-roaring toms and a series of handclaps explode into a cheeky high-pitched synthesizer-driven bop doubled by a singable, catchy melody. One might not mean to turn on

or give precedence to the drum machine, but it takes over anyway. It can't help it. In a warring of digitized timbres, the synths and drum machine fills duke it out in a long outro, though the synth has the last word. The legendary producers Jimmy Jam and Terry Lewis used an Oberheim drum machine/keyboard/sequencer combination to assuage the up-and-coming singer Cherrelle's nerves about "the whole idea of studio time and all that budget and craziness." Not only was the Oberheim economical, but it helped Jam and Lewis to realize "how much equipment changes the way you do stuff."¹⁴ Such logic perhaps entered the music video, too, which is inspired by *King Kong* (dirs., Merian C. Cooper and Ernest B. Schoedsack, 1933); the black-and-white music video shows Cherrelle evading the advances of King Kong, who follows her to New York. As the long drum machine break in the song begins, King Kong breakdances on a roof—at one point, he gets dizzy from a head-spin and is surrounded by Donkey Kong stars, a fun mash-up of the game that was introduced a few years prior—before breaking into Cherrelle's apartment. The video's cinematography plays with the iterability of the drum machine presets, presenting a series of jump cuts to make the breakdancing gorilla's repetition more exciting—just like the preset fills programmed on the drum machine. The song's repetition, especially the drum machine's, sounds out the creative recycling of cultural symbols, both visual and aural.

"Under Mi Sleng Teng," Wayne Smith, 1985

Functional equivalents are beat foundations, as are traditions of rhythms that humans incorporate into songs and feed in and out of machines—especially riddims codified as presets on drum kit and electric bass by drummers like Sly Dunbar and Lloyd Knibb. Riddims spread from Jamaican sound systems to the Caribbean, Americas, and beyond. Presets are the fabric of beats and rhythms in countless musical styles, but they did not get that way by accident. They gained form and connotation through drummers and traditions, whose repetition then was picked up by technologies.

The sound system was crucial to presets' dissemination in these cultural contexts, and, in turn, their creation; for one, King Tubby (a.k.a. Osbourne Ruddock) created his *Home Town Hi-Fi* sound system through a feedback loop, testing effects on dancehall audiences and then building them into his preset sound system.¹⁵ Similarly tested in sound system clash, "Under Mi Sleng Teng," which used the rock rhythm created by Hiroko Okuda for the Casiotone MT-40 keyboard, kicked off the "Sleng Teng" movement for the subsequently digital production of Jamaican dancehall jams.¹⁶ As these collaborations demonstrate, programmable presets accomplished through memory in drum machines would close the loop further between humans and machines (sound systems).

"Sign 'O' the Times," Prince, 1987

In the 1980s, drum machines became more popular, especially as the Linn LM-1 machine (1979) paved the way for several other pop hits, from synthpop in

Devo's *New Traditionalists* (1981) to Prince's "1999" (1982). The Linn sampled and sequenced live drums with silicon chips, lending a realism to genres like rock that champion authenticity—unlike the 808's artificial timbres, which ethnomusicologist Thomas Brett says "endeared the machine to hip-hop and electro producers."¹⁷ The Linn further opened up genre exploration. For Brett, "Prince adapted the LM-1's implicit scripts by going off-script and intuitively tinkering with the LM-1's presets. This led him to create customized detuned and effected drum timbres, finger-drum drum fills, and use the channel-mute buttons to structure songs."¹⁸ Rather than the mystique codified by the goat farming/drum meme about cheating, Prince engaged presets as craft: they are ingredients in new scripts that are not reverse engineered like goat farming but reengineered. Like David Bowie and Brian Eno, Prince "never read manuals. I don't want to have a preconception about what a piece of gear should or shouldn't do. I just start using it. I start pushing buttons, and I discover the sounds that I can make with it."¹⁹ Prince continued Sly Stone's layering of drum machines and other instruments (acoustic or electronic) that made presets the bedrock of pop experimentation.²⁰ But Prince also eschewed functional equivalents in favor of new sounds that would, as musicologists Ragnhild Brøvig-Hanssen and Anne Danielsen have pointed out, "[become] definitive for 1980s 'digital pop.'"²¹ In this way, music crafting entails returns to presets but not for old ways; with preset play in drum machines, old sounds can be recontextualized or made into new ones.

"The Last Donut of the Night," J Dilla, 2006

Two major consequences arose from the delinking of drum machines with real drums as functional equivalents. The first consequence is more literal—a gravitational pull away from using functional equivalents of existing instruments. Like Eno's and Peter Schmidt's oblique strategy "abandon normal instruments," the eschewing of functional equivalents also would be taken up by musicians like Kate Bush and Herbie Hancock, who sampled broken glass and spoken voices instead of traditional instruments on the Fairlight Computer Musical Instrument, the first digital commercial sampler and the subject of the next chapter. Using drum machines, musicians like Prince created new drum sounds, not merely hewing to the LM-1's realistic capabilities but also to its oblique possibilities. The goal of drum machines was not to replace drum sounds but to work with new aesthetics facilitated by presets. Such a goal was realized in combination sequence-sampler workstation and drum machines like the Akai MPC60 (1988) and subsequent MPC3000 (1994), known for its use by J Dilla (James Dewitt Yancey), who especially worked to humanize drum machines by avoiding quantization that snaps drums into perfect time that a human drummer would not necessarily be able to replicate. As writer/producer Dan Charnas chronicles in his exploration of J Dilla's craft and career, "Questlove in particular had come to worship Jay Dee [Dilla] as a guru who liberated him from the idea of keeping perfect time, and instead imparted a permission to be loose, to be human, to be wrong."²² Dilla

stretched drum presets' capabilities by handcrafting time. Drum machines keep a record that is, at base, deeply human in its storytelling, its groove. They give a track tracks; their simultaneously traceable presets and rhythms inscribe, describe, prescribe, and preset—for further creative use.

The second consequence is creating catchy sounds of the '80s, which the Fairlight would also do—its samples form the bedrock of much of 1980s synthpop and hip hop as well. Besides aesthetic interventions, drum machines made interventions in time. Not only did they reinforce traditions in rhythms and cultural forms, but they also made an imprint on the sign of the times. As we turn toward the sample library of preset sounds that were user-created and circulated on the Fairlight, we can also carry through the infinite variations of drum machine sounds and patterns that are still earworms of the '80s today.

Three

Sampling by Mail Art

The Fairlight Computer Musical Instrument

I am not an '80s kid. Even after *Stranger Things* debuted, I resisted '80s music for the longest time. But given how the COVID-19 pandemic stoked an '80s monoculture of nostalgia for “simpler” (and synth-ier) times, it was not long before I found myself sending friends a playlist that featured Kate Bush, Tears for Fears, and Stevie Wonder. These songs overwhelmingly featured the presets of the Fairlight Computer Musical Instrument (CMI)—the first digital commercial sampler.

Sampling in popular music as we know it—when an artist borrows a particular sound, beat, or hook that is implicitly or explicitly used in a new song—first spread through not digital playlists but floppy disks. Imagine this: it is the early 1980s, and you are sitting at a machine that resembles a computer, surrounded by eight-inch floppies labeled everything from GUITARS₂ to HUMANS₁ to MACHINERY. Grouped by a musical instrument family or a particular kind of sound effect, each disk has about 20 samples—each a recording of slightly less than a second of sound. These samples range from instruments, like the Japanese koto, a plucked string instrument recorded in Sydney (labeled KOTO₁), to sound effects like a cash register door banging shut (CASHREG). They end up pervading 1980s synth pop and hip hop, used by artists from Bush to Herbie Hancock to Ryuichi Sakamoto. Several of these short samples became canonical presets not only in 1980s music—like ARR₁/SARARR, a breathy female voice used by Tears for Fears, the Pet Shop Boys, and many others—but also in several different contemporary genres. For example, ORCH₂, the orchestra hit, a biting, dramatic minor chord with many instruments playing at once, graces hip hop, Detroit techno, electropop, jazz, film scores, and contemporary pop. These samples took hold as presets when artists mailed each other samples stored on floppy disks, creating a transnational network



FIGURE 10. Fairlight Computer Musical Instrument Series I. Photograph by J R / dr vaxon, Flickr, licensed under CC BY 2.0.

of shared sounds and, by extension, associations with musical genres, emotions, and meanings.

In the digital era, presets were made exponentially shareable by the floppy disk, which created portable and mutable sample libraries of digital samples. These floppies and sample libraries were connected to the Fairlight, a sampler invented in Australia in the mid-1970s that allowed users to play multiple notes at once on a piano keyboard hooked up to a computer monitor (figure 10). Its novel capability of digital sampling, introduced in 1979, allowed musicians to record and play back “found sounds” taken from everyday life or preexisting songs. These “wild sounds” (to borrow Amy Cimini’s formulation) could then be stored on floppy disks and loaded as preset sample libraries. The Fairlight’s computer monitor was also a preset for the use of computer screens to edit music—now known as digital audio workstations (DAW), like GarageBand and Pro Tools. The visual interfaces of the floppy disk and the screen’s audio editing and arranging capabilities revolutionized music and media presets in a new era of digital sampling.

This chapter is not a definitive history of sampling, but it tells the story of how the Fairlight’s floppies, sound libraries, and editing interface conditioned how samples turned into presets in music, music videos, and even media composition.¹ This revisionist history of sampling far exceeds its common conception as a merely

sonic phenomenon. Samples' meanings are shaped not only through traveling sounds but also through the technological containers that transport them to listeners: specifically, the Fairlight's floppy disks and computer screen. The Fairlight's novel technologies charted default paths for samples to circulate in digital economies. Its disk network and visual interface reveal how presets' production and reception traverse multisensory, especially audiovisual, domains. This audiovisual history of sampling shows the sonic and visual afterlives of presets far beyond the time of their creation, including the visual contexts acquired through their use in music videos, television, and film. Fairlight presets evolve, like the sound of breaking glass in Bush's "Babooshka" video (dir., Keith MacMillan, 1980) that inspired a 2021 TikTok trend; a brassy swell in *Terminator 2* (dir., James Cameron, 1991) that lingers in the infamous "BRAAAM" of *Inception* (dir., Christopher Nolan, 2010); and the orchestra hit's shaping of entire genres from hip hop to new jack swing. These presets' one-second bursts, due to the Fairlight's short sampling memory, bundled effects, sounds, and often accompanying media images in commodifiable, yet variable, ways.

This chapter connects the Fairlight's floppy disk sampling circulation system to the geopolitical networks of mail art, which also resurfaced during the COVID-19 pandemic when artists like Miranda July used letters as socially distanced collaboration. Art curator Vanessa Davidson defines mail art as "a form of communication in which artists subvert the original use of the postal system and use it as a ready-made network for artworks and objects."² Mail art, a post-WWII global movement, includes international Fluxus creators from Japan to Germany like Ray Johnson, Yoko Ono, and Mieko Shiomi, and Latin American mail artists like Eugenio Dittborn, Graciela Gutiérrez Marx, and Edgardo Antonio Vigo. Their postcards, letters, and collages are artworks activated by the post, a preset system of bureaucratic rules for circulation. In 1960s–80s Latin America, mail art thwarted state censorship under dictatorship by incorporating subtle resistance strategies with hidden messages. In 1919, Marcel Duchamp took a postcard of the Mona Lisa and added facial hair and the letters "L.H.O.O.Q.," roughly meaning "she has a hot ass" when pronounced in French (figure 11). Like the Fairlight's found sounds, the postcard is a found object, a material substrate that is inscribed by the artist but also by the system in which it participates.

Mail artists rerouted default conditions of communication networks and art in their contemporaneous moments. In the 1970s and '80s, hard and soft power were being redistributed rapidly—through the Cold War, Latin American dictatorships, leadership information scandals like Watergate in 1973, and the 1979 Iran hostage and energy crises. At the same time, home computers, video cameras, and gaming systems were launching, shifting laws and access to information that increased data's transmission as well as its ownership. And sampling and its cousin interpolation burst into public conscious amid 1977's fair use codification and 1979's "Rapper's Delight" (Sugarhill Gang, with the live band Positive Force recasting Chic's

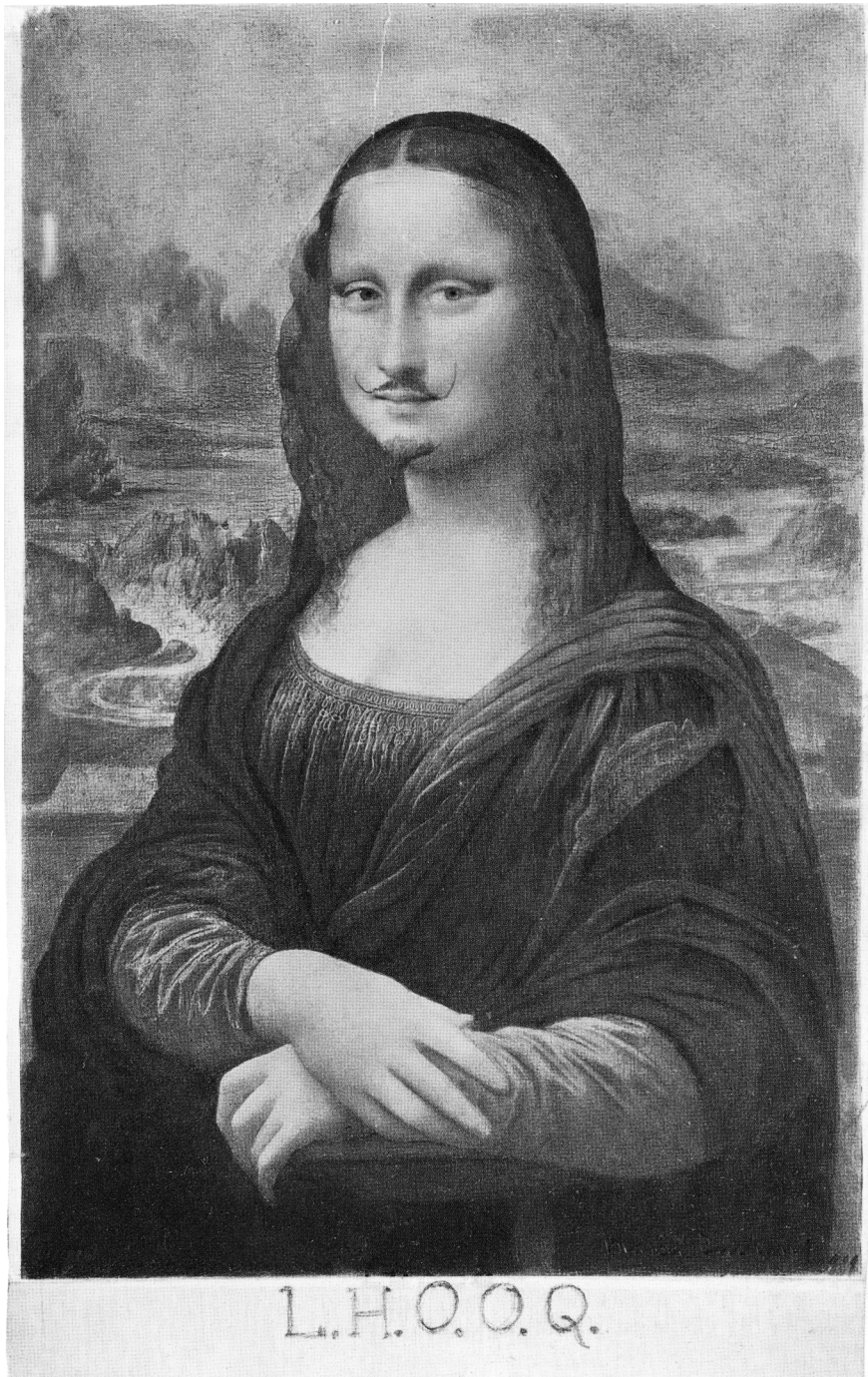


FIGURE 11. Marcel Duchamp's *L.H.O.O.Q.* (1919). Courtesy of Minneapolis College of Art and Design. © Association Marcel Duchamp / ADAGP, Paris / Artists Rights Society (ARS), New York 2025. All rights are expressly reserved by ARS, and this work and all reproductions thereof are excluded from any open-access or open license grant of rights.

“Good Times”). Mail art’s disruption and redistribution of “official” information rewires global transmissions and cuts and pastes discourse into new maps and shapes, much like the collage logics introduced by sampling and presets. Inspired by the pandemic’s resurgence of both art forms, I analyze 1980s presets of expressive exchange by posing mail art as a ground to the figure of the Fairlight.

Like mail art’s standardized postcard or letter preset forms, the Fairlight’s floppy disk was a stable material substrate that put found sounds into circulation as art. Fairlight users sent each other samples through the mail that would then become a part of their own floppy disks of sound libraries. While Fairlight manufacturers shipped certain library disks, artists also shipped manufacturers their own samples or sent them to each other, weaving these transmissions into their work, like the collages of mail art. The Fairlight’s distributed network of collaborators has had consequences for sampling both aesthetically and geopolitically. Aesthetically, the Fairlight’s postal floppy sample libraries created a cut-and-paste system for artists to collage presets. Geopolitically, the Fairlight’s transnational exchange, as in Afrika Bambaataa emulating Kraftwerk’s drum and string sounds in “Planet Rock” (1982) in ways foundational to hip hop, expanded early sampling from a focus on scenes to one on global flows. The Fairlight’s samples became presets for entire genres because they circulated in preset floppy disk and, ultimately, digital forms.

The Fairlight’s transnational system of sample dissemination sheds light on the forces behind the colonizing and repackaging of wild sound—like Peter Gabriel pilfering musical cultures in Fairlight samples that he introduced as his own genius or Bush using the didgeridoo preset in “The Dreaming” (1982) to bring attention to Aboriginal Australians or, rather, her own use of it. Many of the Fairlight presets began as wild sound acquired through capital, whiteness, and maleness, since the Fairlight, notoriously expensive and difficult to access unless musicians were part of a distributor’s network, was created by and initially circulated between wealthy white male artists. As Peter Wielk, product specialist and studio manager at Fairlight Instruments (Sydney) in the 1980s, said, “Samples had been created all over the world by both the distributors and end-users, who were encouraged to share their spoils with Fairlight HQ.” Wielk’s word choice of “spoils” indicates the extraction of taking sounds out of their original environments—many were sampled by white people and circulated as devoid of cultural context, like an Indian flute merely labeled “FLUTE4” on the Fairlight, as composer-scholar Manuella Blackburn has discussed.³ The Fairlight’s early sampling processes engaged love and theft of found sounds, which were wrangled into presets through circulation and reuse as floppies were sent through the mail. In this way, both norms and stereotypes were already baked into sounds upon their sampling, which became entrenched further in their use as presets. Whiteness pervades the official histories of both mail art and the Fairlight. But the women, Black, Latin American, and Asian artists of these transnational networks recontextualized the default meanings of presets to present new connotations that recalibrated the very cultural and political logics of presets’ defaults. In the hands of Bush, Wonder, Sakamoto,

and others, the Fairlight became a tool for the performance and cultural negotiation of gender, race, and more.

By connecting the Fairlight's floppy disk and screen to past, present, and future intermedia movements, I explore how the Fairlight created a preset form of sampling as a transnational and often audiovisual messaging system. The floppy disk's storage and the Fairlight screen's retrieval of samples allowed the medium of sampling to quite literally become the message when they inspired imagery on MTV, launched in 1981, which became a default way to experience popular music. This material history of sampling and exchange follows the development of the Fairlight, its three most famous presets, and their mail art and collage legacies.

THE DEVELOPMENT OF THE FAIRLIGHT

Before the Fairlight's floppy samples went postal, they had an Australian mailing address. Fairlight creators Kim Ryrie and Peter Vogel borrowed heavily from the design of the Qasar M8 analog-digital synthesizer designed by Australian Tony Furse. In 1975, Furse set out to digitally synthesize instrumental sounds with 8-bit microprocessors, a sequencer, eight-inch floppy disk storage, and a light pen. These became key components of the Fairlight when Ryrie and Vogel approached Furse to work together. They praised the Qasar's screen and light pen tool, which allowed musicians to draw and edit waveform frequencies on a screen in real time. But they also benefited from Furse's use of the floppy disk for digital processing: as archivist Jill Chapman writes, "The [eight-inch] disks worked differently from tape recorded music in that a piece of music could be reorchestrated without altering the data on the disk," allowing samples to be stored in a more easily accessible way than in splicing loops of magnetic tape.⁴ Fairlight users could load dozens of preset sounds and rhythms in a few keystrokes. This storage and access revolutionized the collection of sounds and music as presets for music and media composition, and they were faster than the silent film music catalogs that were distributed by mail and that required users to flip through their pages to find "anger" or "love theme" to correspond to a film scene.

In 1979, the Fairlight's debut year, Vogel had what he called a happy accident beyond the Fairlight's synthesizer capabilities: he programmed the keyboard to play back sampled sounds at different pitches. While earlier samplers, the Computer Music Melodian in 1976 and New England Digital's Synclavier Synthesizer System in 1977, preceded the Fairlight, they did not allow musicians to play multiple notes at the same time as the Fairlight did. But despite this desirable capability, the Fairlight was mainly a studio instrument. Too large to feasibly take on tour, Fairlights were heavy due to their two microprocessors, floppy disk drives, two six-octave keyboards, and a QWERTY keyboard connected to a monitor. Moreover, the Fairlight CMI Series I was expensive, costing between \$25,000 to \$36,000, which would be approximately \$120,000 on average in 2026. Only artists

and studios with capital could acquire it or those willing to take a chance on it, such as British producer Richard James Burgess, who went on to work with Bush.

The Fairlight took root in the United Kingdom thanks to Gabriel and his cousin, Stephen Paine, who started a company, Syco Systems, to distribute it. The Fairlight soon graced studios like Trevor Horn's ZTT (Zang Tuum Tumb) Records, and its samples spread through songs as varied as Frankie Goes to Hollywood's "Relax" (1983) to Grace Jones's "Slave to the Rhythm" (1985). Fairlight reviews and advertising materials struck utopian chords; for writer Giles Dawson, using the instrument was as simple as using your own two hands: "Insert a systems disc in the left-hand drive, a library disc in the right, and you can explore a world of sound limited only by your imagination."⁵ A 1982 ad in *Keyboard* continued the praise, proclaiming that the Fairlight can "capture and play any sound at all—even sounds not previously considered as musical."⁶

Such claims of unlimited sound reproduction caused organizations like the UK Musicians' Union to worry that the Fairlight might put musicians out of work. The *Keyboard* ad suggested that it was "the most comprehensive musical instrument ever conceived." Accounts of the Fairlight's low-fidelity sampling went some way to assuage such fears: as audio analysts at the 1980 International Computer Music Conference reported, "Steinway needn't worry about competition from this instrument. In general, the Fairlight offers an enormous palette of sounds to the musician, but it can't do everything. Like a camera, the CMI becomes transparent to the viewer, with no characteristic sound of its own."⁷ These remarks are curious for today's listeners, who recognize the Fairlight's orchestra hit across a panoply of songs and snub its 8-bit tones as cheap and tinny. Some users, however, admire its retro digitality for custom sound effects, because "the sound texture and timbre of the Fairlight sound cards are still very distinctive and hard to duplicate."⁸ Present-day listeners hear the Fairlight's sonic mediation so palpably since sampling rates are much higher now; its sonic snapshots were less marked in its day. Still, the Fairlight's samples were marked in other ways: even nonmusical users like Paine, Gabriel's cousin, soon realized that "it was impossible to achieve the expressiveness with a keyboard that players of acoustic instruments have with finger and/or mouth control."⁹ But this battle between acoustic and digital must be nuanced.

The Fairlight bridged the analog/digital binary in its digital reproductions of analog sounds, which accords with Fairlight scholar Samantha Bennett's observation that digital technologies often live alongside analog ones in studios and even remediate them by emulating their functions. "Between 1978 and 2000," Bennett writes, "the majority of recordists blended technologies from both [analog and digital] domains into their workflows" and did so based on a variety of factors, from financial means to aesthetic preferences.¹⁰ Ads such as the one in *Keyboard* emphasized that the Fairlight was an orchestra in a box, regaled by early proponents, and yet artists had to use analog microphones and cables to record found sounds. With its broad palette of timbres, and the ease of swapping instruments

faster than humans could, the Fairlight opened up enormous possibilities for artists that surpassed analog/digital debates. Musicians could blur lines between musical instruments and objects: from bamboo flutes to car engines, Fairlight samples captured various found sounds that in turn infused artists' videos with threads of fantastical as well as realistic imagery.¹¹ The Fairlight's digital interface increased the speed and range of artists' access to analog instruments, which exponentially increased their sampling capabilities.

Popular music's shift toward mixing acoustic and digital sounds, as enabled by the Fairlight, was as much cultural as it was technological. The Art of Noise's "Close (To the Edit)" (1984) is just one example, with a title that demonstrates the extent to which "we created the music through editing [. . .] and sampl[ing] whatever was lying around," as Art of Noise (AON) group member Paul Morley put it. Sonically, the Fairlight punctuates most of the track, with the groove carved from a sample of a "neighbor's VW Golf stalling" and a scalar "dum dum" vocal that grounds the bass line. As group member Anne Dudley relayed, other vocal samples function as fills, like "group members Gary Langan and JJ Jeczalik saying 'urgh,' and 'money,' which we played backwards" or the "hey" that has been sampled since by the Prodigy in "Firestarter" (1996).¹²

In the 1984 video for "Close (To the Edit)" (dir., Zbigniew Rybczyński), three male band members and a young female actor use hammers and chainsaws to wreck pianos and saxophones. For Bennett, the video is a "metaphorical commentary on the Fairlight's sample-sequenced compositional potential as 'destroying': traditional musical instrumentation [. . .] and Western Classicist music tradition and canon (as depicted by the Mozart bust)."¹³ The video might seem to condemn classical musical instruments, but another reading emerges from the band's mixture of acoustic keyboards—Dudley often used acoustic pianos—and digital samples. For AON's Fairlight operator J. J. Jeczalik, such sonic layering set the acoustic instrument sounds in "incredible-high definition" against the "very low bandwidth drum track thrashing away in the background."¹⁴ While in the video, the band destroys acoustic instruments, AON's soundscape renders the Fairlight drum samples as artificial, which raises the status of the acoustic instruments. The video thus sets up an audiovisual feedback loop between acoustic and synthetic instruments to test whether they can coexist.

The many sampled drum breaks and vocal hooks in the past few decades of music reveal that digital samples of analog instruments still prevail. This enduring blend of analog and digital has roots in how samples circulate both within and across different Fairlight users' songs. As "Close (To the Edit)" demonstrates, Fairlight-inspired videos do not follow a correlation model of audiovisuality as discussed in chapter 1, where a sample is synchronized to a shot of the exact object that produced it. Rather, Fairlight imagery stems from the atmospheres and flavors evoked by sounds. The Fairlight's interface for drawing and tweaking sound waves became a laboratory, a theater, for developing and rehearsing visual

associations with an array of sounds. In the words of sound studies scholar Jonathan Sterne, “Sounds could neither hold faith nor be faithful—that task was left to listeners and performers”—and images.¹⁵

The Fairlight was a creative engine for generating myriad meanings in music and art more broadly. Contingent meanings formed through artists’ exchanges of floppy disks, which encouraged new chains of associations that wound their way through songs and their music videos. Through its floppies, the Fairlight produced a recipe for sampling that would alter both the sonic and visual landscape of the 1980s. To fully understand this audiovisual alteration, I turn not to sampling’s musical origins but to a visual art analog to the Fairlight’s floppy disk: mail art, a transnational movement that took root in the 1950s.

TRANSNATIONAL EXCHANGE IN 20TH-CENTURY MAIL ART AND FAIRLIGHT FLOPPIES

The Fairlight’s transformation of objects like Volkswagen Golfs into sounds, and consequently into audiovisual objects in music videos, runs parallel to midcentury mail art, where artists treated letters as found objects, slightly altered them, and sent them to correspondents with new meanings. Much as mail art turns words into images and back again, the Fairlight takes objects like car engines and turns them into presets, which enables artists to use them in a network of other sounds and, ultimately, attach them to images in music videos. The Fairlight’s presets foster an economy of exchangeable art objects where artists build on each other’s references.

At the heart of both mail art and sampling is a yearning for correspondence. Art historian Ina Blom defines mail art “as communication, an act of ritual generosity, social networking, and the new ideal of interactivity or democratic participation in the arts.”¹⁶ Mail art has no true point of origin: as soon as a piece of mail art leaves its sender, it belongs to the postal system and its chain of recipients. The collapsed sender/receiver, art object/artist binaries in mail art also characterize Fluxus, a midcentury association of artists who valued art-making as a process and as a relationship between artist and audience. The mail art movement was led in the United States by Fluxus members Ray Johnson, Raoul Hausmann, and Robert Filliou. Johnson, the founder of the tongue-in-cheek *New York Correspondance School of Art*, had hundreds of correspondents in the postal system. Collaborators would, as art historian Johanna Gosse describes, “‘add to’ a mailing and then pass it along to an ever-widening group of recipients: conceptual art meets the chain letter.”¹⁷

The chains of meaning circulated by both the Fairlight floppies and mail art are reminiscent of collage—works where component layers are still detectable but recombine in new meanings, not unlike the collisional model for audiovisual art presented in chapter 1. In ways that similarly sparked asynchronous yet

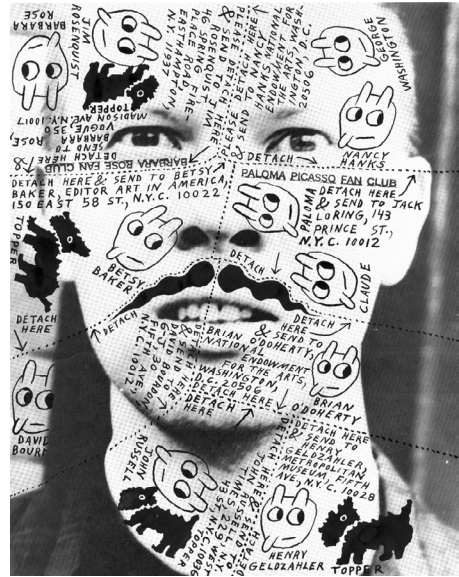


FIGURE 12. Ray Johnson, *Untitled (Ara Ignatius Portrait with Detach)*, n.d.
© The Ray Johnson Estate.

connected interactions, Fairlight samples were short bursts of sound: its limited random access memory could only store sounds under a second long. Additionally, its low 8-bit quality prevented artists from using samples for lead vocals or key acoustic elements, so its samples were layered in DAWs to provide momentary yet meaningful connections. Through a collage model, both mail art and the Fairlight rely on a malleable network of contributors to circulate found materials and tweak, whether slightly or radically, their cultural meanings.

Collage's influences on mail art can be seen in the work of Johnson, who especially used faces as material for transformation, as in *James Dean (Lucky Strike)* (1957) and *Oedipus (Elvis Presley #1)* and *Elvis Presley #2* (1956–58). The undated mail art in figure 12 cuts up Johnson's face with his infamous instructions "and send to." Art historian Miriam Kienle dissects the queerness of Johnson's mail art, as it "emphasizes correspondence not as a product of inherent sameness but rather as a construction of likenesses elastic enough to embody differences."¹⁸ Johnson had to work within defaults of heterosexuality, as expressed by his close correspondent William S. Wilson: "His survival as man and as artist meant obeying self-set laws aligned with self-set standards. [. . .] An object serving different purposes did not necessarily lose its identity. [. . .] Ray had, since puberty, been divided within himself, as both the good son and the gay boy, using parts of his body for purposes which differed from biologically authorized purposes. A task was to work out his identity as one man, in spite of differences, which seemed to divide him in two."¹⁹

Johnson's bodily collage shows that sexuality is not skin-deep. In his art, he would divide himself into not just two, but many, pieces, to break apart presets and

recombine them into something new—which correspondents could put to alternate purposes, altering art in order to, perhaps, alter cultural defaults of heterosexuality, white privilege, Western privilege, appearance-oriented privilege, and more.

Johnson was not the only mail artist who made collages (or the related practices of surrealist exquisite corpse or Dada photomontage). Recall Duchamp's postcard that gave Mona Lisa facial hair, queering a found object. Duchamp created a Fairlight-like sample library in his *Boîte-en-valise* (1935–41), a leather suitcase-shaped box of 69 reproductions of his readymades. Given the whiteness of the mail art history I have traced so far, it is not insignificant that Duchamp referred to *Boîte-en-valise* as an "album," a word that etymologically links to blank pages through the Latin *albus*, or "white."²⁰ History predominantly has sampled from whiteness. But many mail artists worked to widen circles of creation and dissemination. Fluxus artist Mieko Shiomi's *Spatial Poem No. 1* (1965) sent cards through the postal system, inviting collaborators worldwide to contribute to a "word event" that created a new network of artists. Each artist left a word or words that sampled their work, which Shiomi placed in relation to others through the mail and as a flag on a world map. Shiomi helped people worldwide to forge lexical and transnational connections.

The art of mailing letters as well as floppy disk samples back and forth, especially transnationally, interrupts preset ideas of what art is: these practices make art about the journey, not the destination. As a participatory art form activated by reception and interpretation, mail art for Gosse "is constituted not so much by discrete objects as by ongoing experiential processes, activities and encounters that require participation for their myriad meanings to catalyze and their full implications to be realized."²¹ So, too, must a preset be circulated and contextualized to become a preset. In early sampling, the floppy disk furthered the work of silent film music encyclopedias by circulating preset themes for certain moods and settings, as in the pairing of chase scenes with preset "hurry" music. In many ways, the Fairlight is no different from the stereotypical "ethnic" music used and reused for silent film scenes in the *Sam Fox Moving Picture Music* catalog. Much like its "Indian Music" piece uses a simple melody and open fifth interval to harmfully portray the Western misconception of the "simple savage," the 1982 CMI IIX sample library's NATIVES preset, with the written description "the natives are restless," puts forth much the same stereotype. By carrying links between preset themes and moods forward into digital sample libraries, the floppy supplied presets for sampling today that perpetuated both sounds and their cultural baggage.

Putting mail art and floppy mailing in conversation also emphasizes the small-scale interactions and ephemeral transformations of the transnational exchanges of meaning that were key to both mail art and sampling. For Argentinian mail artists Edgardo Antonio Vigo and Horacio Zabala, "Sending a letter by mail involves the transmission of a message and is an act of communication between two people. The use of the mail makes communication possible at a distance: it connects a sender and a recipient. [. . .] The fact that the work must travel a set distance is

part of its structure, is the work itself. The work has been created to be sent by post, and this factor conditions its creation (dimensions, postage, weight, content of the message)."²²

Vigo and Zabala characterized the set distances, dimensions, and rules for mailing items through the postal system. These defaults of institutional infrastructures irrevocably shape communication and art forms. The work of mail art is its circulation, not merely visual objects but the network of ideas behind that object in motion. Shiomi's word event that subsequently became a three-dimensional map of artists, or the Chilean mail artist Eugenio Dittborn's *Airmail Paintings*, whose politics of travel were located in the folds of paper that were opened and stuffed back into envelopes worldwide during 1980s dictatorships, traverse multiple borders, physical and metaphorical, in order to find connection.²³ Like mail art challenged the ways institutions vertically controlled and sanctioned art, instead highlighting horizontal nodes between makers and interactors, early Fairlight sampling connected instrument makers and artists through presets on floppy disks that were shared between musicians and manufacturers.

I follow the floppies of the Fairlight in a similar manner, insisting on their use as material substrates in a preset system of mail that was instrumental in the creation of sampling libraries and procedures—and sonic presets used repeatedly in music and media. By comparing the postal distribution of samples to mid-20th-century mail art movements, I add new understanding to the messiness of media-technological movements, the establishment of conventions, and more. As music technology scholar Paul Harkins writes in his study of the Fairlight and digital sampling, "By following the instruments, designers, users, and sellers of music technologies, we can try and make sense of the socio-technological processes of music making in the twentieth and early twenty-first century [. . . and] a more nuanced understanding about the relationship between humans and music making technologies."²⁴ Here, I follow the floppies, zooming in on an aspect of the Fairlight that is understudied to unearth preset samples' muddy, nonlinear histories.

FOLLOWING THE FLOPPIES

With the Fairlight, the disk drove everything. Whereas in synthesizers, presets were a tangle of patches and cords, in the Fairlight they were systematized inside a black box and a removable, transferable way of sending and receiving samples: the floppy disk. Its mailability started the chain of sampling, such that sample libraries were built disk by disk. This is why there is not a centralized sample library for the Fairlight—try as Nord Keyboards might with their "Fairlight online collection" that has chosen to emulate an "overhauled System IIX"²⁵—but rather a network of individual disks sent and received by individual users. The 1982 manual for the Fairlight CMI IIX reports, "This sound library is constantly being updated and improved. Revision disks will be available to keep your library up to date."²⁶ But that was necessarily a

slow process. As Vogel explained, “15 years before the internet was around, [. . .] software updates involved putting a floppy disc on a courier and sending it by DHL across the world. It was expensive and slow to do updates. It wasn’t something that you could just put out on the internet and have it be there within seconds.”²⁷ In this way, following the floppies leads us to a more complete understanding of how and why preset sample libraries came into being and their use still today across various DAWs and music-making platforms, from GarageBand to Splice.

A typical Fairlight user would have access to a sample library of 29 disks, which encompassed 28 sound disks and a demo disk of how Page 9, the sequencer, and Music Composition Language work to both string together and play back users’ presets.²⁸ This demo disk is what encourages users to learn how to record their own samples, such that the sample library disks shipped with the Fairlight become infinitely expandable. As music technologist Rob Puricelli writes, “In the early days of sampling, you either used the factory sounds or made your own. Sample libraries as we know them today didn’t exist back then, at least not until the mid-1980s, so the guys in the Fairlight office tried their best to supply their new machines with a decent amount of content to get on with.”²⁹ The Fairlight thus was an early sample library that drove users to get creative with their own samples—at once offering factory presets as readymades but also a machine for interested users to make their own presets. But the Fairlight manufacturers were not necessarily building a sampling democracy formed wholly by the circulation of floppy disks. As the CMI IIX Sound Library manual reads, “Most of the sounds presently forming the library were sampled in our Sydney studio, although occasionally we receive sounds from users that are of sufficiently high quality to warrant inclusion. Should you have a sound, or sounds, that you feel might meet this high standard, we welcome your submissions, with the prospect of any sound included being given full credit in this most prestigious collection.”³⁰ The statement’s emphasis on high standards perhaps stemmed from contemporaneous complaints from musicians’ unions that feared that artists’ labor would be replaced by machines. For musicians’ unions, the best chance for survival was for an electronic innovation to fail to meet certain standards—a problem facing the automation and commodification of music. As Sterne wrote about the MP3 music format, “a particular standard is situated among technical, industrial, and aesthetic concerns all at once—and attempts to negotiate them.”³¹ Musicians’ unions were concerned that presets sounded like acoustic instruments, that electronic presets were so functionally equivalent that they could replace the sound and potentially labor of acoustic instrumentalists through sampling on the Fairlight. These are functional equivalents that come with plenty of strings attached, as electronic sounds were sometimes reminiscent of the acoustic instruments they purported to be and others were not. (An aside: as a former oboist, I think Fairlight presets make a mockery of that instrument!) Manufacturers, as stated above, also had aesthetic, technical, and political concerns, in that they wanted to maintain a purity of “most prestigious” presets. As we will see in

following the floppies, sample libraries are always in tension with the standards that critics and industries decide in art, as the readymade indicates that what is canonical can shift—from a urinal to a *Fountain*. But what about artists' technical, industrial, and aesthetic concerns?

At the same time that floppies broke a path forward for default sounds to be installed in the Fairlight's and other future sample libraries, they also were fully customizable for users. Much as Duchamp focused on the ways in which artists transform readymades by placing them in new contexts, artists negotiate how they can creatively use presets. Fairlight artists who experiment with ready-made sounds and send them to other artists discover new aesthetics in sonic and visual realms and new ways to play with default settings. As much as industries, manufacturers, and systems establish sample libraries and sampling conventions, so, too, do artists' choices and the distribution of their music and music videos in different networks.

In the next three sections, I explore three presets to demonstrate the crucial role of path dependence to the Fairlight: that is, when artists and technicians, not merely manufacturers, help to decide an instrument's uses after it is designed. I explore GLASMASH, ORCH₂, and SARARR, some of most well-known Fairlight samples that became presets in the disks' libraries. I trace the origins of their creation by artists, as well as their subsequent distributions via floppy disks, into songs, and onto screens in music videos.

GLASMASH

GLASMASH was an early sample that circulated among several Fairlight operators, from Gabriel and Vogel to producer Burgess and Bush. Burgess, who programmed Bush's Fairlight, recalls how he and Bush created the sound together: "We took glasses, I guess, from the kitchen. We had, I seem to remember, a concrete block or something in the studio and we just threw them down on the concrete block and recorded it. We had several samples and we stacked them up and then just found a combination of keys that made the best sound. The pitch changing is all from the keyboard on the Fairlight and mostly they were clusters, semi-tone clusters, on the keyboard."³²

Burgess and Bush combined multiple samples, articulating the preset GLASMASH as a Russian nesting doll of samples. This is a key difference between presets and samples: a preset can contain multiple samples. A preset is not, contrary to what many musicians thought at the time, one simple sound. Both sampling and presets can entail a multistage production process. Bush produced her own music early in her career, and she was meticulous about finding the right sound for the affect and narrative of her songs and videos.

Bush was not the only artist to seek out the ideal presets for their music. A 1982 *South Bank Show* episode about Gabriel followed his visit to a junkyard with

producer David Lord to record “any noise they found interesting: scraped paving slabs, blown bottles and tubes, even smashed-up TV screens. All these sounds were sampled into [Gabriel’s] Fairlight CMI sampler and used extensively throughout the album [*Security* (1982)].”³³ *Security* contains many uses of the Fairlight in 1982, but most of all, it shows the influence of GLASMASH on the floppy Gabriel cued up in this documentary television series. GLASMASH seems to have multiple actors and authors; the Fairlight CMI IIX Sample Library labels GLASMASH as “smashing glass” on disk 30, “Effects4,” but does not attribute authorship. To track the collage artists of GLASMASH, we must follow the disk through its subsequent uses, as well as its contested beginnings. According to Vogel,

Peter [Gabriel] actually smashed that glass, because as soon as I showed him the sampling, he thought ‘ah, I wondered what happens if we smash some glass.’ And he found [. . .] an old TV or something, and in his backyard of his house there at Bath, he put it in a cardboard box and set up a microphone and grabbed a crowbar and smashed it. And then when you play back that breaking glass sound at different pitches, if you take it up or down a couple of octaves, it can sound like thunder or it can sound like a fairy’s wings tinkling at higher pitches, so it’s a very versatile sound.³⁴

While GLASMASH’s authorship is contested between Burgess/Bush and Gabriel, the preset could be put to a large variation of uses. GLASMASH’s arguably most famous use is on Bush’s *Never for Ever* (1980), a landmark album for early Fairlight presets. GLASMASH features on “Babooshka,” the first track on Bush’s coproduced third album, which was the first number one album in the United Kingdom by a solo female artist. “Babooshka” peaked at number five for 10 weeks in the United Kingdom and was Australia’s 20th best-selling single of the year, evidencing the transnational diffusion of GLASMASH.³⁵

In the song, Bush plays a wife who tests her husband by adopting the pseudonym and persona of Babooshka. “Babooshka” is the Russian name for grandmother, but Bush uses it for its sound over its meaning. Bush introduces GLASMASH into the song after Babooshka catches the wife’s husband’s eye; “in the break [. . .] it’s really her just throwing the restaurant at him, so there’s like cutlery going straight across the room.”³⁶ The vivid image Bush has of breaking glass has a sonic parallel in GLASMASH, which in “Babooshka” becomes a preset for strife, especially coded as domestic. GLASMASH occurs when the husband’s infidelity is exposed.

GLASMASH becomes particularly poignant when paired with music video images; Bush is a visually oriented creator, beginning the songwriting process with clear images in mind. Bush’s music and music videos take up themes of romantic love and desire, often inspired by the Victorian novels she devoured; her 1978 song “Wuthering Heights” is a prime example. Bush detailed her fundamentally audio-visual songwriting process, verging on Method acting, in a 1980 interview: “If I’m writing a song about another person, I’ll really try to become that person. [. . .] To

create the visual ideas [in music videos . . .] it really does depend on the song, because the song lays down every key mood and who you are, what you wear, what color the set is, you know. It's really the song [that] dictates it all."³⁷ In the "Babooshka" video, Bush alternates between two personas—the wife (wearing a black unitard) and the lover (in a glorified bikini)—as she dances with a double bass, a large stringed instrument that towers over her and acts as a stand-in for her husband.

In much of the video, Bush stares and lip-syncs at the camera—a direct address that jars with her third-person narration, until the viewer realizes that Bush is posing as the wife who is posing as the lover Babooshka. This nesting dolls conceit seems intentional, as the dolls also are called babushka dolls. Bush's shift from one persona to another reaches a theatrical height—along with her vocal range—as she cries, "All yours, Babooshka" to implicate the cheating husband she imagines before her. Her fierce direct address to the camera is also a common trope of MTV rock videos, as well as her lip syncing.³⁸ Direct address and lip sync become a preset in music videos to build rapport between artists and their audiences. Here, Bush implicates viewers to feel Babooshka's rage, as she exaggeratedly opens her eyes and her body thrusts animatedly as she grabs the hilt of her sword. She wields it in the video's final moments as if the sword has the last word in infidelity. Her theatrical wrath strikes historian Ian Cawood as an "unwillingness to commercialise her music [in order to] use it to speak what she regards as an emotional truth, directly to her audience."³⁹ In 1980, speaking about a woman's emotions surrounding infidelity was risky, much as her refusal to commercialize her pop/rock sound or music videos. "The happy stories for girls remain based on fairy-tale formulas: life, marriage, and reproduction," feminist writer Sara Ahmed observes.⁴⁰ Bush's ruptures with fairy tales prescribed for gender roles and compulsory heterosexuality might bring criticism of her nonalignment with those cultural norms. But defying defaults also dares for freedom.

Like the direct address in Bush's music video, GLASMASH creates a dramatic crack in the fourth wall (beginning at 2:22 in the YouTube video). The sharp bursts of shattered glass echo the downward throwing of glass to create the sample, and in the video, the broken glass also disrupts the image with kaleidoscopic color and static. GLASMASH thus interrupts the visual field and the pop song's expected four-beat drive. For music video theorist Carol Vernallis, "music video is orchestrated to showcase the most arresting features of a song. [. . .] To share ground with or showcase features of a song, images must often relinquish qualities associated with objects and adopt those of sounds [. . . with] permeable and indefinite rather than clearly defined boundaries."⁴¹ But when the arresting feature is sampled from an object, as GLASMASH is from broken glass, the video showcases both object and sound for maximum impact in the image. The inextricability of image, sound, and sample referent in the video highlights the alternation between Bush's imagined images, GLASMASH's sound, the Fairlight's image of it, and the resulting video.

GLASMASH's imaged waveforms on the Fairlight are remarkable enough to appear prominently in the aforementioned *South Bank Show* Peter Gabriel episode, as a site of visual fascination that satisfies a meticulous audiovisual creator. Bush, similarly, thrills at the ability to "actually see a sound [on the Fairlight]. Incredibly ugly sounds can look really beautiful—it's really like another dimension: visual interpretation of the world rather than audio."⁴² GLASMASH's audiovisuality serves several functions. This found sound echoes musique concrète recordings of everyday events; it may remind listeners of moments when relationships reach a breaking point, and a wine glass is smashed in the course of an argument.

In the music video for "Babooshka," GLASMASH also shatters the seamless visual transition between Bush's two characters, who previously were knitted together by subtle zooms to matches on action and her insistent rhythmic dancing. But with GLASMASH, Bush commandeers viewers' access to her star image by momentarily obliterating it, in a subversion of direct address. Once the glass breaks and the wife-Bush lifts her veil, Babooshka-Bush takes up her sword to dance with it like a guitar: by musicalizing her weapon, she signals to viewers her control as both songstress and video artist. The Fairlight's mode of visualizing sound showcases Bush's penchant for layering audiovisual signifiers. In an interview, she reported that in working on the Fairlight, "I'm getting associations of the sounds straightaway as I start writing the song."⁴³ When she cuts and pastes surprising sounds and images together, much like Johnson's segmented face in *Untitled (Ara Ignatius Portrait with Detach)*, the breathtaking junctures between sound and image unveil traces of her labor of expression as a person and an artist.

Bush uses the Fairlight, dance, and collage logic to pivot between her artistic identity and theatricality in "Babooshka." The Fairlight sample momentarily shatters the typical reception of a singer as the auteur of their video, which, alongside direct address, becomes a preset frame for stars in music videos. Madonna's "Material Girl" video (dir., Mary Lambert, 1984) is one example: she is framed as an auteur who leads a coterie of male dancers. For dance historian Sally Banes, Madonna's dancing "def[ies] gender stereotypes and expectations [. . . as it] always functions together with (and cannot be separated from) camerawork and editing."⁴⁴ Bush's forceful dancing similarly reacts to and spurs on the editing that surrounds her revelation. The "Babooshka" video created prismatic static that alerts listeners to musique concrète within pop. This rupture in both sound and image signals her character's breaking point after enduring the pressures of a to-be-looked-at woman—that familiar icon of early MTV that Madonna brings to mind.

Bush's audiovisual collage collides "real and natural sounds and extremely electronic synthesized ones" in ways that stand in for both instruments and concepts but also transform them.⁴⁵ Unlike purists who refuse to mix acoustic and digital sounds, Bush samples musicians and alters them digitally. For example, "Babooshka" features the balalaika, a traditional Russian stringed instrument played initially by Paddy, Bush's brother and career-long collaborator. The balalaika sample turned

Fairlight preset, which veers Bush into Gabriel's well-trodden territory of world music (he liberally used global musical styles), covertly airs an exoticized signifier of the Babooshka-Bush persona before she appears in the video. The balalaika preset, and others for instruments like the shakuhachi flute, fueled Fairlight musicians' participation in 1980s world music trends. As Gabriel quipped, "I'm certain the third world is going to have an increasing influence on our culture. And in music, a very vigorous hybrid will be produced, which is based on this non-European influence, and this new technology which is going to get very very cheap, and this facility will open up a new age of electronic skiffle."⁴⁶ Gabriel often smuggled in "exotic" sounds, taking advantage of cheap labor and sound reproduction to augment his music. His and others' uses of Fairlight samples show how colonizing sound becomes a preset way to sample and hold onto cultural defaults of Western privilege and the stereotyping of myriad sounds from other cultures. In "Babooshka," the balalaika preset infuses one sensory world of Bush's character with another, as in the quick superimposition of Babooshka-Bush on the back of wife-Bush's bass when she spins it in the second verse. In this song, Bush's uses of found objects transform a singular intimate event into generalizable dimensions. Presets are utilized for what cultural theorist Margaret Morse calls "drawing the imaginary world into being," filling rote objects with imagined scenes and emotions.⁴⁷ In a music video such as "Babooshka," the briefest flicker of an image speaks volumes when it collides with adjacent images, lyrics, and music, as in a mail art collage.

In this early use of the GLASMASH preset, the Fairlight plays a role in empowering women as producers of their music, not merely as to-be-looked-at vocalists (which, as chapter 2 argued, eventually occurred for women synthesists too). Bush coproduced *Never for Ever* and produced her own music from 1982 on—she had the fortune to do so in both senses, having capital and also having been discovered by David Gilmour of Pink Floyd. In an interview, Bush credited the Fairlight in "taking over the production. Then I had control of every area of the song. [. . .] From a writing point of view, the more control you have over that whole area, hopefully the more direct your expression is, it's more how you want it to be at the end result."⁴⁸ Thus, rather than the presets having control over Bush's artistry, the Fairlight was a vehicle with multiple presets she used to make her emotional and musical expression more direct.

Emblematic of the ways artists transform presets both sonically and visually, Bush cast GLASMASH as its own nesting doll in "Babooshka": a sound, within a disk, within a song, within a video. The song's music video, like the Fairlight's waveform visualization of GLASMASH, depicts highs and lows of emotion in each crest and trough of a sound wave. Bush embraced the preset's capability of heightening the drama of real-life scenarios, in turn helping Fairlight presets to visualize other narrative and theatrical forms in music videos.

GLASMASH offered similar shock waves for other bands who used the Fairlight: for example, in Frankie Goes to Hollywood's 1984 "Two Tribes," GLASMASH

synchronizes with a punch thrown in a boxing match between then-President Ronald Reagan and then-Soviet leader Konstantin Chernenko in Kevin Godley and Lol Creme's video—which ends with the world exploding, as if to mimic Bush's shattering. In the Christmas version of "Babooshka" (also 1980), Bush punches the air with each GLASMASH, which mirrors the punching throughout Frankie's "Two Tribes." Whether or not Frankie saw the Christmas video version of Babooshka, they present a collage akin to Bush's depictions of GLASMASH. These repeated uses of a preset reveal how widely music video imagery can vary for the same sound: while both artists sonify a violent revelation, Frankie frames GLASMASH as a political intervention, and Bush stages it as a feminist one.

As Fairlight artists used presets to make the personal political, so did mail artists in Argentina under dictatorship. For example, in 1980—the same year as "Babooshka"—Graciela Gutiérrez Marx created *Los códigos marginales de Mamablanca*, which was a series of postcards to celebrate her mother. The image side was painted all white, and the other side read, "Family Group, reconstruction of the myth" alongside recipients' addresses. As art historian Madeline Murphy Turner relays, the white image signifies the white handkerchiefs waved by the Madres (Mothers) de la Plaza de Mayo from 1977 as they protested the systemic disappearances of their children under the dictator Jorge Rafael Videla. Turner observes, "The Madres shifted the culturally crafted private role of the mother into the public sphere [. . . much as] artists such as Graciela Gutiérrez Marx and Polvo de Gallina Negra distributed their projects through the mail to evade state and institutional censorships."⁴⁹ In this way, public and private displays of intimate protest occur in the mail as they do in the public square or in the rectangular frame of a music video, using preset forms to smuggle in political meanings.

In 1984, alongside "Two Tribes," GLASMASH also appeared in Trinidadian British singer Billy Ocean's "Caribbean Queen," which charts out a more intimate public. Much like the initial inspiration Bush had for "Babooshka" in a restaurant with flying cutlery, the music video for "Caribbean Queen" depicts a broken wine glass as Ocean sings about losing his cool when seeing the titular queen in his dressing room. Ocean's GLASMASH accompanies a heterosexual couple, as Bush's did, but he uses the preset to signal passionate love rather than anger at an affair.

Also in 1984, GLASMASH was used by Frankie Goes to Hollywood not for heterosexual, but rather queer, relationships; two of the band's members, Holly Johnson (lead vocals) and Paul Rutherford (backing vocals) were openly gay. Their 1984 hit "Relax" alluded to phallic sex and was momentarily banned by the BBC, but "Two Tribes" was more subtle, possibly invoking homosociality between former President Reagan and Chernenko. In the latter song, Frankie's use of the preset parallels the "productive ambiguity" that Kienle identifies in Ray Johnson's queer correspondence art: "Johnson's work is inextricably structured by the queer tactics of plausible deniability, productive ambiguity, and the multitudinous associations he developed to contend with the conditions of hetero-normativity and

homophobia in midcentury America.”⁵⁰ By coding GLASMASH as potentially queer in “Two Tribes,” Frankie makes ambiguous use of the preset but nevertheless questions cultural defaults like Bush’s “Babooshka” does—creating collisions of murky meaning, as in mail art, between the floppies, the sound’s placement and context, and its corresponding images.

The GLASMASH network of floppy following seems to have fizzled out in the 1980s; the preset was used in Zinno’s “What’s Your Name” (1985), Whodini’s “Funky Beat” (1986), and Howard Jones’s “The Balance of Love (Give and Take)” (1986). In 2021, however, GLASMASH resurfaced; it became a preset for a trend of lip-syncing to “Babooshka” on TikTok. The nature of algorithmic content creation and cultural biases makes it difficult to trace the trend’s origins. But somehow “Babooshka” took root in young Gen Z minds and hearts, even before the popular use of “Running Up That Hill” in the fourth season of the Netflix show *Stranger Things* (2022). I suspect that “Babooshka” took over TikTok because Bush’s use of GLASMASH in the chorus fits a common TikTok formula of the “reveal”—which can also be traced back to drag reveals, as when a drag queen removes a wig or article of clothing.⁵¹ In some TikToks, the creators don similar costumes to Bush, while others lack a reveal, instead paralleling the theatricality of Bush’s music video. The latter TikToks suggest an attempt to break from cultural norms, to GLASMASH a new path forward.

As GLASMASH traversed different artists, nations, music videos, and digital content, it took collage forms much like mail art. By circulating sonically through floppy disks in the mail, GLASMASH’s depiction onscreen doubles down on the floppy’s visual medium of transportability and missive. While we might first have thought that the floppy was not crucial to the story of sampling, its storage preset became the medium upon which samples, and subsequently audiovisual stories of those samples, were made. Ultimately, mail art logic parallels the audiovisual sampling logic of the Fairlight as collage. But to fully unpack that audiovisual logic, we must follow not only floppies but also follow Fairlight and music television screens.

FOLLOWING THE SCREEN

Herbie Hancock demonstrated not only synthesizers but also the Fairlight—on *Sesame Street*. As Hancock told the children on the show in 1983, its screen displayed “what the sound looks like.” When a girl named Tatyana Ali (who was later on *The Fresh Prince of Bel-Air*) spoke her name into a microphone, Hancock and his programmer played it back on the keyboard and then showed its varied waveforms on the screen. This whimsical segment reveals how the Fairlight’s visual editing interface forever changed sampling—and became a preset for music creation and audio editing on DAWs. Just as the push-button car radio was supplemented by multiple screens, the windshield and the cinema screen, the Fairlight’s computer monitor often was mirrored by corresponding soundwave-inspired imagery on MTV.

The Fairlight's screen was instrumental to assembling mail-art-esque sound collages of presets. Unlike the painstaking process of splicing magnetic tape, digital sample editing was facilitated by functional equivalents. As the Fairlight's manual declared, "The equivalent of [knobs, switches or patch cords] are displayed in a meaningful way on the graphics monitor for manipulation by the user when creating a sound or instrument. It takes only a few seconds to save, onto floppy-disc, many parameters which can be recalled later and modified if desired."⁵² Once floppy disks stored presets as sounds and as data, the screen permitted their near-instantaneous retrieval and manipulation. Keyboardist Thomas Dolby thrilled at "drawing waveforms on the [Fairlight's] screen": through this visual experimentation, "you hit on a sound that is so inspiring that the next thing you know, you've written a song."⁵³ By now, this is a familiar story—much like mail art collage, a single preset can inspire an entire song and its promotional imagery. The Fairlight's graphic interface shaped the audiovisual logics of sampling that developed through MTV, as we have already seen in the music video images that artists paired with GLASMASH. Such visualizations of presets not only evoked a historical interest in visualizing sounds but also became a preset for the way that artists and media composers now edit audio—with sound and vision not divided but interlinked.

The Fairlight CMI Series II introduced Page R, a sequencer or graphic interface for depicting eight rows of sound tracks in order to arrange each sound horizontally and vertically. Music theorist Megan Lavengood defines the sequencer as "a computer that can store and recall patterns entered by the programmer. The programmer does not necessarily have to enter these patterns in real time, which introduces the possibility of programming something that would be quite difficult to perform if played live."⁵⁴ Thus, the Fairlight's visual interface allowed musicians not only to recreate the samples they had recorded but also to arrange them. The Fairlight introduced an audiovisual way of producing sound and music that would have wide ramifications for their production, as well as that of music videos. Of course, the Fairlight's technology for depicting sonic layers expands on music's preset notational forms, extending a laboratory for audiovisual experimentation. Like musical modernism's extra-musical sounds proliferated with vocalists/composers Cathy Berberbian's and Yoko Ono's graphic scores, the Fairlight's ability to sample sounds from everyday objects necessitated a new graphic interface for treating all sounds as raw materials for composition. From the late 1980s, the waveform (and, to a lesser extent, the piano roll) combined audio editing and sequencing in DAWs. In film composition and sound editing for media, tools like AVID's Media Composer popularized edits using waves' visual patterns. The Fairlight's screen became a preset for the modern DAW, from Ableton to Logic Pro to Pro Tools.

Moreover, the Fairlight's visualization of sound editing arose concurrently with music television: the computer monitor paralleled an MTV television screen. Crucially, the preexisting referents of samples brought in associations

that were at once aural and visual: artists drew inspiration from the shapes of waveforms that were televisualized on the Fairlight's monitor, such as the kaleidoscopic GLASMASH topography that Kate Bush transposed into a rainbow shattered frame in her "Babooshka" video. The Fairlight's computer screen turned a musical instrument into an audiovisual medium, a playground for experimenting with sound-image aesthetics that had the power to recontextualize presets. Music videos offered yet another way to circulate and recontextualize presets as collage material.

Take the audiovisual experimentation of GLASMASH. In music videos, the percussive punctuation of the GLASMASH sample is illustrated with kaleidoscopic static by Bush, and with men throwing punches in "Two Tribes" by Frankie Goes to Hollywood. These audiovisual impressions of GLASMASH travel forward into songs like M.I.A.'s "Paper Planes" (dir., Bernard Gourley, 2008), which samples gunshots and cash register dings. Each of these artists' interruptive samples generates visual consequences in music videos—kaleidoscopic bursts, punches and slow motion, and finger guns that M.I.A. fans hold up during concerts and on TikTok. Fairlight samples and their accompanying images in music videos allowed artists to present commentary on cultural issues like policed borders.

Fairlight preset-making also fueled possibilities for fabrication, a contentious issue for much of sampling's history. M.I.A.'s gunshots were preceded by Fairlight gun samples in Bush's "Army Dreamers" (1980), also on Bush's *Never for Ever*. Bush and Burgess sampled and overdubbed several different gun sounds for the sound of one cocked gun.⁵⁵ The layered sample comes to express grief for the titular "Army dreamers" who do not live to fulfill their dreams. But in the video, the collaged preset gains come-hither status, as it first appears synchronized to Bush's blinking eye in extreme close-up. The gun simultaneously summons several emotional meanings—of sexuality, war, and pain—much like the glass in "Babooshka." Layered sonic textures aestheticized the gun preset; for Burgess, "Sometimes you have to fake it up in order for it to sound correct."⁵⁶ This recalls Foley, which is media sound design created from live performances of sound-making, such as snapping celery to play when a bone snaps onscreen. The Fairlight became a stand-in for Foley in several films, especially *Crocodile Dundee* (dir., Peter Faiman, 1986) and *Crocodile Dundee II* (dir., John Cornell, 1988). But sometimes film images provoked a whole soundtrack's aesthetic of artifice, as in the Australian independent science fiction film *Liquid Sky* (dir., Slava Tsukerman, 1982) and *Terminator 2: Judgment Day*. The visual innovation of the latter, an early CGI, or computer-generated imagery (see chapter 4 for more on the audiovisual aesthetics of CGI) film, directly inspired Brad Fiedel's Fairlight score.

Fiedel corresponded with and dovetailed off of director James Cameron's visual style, much as in mail art correspondences. Fiedel used two Fairlight CMI IIIs, "one for percussive sounds and one for the sustains and melodies."⁵⁷ For the antagonist T-1000, Fiedel created a preset of what he called "a sample of a room

full of brass players warming up and playing [. . . taken] down into a speed and pitch that was not recognisable. [. . . It sounds like] artificial intelligent monks chanting in a weird chapel or something.”⁵⁸ Many viewers likely neglect how Fiedel matched Cameron’s CGI innovations with his Fairlight prowess. When Cameron doubted some of the score’s tones, Fiedel told him, “You’re creating something that people have never seen before, and it ought to sound like something people have never heard before to support that.”⁵⁹ As early Fairlight ads regaled, Fiedel sculpted new sounds and layered timbres in complex arrangements that surpassed preset expressions of known objects and emotions.

And yet, the brass sound has become a preset for modern-day movie trailers—particularly, the “BRAAAM” from the *Inception* trailer. This preset has been associated with the film’s composer, the infamous preset hater Hans Zimmer. However, the music for the theatrical trailer was composed by Zack Hemsey. Even more confusingly, before Hemsey, composer Mike Zarin worked on the teaser trailer.⁶⁰ A collage, maybe even an exquisite corpse (where one artist completes the line left by a previous artist), emerges from their musical ideas for the film and its prominent motif of a train journey: Zarin used train Foley mixed with brass samples, Hemsey musicalized it, and Zimmer wove it into the score. Whereas Fiedel’s brass sound is accompanied by the molten material of the T-1000 morphing and reforming into its humanoid shape, the three “BRAAAM” collage artists use it to amp up anticipation. Once anti-preset, Zimmer takes a cue from the Fairlight that would become a preset for action-adventure movie trailers, so notorious a sound that even *South Park* parodied it (“Insheption,” season 14, episode 10, 2010). Few Fairlight presets and their spiritual successors have been more pervasive in popular culture—except, perhaps, ORCH2.

ORCH2

Known as both ORCH5 and ORCH2,⁶¹ the “orchestra hit” preset—a large chord when many instruments play at once—has heightened the Fairlight’s ability to bring “wild” sounds into the mainstream. ORCH2’s sound was an unlikely pairing of high classical music and popular music: it was sampled from Igor Stravinsky’s *Firebird Suite* but used in hip hop as a record scratch sound. As Fairlight inventor Vogel explains, ORCH2 was “a complete accident. [. . .] I grabbed a random LP that I had sitting on the shelf, and the very first sort of sound or chord on that track happened to be what has come to be known as the orchestral stab. There’s a lot of different instruments playing notes to build up a very fat chord. I played it back at different pitches and it sounded quite unlike the original sound, but obviously it was a very interesting sound in spite of being corrupted from its original intention.”⁶²

Vogel’s line that the orchestra hit was “corrupted from its original intention” in its transfer from the record to the Fairlight floppy raises a question for presets:

If something becomes a default and is used widely, is it still useful to talk about original intentions? Perhaps only if it becomes popular and someone wants credit for it. ORCH2, and the orchestra hit more broadly, has been used hundreds of times from the 1980s up to Bruno Mars's and Cardi B's "Finesse" (2016).⁶³ The sample's attributed authorship has been corrupted too; musician David Vorhaus lays claim to choosing the record at Vogel's Rushcutters Bay Fairlight factory in 1978. A fan of Stravinsky's *Rite of Spring*, Vorhaus "found that particular sample [in the record collection] and put it on his Fairlight." Who would not want to be credited for what Vorhaus calls "the most sampled sample of all times?"⁶⁴ This slip-page between preset and sample has implications for its use; since the preset on the Fairlight was ready-to-hand, it ensured its spread throughout its most adjacent users in the 1980s.

The Fairlight's ORCH2 preset was shaped by the machine that recorded and played back the sample with limited 8-bit memory. Due to the Fairlight's short sample time, ORCH2 functions as a quick and powerful accent. Its most notorious early use was in Afrika Bambaataa and the Soul Sonic Force's "Planet Rock" (1982). Bambaataa and his band used one of the first Fairlights in the United States at Intergalactic Studios. DJ/producer Arthur Baker recalls, "We used an explosion, the handclaps and the orchestra. Once we heard the orchestra [hit], which I think Tom [Silverman, manager of Bambaataa's label] hit, we thought, 'Oh, that's amazing. We've got to use that.'"⁶⁵ ORCH2 has the first word on the 5'20" version of "Planet Rock," with five hits in a row, and it hits on every downbeat until the lyrics (largely sung by Bambaataa's Soul Sonic Force rappers Mr. Biggs, Pow Wow, and MC G.L.O.B.E.) begin. It recurs in pivotal spots throughout the song, lodging it in memory and helping it to become a part of hip hop's sonic language. Through this track, ORCH2 became a ready-to-hand preset for Fairlight musicians.

Also in 1982, ORCH2 punctuates Bush's song "The Dreaming" in the album of the same title. Bush uses the hit in a very different context, in a song about the colonization of Indigenous Australian lands. But in 1985, Bush decried ORCH2's cheesiness and overuse—"Every time anyone who has a Fairlight hears it they go, 'Oh no! Not again!'"⁶⁶—but could not resist using it. ORCH2 was the first Fairlight sound Trevor Horn played, which features in his band Yes's "Owner of a Lonely Heart" (1983) and at the end of AON's "Close (To the Edit)."⁶⁷ These synth pop tracks have vastly different moods than "Planet Rock," showing the diverse collage art ORCH2 has created.

According to musicologist Robert Fink, avant-pop artists tended to use "the grainy, slowed-down, 'half-dead' sound of a classical orchestra taken out of context [. . . as] a kind of Orientalist exoticism": they rendered ORCH2 as aesthetic currency, a spooky and hollow-sounding effect, before moving on to create their own samples.⁶⁸ But hip hop artists put the preset to creative use: as Harkins explains, ORCH2 "resembled the sound of scratching with turntable styluses by DJs like Grand Wizzard Theodore and Grandmaster Flash."⁶⁹ As a functional equivalent

to the record scratch, ORCH2 held multiple possibilities for emotional expression in hip hop.

Hip hop is more than a musical genre characterized by rap and ear-catching beats; it also encompasses dance (breaking), graffiti, and streetwear. Hip hop artists employ preset moves and sounds to set up flows of expression. The artists of “Planet Rock” used samplers and vocoders like the German band Kraftwerk but instead broadcast Black identities in the face of oppression. Prior to “Planet Rock,” Bambaataa DJed in the South Bronx and tested synth pop records on hip hop dance floors, including Kraftwerk’s. In “Planet Rock,” Bambaataa’s keyboardist John Robie plays the melody from Kraftwerk’s “Trans-Europe Express” (1977) on his Micromoog and Prophet-5 synthesizers, and Bambaataa uses Kraftwerk’s signature vocoder to bring a futuristic flavor to the lyrics of the chorus. These interpolations are joined by a beat Bambaataa and Baker created on a Roland TR-808 drum machine—rented through the *Village Voice*—that looped the rhythms of Kraftwerk’s “Numbers” (1981). Bambaataa and Baker took hip hop crate-digging (how they discovered Kraftwerk) to a form of mail art when they introduced the now-iconic samples from their Fairlight’s floppy disks to other hip hop records. After a one-night session, Baker told his wife that “our record is going to sell uptown and downtown.” [. . .] I knew if we used that beat and added an element of the street, it was going to work.”⁷⁰ That kick drum beat, mixed with a Fairlight sample of handclaps, is still heard on hip hop records today, including those from Dr. Dre and Lil Wayne. With samples from Kraftwerk and the Fairlight, the artists forged three lasting hip hop hooks: the beat, the Trans-Europe melody, and a hip hop preset still today—the orchestra hit.

For sociologist Tricia Rose, Bambaataa adapted Kraftwerk’s robot look for hip hoppers who, under capitalism, wore “body armor that identifies you as an alien: if it’s always on anyway, in some symbolic sense, perhaps you could master the wearing of this guise in order to use it *against* your interpolation.”⁷¹ The preset, able to be contextualized in any setting, is what helps shape whether this armor is constraining versus empowering. The “Planet Rock” video portrays ORCH2 as audiovisual armor that pairs hip hop with breaking. Its record-scratching sound is the impetus for hip hop dancing defiance. For Banes, breakdancing is “a physical analogue for a musical impulse [. . .] using your body to inscribe your identity on streets and trains [. . .] in a flood of rhythmic motion and fleeting imagery.”⁷² The dance form thus resembles the Fairlight’s translation of found sound into waveforms, as the timbres that are transduced into physical movements then become images and visual contours in the track’s music video.

The track’s repeated orchestra hits usher in footage of breakers and crowds, which enliven the interspersed footage of the band (a typical “performance video” in film scholar Marsha Kinder’s taxonomy of MTV videos that also includes narrative and dreamlike videos⁷³). The band wears Afrofuturist costumes that dominate the visual field. These visual elements blend old and new in much the same

way Fink defines ORCH2 itself as a shifting sonic signifier: “[It is] a brittle, grainy sample whose frequency spectrum is shifted noticeably towards the upper registers of the orchestra. This has the paradoxical effect of making the sample sound both ‘old’ (because its low fidelity cannot capture the full range of the orchestra, as in the pre-LP era), and ‘new’ (because the sound itself is noticeably devoid of romantic lushness).”⁷⁴

Taking the Fairlight preset’s cue, Bambaataa and the band reproduce the sounds of the past with a flavor of the future. Their costumes in the “Planet Rock” music video evoke aspects of kinship, spirituality, and robots—as well as appropriation of Indigenous costumes—while the breakdancing footage forecasts the dance moves of the future. With costumes that blend vestiges of Black culture with space-age suits, the band’s appearance extends both ORCH2’s old/new mashup, Fairlight users’ tendencies to create stereotypical “world music” presets, and the use of space costumes as what Afrofuturist scholar Ytasha Womack calls “visual tool[s] to stimulate higher thinking and to prepare audiences for something new”—undermining the cultural default of whiteness.⁷⁵ For science fiction and film scholar Steven Shaviro, paraphrasing Kodwo Eshun on the Black origins of Detroit techno, “alienated, militaristic stiffness could be used to signify a sharp break with the racist social relations of the human here and now, in favor of a posthuman black future.”⁷⁶ The preset ORCH2 helped dismantle both sonic and cultural precedents.

“Planet Rock” embodied Afrofuturist sounds and visions, including technological prowess, through the incorporation of Kraftwerk’s techno-pop and the vocoder’s robotic synthesis. The Fairlight usage reframed *Rite of Spring*’s white classical take on pagan Russia as the 8-bit sonic preset of a record scratch that became synonymous with hip hop. The Fairlight’s past/future mashup aligns with the capacity for Afrofuturist sound and music “to transduce the qualities of consciousness holding present relations in place into something qualitatively different,” as cultural theorist Kara Keeling characterized.⁷⁷ While listeners today might groan at ORCH2’s 8-bit cheesiness or the persistence of orchestra hits in songs like “Finesse,” in this 1982 track it aligned Black visual and street cultures with Black musical practices. Orchestra hits also fueled new mainstream musical movements like new jack swing, as in the Fairlight punctuation in Bobby Brown’s “On Our Own” featured in *Ghostbusters II* (dir., Ivan Reitman, 1989). In “Planet Rock,” the Fairlight amplified preset sounds and dance moves to establish hip hop as an art where man meets machine, avant-garde meets mainstream, and the past lifts off into the future. The track’s fusion of electronica and hip hop added other layers to the collage of house and techno genres popularized in the 1980s. As a preset used transnationally for a record scratch sound, ORCH2 persists in pop and hip hop today, in different orchestrations and contexts, as perhaps the Fairlight’s most popular preset.

In sampling, the legacy of ORCH2 perhaps only is matched by Stevie Wonder's appearance on *The Cosby Show* where "jammin' on the one" would be the sound heard around hip hop.⁷⁸ Wonder owned a Fairlight, but he also had two of its predecessors, the Synclavier and the Computer Music Melodian, the latter of which he used to compose *Journey Through the Secret Life of Plants* in 1979. We can see Wonder's Fairlight in photos of the *Plants* tour in Madison Square Garden, and we can hear it on *Hotter than July* in "Happy Birthday" (1980), which helped to make Martin Luther King Jr.'s birthday a national holiday only a few years later. Wonder guest starred in a 1986 *Cosby Show* episode, which Questlove (Ahmir Thompson) would later call "the single most influential moment in the history of hip hop."⁷⁹ In the episode, Wonder invited the Huxtables to a studio session, recorded each of their voices, and immediately sampled them on the Synclavier before incorporating them all into a song. This sonic collage, especially Theo's quip, "Jammin' on the one," struck many musicians who would take up sampling. As Questlove writes, "[it] sucked me into hip hop production. [. . .] It was the first time J Dilla saw a sampler. It was the first time Just Blaze saw a sampler. [. . .] An entire generation of talented, ambitious black kids leaned forward in their chairs to the point of falling out." Indeed, "it would explode old ideas of structure, sign, and play."⁸⁰ While this anecdote does not directly connect to Fairlight floppies, the episode mimics their circulation of samples and shows that the sight and instantaneity of Wonder's sampling—much like Hancock's Fairlight demo on *Sesame Street*—would hasten hip hop culture, experimentation with sonic (and visual) collage, and more. When the mid-'80s brought a wave of more affordable samplers like the E-mu SP-1200, presets were already taking root in hip hop and then became more accessible and widely circulated.

Wonder was, as the episode reveals, very interested in sampling vocals on his Fairlight, with gospel-inflected treble voices gracing "Happy Birthday" and "That Girl" (1982). Bill Wolfer, Wonder's Fairlight operator, recalls two unforgettable samples they created: a "flute that's not a flute" played by Wonder's saxophone player, Hank Redd, and what Wolfer considers "the coolest sound on the whole thing [. . .] background vocals that are not background vocals. [. . .] He got all four of his very talented background vocalists to sing just the vowel 'Ah' into the Fairlight [. . .] and then he could play those chords using their four voices [. . . with] a Mellotron sort of artificiality."⁸¹ Wonder used a similar gospel choir preset sound in "Happy Birthday" (performed live by gospel singers), which gave him the flexibility to compose, produce, and memorialize autonomously—forecasting the DAWs that could do just that. The impact of presets in Black music-making and beyond cannot be understated. Presets contributed to the design of future technologies; sculpted foundational sounds in hip hop and many other genres; and set global creative and cultural trends by setting up resonances across dance, fashion, and Afrofuturism, at the flip of a floppy and a gesture onscreen. By

transmuting crate-digging and vinyl record mailing into digital sampling, Black artistry on the Fairlight and related technologies furnished transnational exchange on the magnitude of a sonic boom.

SARARR

If GLASMASH is a lightning strike and ORCH2 a sonic boom, SARARR (a.k.a. ARR1), a breathy female vocal preset, is an atmospheric constant. Put in film music terms, GLASMASH and ORCH2 are “stingers,” bursts of sound that provide punctuation, like the shrieking violins in *Psycho* (dir., Alfred Hitchcock, 1960); SARARR is a “pad.” Pads provide atmospheric texture to “pad out” the sound. Pads are most often used to provide “unnoticeable” sound that supports thematically significant sounds. In this sense, a pad is an Ur-preset, a default designed to passively hum away in the background. What happens when we apply pressure to defaults, putting them in the foreground? SARARR is a preset for atmospherics but also features in songs not just in the 1980s but in every decade since.

SARARR is perhaps most recognizable in “Shout” (1984) by Tears for Fears; it also traverses the music in TV’s *Miami Vice* (1984–89) and even in Katy Perry’s “Dark Horse” (2013). Its versatility derives not only from its atmospheric sound but also its familiar organic material: the human voice. The Australian engineer Tom Stewart created SARARR by sampling a friend of a friend, Sarah Cohen: “a bluesy singer with a unique husky voice.”⁸² While ORCH2 is a found sound, sampled off the Stravinsky record, SARARR was curated by Stewart: “I was trying to get the sound of angels singing and wanted Sarah to sing more and more airy or breathy (as angels do).” The religious and potentially gendered connotations of the angelic voice—for angels are ostensibly genderless and yet women tend to be labeled as angelic—become even more complex in Stewart’s report of Sarah’s labor conditions: “After a few hours in the non-air-conditioned studio we must have re-sampled 100 times before finally capturing The Perfect Sample/Loop. It sounded fantastic. Sarah was a little hoarse by then (resulting in a better sound perhaps) but still cheerful.”⁸³ Stewart pushed Sarah’s voice to its breaking point to capture the ideal sound, both for the Fairlight’s short sample rate but also the timbre that would sharpen the intrigue of this breathy female voice. Consequently, Sarah’s voice, as SARARR, featured in many 1980s synth songs, as both foreground and background.

Perhaps nowhere does SARARR take a leading role more than in “Moments in Love” (1983) by AON. To quote *Pitchfork* writer Eric Torres, this is “their masterwork, an elegant New Age ode to romance embellished with fleet-footed strings and an echoing vocal sample that buries itself deep into your brain. The song has secured its place in history by being sampled in tracks by J Dilla, Charli xcx, Lil Wayne, and many others (Madonna also reportedly walked down the aisle to it), and listening back to the original is like engaging in its own private ritual.”⁸⁴

Here, SARARR is haunting, perhaps even hallucinogenic, given its repetitive three notes throughout the entire ten-minute song; it is minimalist enough that one can imagine Madonna using it as her wedding entrance music. In the context of the song, it is as reassuring as a heartbeat, and its use in the melody line endows it with a human quality, as if it is sung by the original sampled vocalist. However, in its preset use it maintains the breathy “ah” of the Fairlight’s notoriously low sample rate—it is a human voice with a machine hooked up to it, like a heart hooked up to a monitor. Such a use also occurs in Robin Hatch’s *T.O.N.T.O.* (2021), as “a Fairlight VST chipmunk voice sample to add some Enya-inspired atmospherics to the chorus.”⁸⁵ Even when SARARR is used as a preset that voices the melodic line, it provides atmospheric sound—but slightly askance from the human voice, which we will see with Auto-Tune’s chipmunk effects in the next chapter.

Then, there is the use of SARARR as a countermelody, an instrumental line that augments the timbral flavors of new verses. Michael Jackson’s and Quincy Jones’s “Billie Jean” (1982) injects wistfulness in a stringlike, short-lived countermelody in the second verse. In “Shout,” SARARR takes a more dominant instrumental line that accompanies each verse, allowing the countermelody to be vital to the full song. The preset is used in a wistful manner here, perhaps responding to the bitterly resigned protest of “Shout / Shout / Let it all out,” especially when SARARR is used on a second instrumental solo as the climax of the song. In the video by Nigel Dick, the cliffs of Dorset, England screen the calming atmosphere of the countermelody, whereas performance video footage of hands on a keyboard accompanies the solo—both common image presets for these sonic uses on MTV.

Also in 1984, the Japanese composer and instrumentalist Ryuichi Sakamoto employed SARARR on the songs “Paradise Lost” and “Self Portrait” on the album *Ongaku Zukan*—but less as a countermelody and more as a texture. In “Paradise Lost,” SARARR outlines the melody line in the often repeated chorus that then becomes accompanied by a sampled trumpet, Caribbean beat, and spacey-sounding counterpoint and intercom interjections. In “Self Portrait,” SARARR takes more of a backseat to an acoustic piano—leading timbre, but its breathiness nevertheless doubles the melody several times.

The latter uses echo a recent trade journal’s suggestion to use SARARR as a pad, in contrast to stingers like ORCH2. As the sound designer/producer Francis Preve writes, “Pads with a hint of ‘air’ or ‘breath’ are a time-honored component of many forms of music production, from synthwave to progressive house to ambient and film soundtracks.” Preve says that this breathiness “allows you to add presence to a traditional soft pad, which helps it cut through a mix.” He points to the SARARR/ARR1 preset as an “iconic examples of this sound [. . .] which served as the main component of countless hits of the 1980s. Because of those presets”—fascinatingly, Preve refers to SARARR and ARR1 as two different presets, which was probably due to different labels on Fairlight floppies as they passed through the mail—“unique sonic identity, numerous vintage digital synths from that golden era

followed suit, including emulations of that ‘air’ by providing inharmonic elements in their factory waves.”⁸⁶ If the 1980s is the golden era of a breathy sound that is ideal for pads, then Sarah’s voice is at the heart of an infinitely unfolding collage of sound design—from 1980s horror films to Charli xcx’s 2012 mixtape *Super Ultra*, which samples under two minutes of “Moments in Love,” to the New Italo Disco stylings of Coast 80’s “Ventura” (2020). In 2021, SARARR featured in Manuella Blackburn’s electroacoustic composition *Farewell Fairlight*, which was inspired by her own mail-art-like tracing of the use of SARARR from its floppy disk.

These varied uses from the 1980s to today nod to SARARR’s versatility, which fundamentally points to the signifying preset of the human voice. Sarah’s voice was perhaps not instantly recognizable as female or dominatable but rather as other-worldly—recall that Stewart dubbed it “angelic.” And Sakamoto’s use of SARARR was described as “a ‘cold’ human voice-like sound with low resolution.”⁸⁷ In these different contexts, SARARR is molded as both warm strings and cold humanoid vocals, as melodies and countermelodies, and as a pulsation. It becomes the Fairlight’s arguably most flexible, customizable preset—the heart of Fairlight collages.

Yet not everyone was a fan of SARARR; the screen composer Zimmer called it “the most over-used sound in the world [. . .] one of the original Fairlight factory presets. [. . .] That shows you how wonderfully conservative the music business is: seven years on and the original presets are still the most famous Fairlight sounds!”⁸⁸ Zimmer decried the recycling of presets and their sameness but neglected possibilities for their customization by users who put them into new contexts. This preset, a moldable voice reanimated as both atmosphere and feature, enlivened many a collage.

ITINERANT AUTHORSHIP

Fairlight users’ collage and collisional models for sampling by mail (and, eventually, email) were endorsed by the Fairlight’s inventors. As Vogel said, “We didn’t actually attempt to provide a comprehensive library because the intention was that the musicians would do their own sampling and create their own sounds. [. . .] The intention was that they would use their own creativity, and that’s exactly what happened.”⁸⁹ As a result, the Fairlight sample library was a site of globetrotting authorship, with samples not contained in the instrument but scattered on floppy disks in the mail and different users’ archives. The contested origins of GLASMASH and ORCH2 reveal the itinerant authorship of Fairlight samples, from manufacturers and instrument programmers to artists like Bush and Gabriel. The misremembered origins of samples would only increase with the advent of the internet and the complex webs of uses examined in music copyright cases. The Fairlight’s mail art network may have begun with what Vogel called a “caring, sharing attitude”; nobody “thought very much about intellectual property or their property [. . . so] a lot of people would send us floppy disks from time to time, and say yeah, here’s

some sounds you might like to add to the library. We got a few disks from Trevor Horn and . . . after he died, Michael Jackson's disks found their way back to me."⁹⁰ But intellectual property and privacy concerns would soon pervade sampling. And while mail art has had an ethos of shared intellectual property, privacy and censorship concerns balance on a letter opener's edge.

Censorship concerns in sampling are well known but less so are those in mail art, from Marx's evocation of protest symbols that would pass through Argentinian mail censors to musician Genesis P-Orridge, who was tried in 1976 for mail art pornography in violation of the United Kingdom's 1953 Post Office Act.⁹¹ Johnson and his correspondents also faced homophobic postal and legal systems but used subconscious codes to subvert the system, sometimes flaunting it much like Frankie Goes to Hollywood's "Relax." The idea that early sampling was a "caring, sharing attitude" is utopian when considered through the lens of the postal service. As Blom argues, "to focus on the anonymity and automatism of the postal system is to focus on the unsettling fact that to be a modern subject is to truly be a subject of the postal system."⁹² Everyone who participated in these networks was open to scrutiny. Presets' signification shifted depending on the sender and receiver, itinerant authors, all.

By studying the Fairlight alongside mail art, we see that the most crucial aspect of sampling is its correspondence across modalities. Exchanges of meaning happen in a variety of domains, translated from sound to vision to moving images. As translation and citation in music videos help sampling become an even greater phenomenon through wider circulation, the Fairlight's sonic presets become audiovisual ones. To make collages in a song or music video, Fairlight artists began with the floppy disk, the material proxy of their presets. They loaded floppy disks in the computer system to customize presets sonically and visually. The Fairlight translated a disk's captured sound into a visual object that could be edited with the on-screen sequencer. The floppy and the screen encouraged the creation, use, and reuse of presets that became crucial to sampling's vocabulary. Moreover, the Fairlight's possibilities for visualizing music on the digital screen and circulating samples on floppy disks shaped sonic presets' multisensory meanings in music videos and media from the 1980s to the present. Telling the material history of the floppy and the screen of the Fairlight reveals how sampling's medial beginnings changed audiovisual culture in the 1980s and laid foundational music video and image sampling that show up on TikTok and in memes in the 2020s. By screening these samples and re-gridding horizons of social experience not unlike push-button car radios and their windshields and cinema screens, these artists make crucial feminist and queer interventions in the uses and afterlives of their presets.

Transnational exchanges, like ORCH2's proliferation of record scratch sounds in hip hop, also overturn cultural defaults. Wilson writes that his longtime mail art correspondent Johnson "acted on the suggestion of Modernism to 'Make it new' by constructing new purposes. [. . .] Ray had to make it new because almost nothing

in social existence or in art described, explained or otherwise illuminated him in his predicaments. He changed his predicament into possibilities and opportunities by supplementing ‘Make it new’ with ‘make it do.’ Living among the poor in a slum put him within a community of people who needed to *make it do*: ‘Use it up, / Wear it out, / Make it do, / Or do without.’”⁹³ Like Laurie Anderson, Johnson focused on art-making as action, bricolage as bridge-building. As Johnson advocated for sexual and wealth equality, he affirmed how mail art could transform or create new social presets, paving the way for spiritual successors of mail art like Fairlight floppy trading. By “making it new” rather than “making do,” cultural and artistic defaults can work for minoritized communities and uses. Presets are the sum of their parts—users’ changes to them add up over time to exponentially acquire new meanings, especially through the chains of association activated by Fairlight sampling. Artists transform the meanings of a preset from song to song, from new musical contexts to visual ones added in music videos and media.

Ultimately, the Fairlight shows us that presets are rife for both sonic and visual—and audiovisual—homage. By circulating from user to user via floppy disks and subsequently digital sound libraries, Fairlight presets accrue a host of meanings across artists and cultures. Both sampling musicians and mail artists use these formats to advance radical art and thought, including the political agendas disseminated by both Argentinian mail artists and Frankie Goes to Hollywood. For these users, postcards and floppies became presets for generative creativity and activism. For others, such as Gabriel, the mailing of sounds seems to further the long-term preset project of aural colonialism, farming “exotic” sounds for the sake of intriguing music as in the “desert lady voice” discussed in the introduction. Itinerant users of presets make them do cultural work, whether for communitarian care or for capturing capital.

If Fairlight samples gained preset status by being circulated (and retrievable by the floppy disk and editable by the screen interface/lightpen), then they set up a transportation logic—seen also in radio push-button presets—for found sounds. Transnational transportation logics would soon apply to a force at the center of pop music, the voice. Certain 1980s and 1990s technologies broke voices down into samples, but no technology would truly chop and screw the voice like Auto-Tune.

Four

Preset Pitches and Personas

Auto-Tune and Voice Adaptation

For many years, I have attempted to sing Cher's "Believe" (1998) at karaoke. But in the song's infamous robotic sections, I cannot match Cher's voice, which is technologically manipulated through Auto-Tune—a software plug-in released in 1997. Initially, Auto-Tune was invented to imperceptibly correct singers' pitch. Auto-Tuning, or the audible use of Auto-Tune, like in those robotic sections of "Believe," has become a dirty word for a singer who lacks skill and requires technological support. A majority of pop voices today use Auto-Tune, however, because it is an industry-wide, digitally polished sound.

The widespread use of Auto-Tune has created two main cultural and technological default settings in music. The first is the preset of being "in tune"—whether with the Western scale or with other regional/national vocal styles (akin to musicologist Nina Sun Eidsheim's "figure of sound" in chapter 2). Auto-Tune was invented after a distributor's wife at the 1995 National Association of Music Merchants (NAMM) trade show asked signal-processing engineer Andy Hildebrand to make a device that would help her sing in tune.¹ As Hildebrand recalls, "Everyone just stared at their lunch plates, they didn't say a word." Auto-Tune's origin story grew out of singers' shame at lacking certain skills, which has become a default judgement of Auto-Tune use. Women and Black musicians who used the plug-in, from Cher to T-Pain, were criticized for not having the skills of "true" singers or for cheapening their musical labor. The perception of Auto-Tune as a cheap gimmick was inaugurated the moment a woman suggested the device in 1995.

And yet, as with T-Pain, some singers have made the Auto-Tune sound a feature of their entire career. The Catalan singer Rosalía uses her biting, Auto-Tuned rap "like another production element [. . . to] get an aggressiveness that many times with an organic voice without any effect is not the same."² Unlike many commercial

pop stars, she proudly makes her voice a blend of organic and machinic. In her third album, *Motomami* (2022), Rosalía negotiates “the ambivalence [of achieving fame. . . . It’s] a violent oscillation between feeling the emptiness of *esta máquina*, this machinery, and the warmth or intimacy that family or your people can give to you, you know? Or like the artifice that supposes success sometimes, or fame.”³ Rosalía primarily works out these organic versus machinic contradictions in this album through her use of Auto-Tune, which has been described as “modernity pixelating tradition.”⁴ Rosalía’s Auto-Tuning helps her adapt to fast-moving music and media industries that can enthrone or dethrone stars in an instant. She makes self-transformation her motto—in her first two albums, Rosalía was criticized for appropriating flamenco, despite being classically trained in flamenco dance and music; similar accusations have surrounded *Motomami*’s use of Afro-Caribbean reggaeton, and she has said that she “feels Latina” despite being from Spain.⁵ Rosalía is not afraid to embrace the contradictions created by self-transformation, whether in the sonic aesthetics of Auto-Tuning or in the seismic stylistic shifts of her albums, including 2025’s *Lux*, which takes a hard turn back to Eurocentrism. In her complex global borrowings of music, language, and racial identity, Rosalía advances a pop star default of commercial adaptation that is bound up with Auto-Tune.

While Auto-Tune may have been invented for singers to adhere to the technical default of staying in tune, Auto-Tune has become a preset sound for nearly all pop voices today. It is used on most recorded (and even live) vocals for covert pitch correction. This sonic airbrushing helps a pop star’s voice match their glossy appearance. But there are other ways to use Auto-Tune for over-the-top sounds that allow pop stars to manufacture a pop persona, like Rosalía does. Overt uses of Auto-Tune occur when the software’s retuning speed is set to zero milliseconds for instant pitch correction. Overt Auto-Tune’s machinic, garbled tones have become a preset for pop stars who use Auto-Tune to make a splash in the music industry, including Cher and T-Pain.

This chapter explores Auto-Tune as a preset for adaptation—whether to the baseline of an industry standard sound or by transforming into new personas that catapult stars to the zeniths of their careers. Adaptation is, variously: “the action of applying one thing to another or of bringing two things together so as to effect a change in the nature of the objects”; a transfer from one art form to another, whether musical, cinematic, or literary; and “a process of change or modification by which an organism or species becomes better suited to its environment or ecological niche.”⁶ Auto-Tune artists from Cher to Charli xcx engage each of these definitions of adaptation. This chapter tracks artists’ reinventions with Auto-Tuning to adapt preset looks and sounds in pop. Cher refuted ageist demands on stardom by reinventing herself as a Europop singer and cyborg in the music video for “Believe” (dir., Nigel Dick, 1998); Jennifer Lopez depicted herself as a triple-threat dancer, actor, and singer under self-aware surveillance in the video for “If

You Had My Love” (dir., Paul Hunter, 1999); and women, trans, and nonbinary hyperpop artists modulate normative genders and sexualities in their musical and visual performances. Pop stars use Auto-Tune to either prop up or unsettle media industries that historically, and increasingly, cling to presets of gender conformity and whiteness. These norms influence critics who judge Auto-Tuning as an inauthentic gimmick. In *Theory of the Gimmick*, Sianne Ngai shows how devices like Google Glass seem future-thinking but then become outdated as soon as they fail to reproduce white patriarchal and heteronormative capitalism. But even preset gimmicks evolve over time, often through creative misuse—like a mid-2010s muffin recipe that added canned pumpkin (instead of eggs!) to boxed cake mix. I reveal Auto-Tune as a gimmick that adds value to artists through adaptation, in vocal experimenting, and in persona-making.

As with previous chapters, I untangle preset binaries that surround preset devices—for Auto-Tune, natural/unnatural, freedom/control, and tradition/innovation. First, critics discriminate between the “natural” voice and its “unnatural” manipulation with Auto-Tune. Auto-Tune ungrounds the idea of a body’s natural voice by changing its tuning and timbre; it also troubles the philosophical belief that a person has one voice unique to them—we all have voices we try on or experience due to changing physical and emotional states. Whether our voice is natural for us is a judgment made by others based on our personality, appearance (racialized, gendered, sexualized, classed), and more. We must debunk Auto-Tune’s natural/unnatural binary; for pitch correction scholar Catherine Provenzano, Auto-Tune instead is a tool for producing emotional expressivity, though it is fraught with raced and gendered expectations.

Auto-Tune also triggers a freedom/control binary, as music industries set presets for what talent looks and sounds like. For example, Auto-Tune has been instrumental to an industry-wide rapping-versus-singing debate, from T-Pain to Rosalía. In *Motomami*’s opening track, “Saoko,” Auto-Tune erodes the border between speaking and singing; a Genius video of Rosalía’s unaccompanied rap reveals already mellifluous phrases that Auto-Tune and reggaeton merely accentuate. Relatedly, this border-crossing singing inflects the song’s video (dir., Valentin Petit, 2022), which depicts a women-dominated biker gang on a Kyiv bridge months before Russia invaded Ukraine. Despite the intention behind Rosalía’s vocal techniques, critics continue to say, “When she does a capella, she can’t sing, but when they put the autotune [*sic*], it seems that she sings”—as a Madrid pedestrian observed to Rosalía herself, in disguise as a television entertainment reporter in 2022.⁷ In Auto-Tuning, Provenzano writes, “female voices have been most subject to ‘taming,’ and are more often subject to standards of sounding ‘normal’ and ‘unmediated,’ but still superhumanly ‘good.’”⁸ While pop producers use covert Auto-Tune to polish “unruly” (read: feminized and racialized) voices for mass consumption, such unruly artists use Auto-Tune to draw attention to what they have to say. T-Pain’s 2014 NPR Tiny Desk concert features virtuosic melismas that

make clear that he does not *need*, but *chooses* to use, Auto-Tune. Similarly echoing Marcel Duchamp's agency in choosing a tube of paint or ready-made object to make art (as quoted in the introduction), Rosalía spent a year of 16-hour days "choosing the right [vocal] for every song" of *Motomami*.⁹ For these artists, Auto-Tuning happens under their control so they can deliver a message on their terms.

Tradition/innovation is another significant binary in Auto-Tuning, as singers like Rosalía often have years of vocal training but then use the device for a persona effect. Rosalía's formal musical training is a preset-adjacent enabling constraint—"a setting in place of a series of conditions that foster a limiting of the field of experience even while they allow the incipient event to remain open to invention."¹⁰ Such parameters may be thought to prevent creativity but instead help to stoke it. As Rosalía said on the irreverent celebrity wing-eating interview show *Hot Ones*, "Tradition is just a foundation. In order to create, [. . .] know where you come from to know where you're going. [. . .] The more knowledge you have, the more freedom you're gonna have."¹¹ For T-Pain, Rosalía, and others, training and tradition are enabling constraints that lay foundations for Auto-Tune to aid in stylistic (even when contradictory) innovation.

Auto-Tuning artists adapt their public personas in voice and image, but the binaries and contradictions they embrace tend to be labeled as gimmicky by critics. I closely analyze Auto-Tune's accompanying imagery, especially music videos, to reveal preset beliefs about which voices belong to which bodies. Given Auto-Tune's vast repertoire, I focus on women who negotiate the music industry's covert uses of Auto-Tune to polish unruly voices or use Auto-Tune overtly in intended unruliness. Prejudices show up in critics' dehumanizing labels of Auto-Tune sounds as "gerbil-like" and "robotic." But Auto-Tune's animalistic or machinic preset beliefs began much earlier in voice-modulation history, through devices that ventriloquized human voices as animals and machines.

PRE-AUTO-TUNE VOICE MODULATION IN THE VOCODER AND TALK BOX

Auto-Tune belongs to a larger genealogy of voice-modulation devices, both analog and digital. Each has a similarly futuristic sound—so much so that they are often confused with one another. For example, to prevent people from recreating the Auto-Tune sound in "Believe," Cher's producers said that they used the DigiTech Talker pedal, which is often labeled as a vocoder but is closer to a talk box.¹² These devices have distinct histories, yet they are entangled with similar power differentials along the lines of gender, race, and class. Importantly, long before Auto-Tune arrived, voice modulation was considered gimmicky, a label that for Ngai "names an experience of dissatisfaction—mixed, for all this, with fascination—linked to our perception of an object making untrustworthy claims about the saving of time, the reduction of labor, and the expansion of value."¹³ Critics

maligned voice-modulation devices for drawing too much attention to inhuman-sounding voices or for the top secret mechanics of persona production.

The vocoder (voice + encoder) was used during World War II as a transatlantic vocal encryption system by the Allies, linking Winston Churchill to Franklin D. Roosevelt. Like magnetic tape, the vocoder was limited to small circles of men and wartime purposes before it became musical. After the war, musicians used vocoders with synthesizers in genres from avant-pop to science fiction and hip hop, from Kraftwerk and Wendy Carlos (in *A Clockwork Orange*) to Grandmaster Flash and the Furious Five, and Afrika Bambaataa and the Soul Sonic Force in “Planet Rock.” Given these musical associations with robots, metallic costumes, and Afrofuturism, it might be tempting to judge the vocoder as a preset for robotic sounds and images. But across different genres, the vocoder modulated ways of seeing and sounding humanity and futurity. For cultural theorist Alexander G. Weheliye, Black musicians’ uses of vocoders in R&B dissolved binaries between humans and machines and music and noise, “dispersing the machinic across the musical text rather than giving it an integral and system-maintaining role.”¹⁴ In another cybernetic fusion of humans and technology, Laurie Anderson used the vocoder to stage herself as a mechanical object in her avant-pop “O Superman” video, which metaphorically comments on human surveillance and militarization under Cold War capitalism. While vocoded voices produced different types of futurism depending on an artist’s politics, genre, and more, the preset function of vocoders—to combine a human input with a synthetic signal and create a hybrid output—adapted one’s voice into several possible new personas.

One persona, created by a successor to the vocoder, was a talking puppet. In 1939, a guitar-shaped puppet named Stringy sang with a hybrid voice and guitar sound joined through a carbon throat microphone. Like the vocoder, the throat microphone was developed for military use to make pilots’ speech heard over noisy jets.¹⁵ In a performance of “St. Louis Blues” in a circa 1944 film, the electric steel guitarist Alvino Rey had his wife, Luise, speak into a throat microphone to provide Stringy’s voice while he patched it into the sound of his onstage electric guitar. Rey kept Luise out of view backstage in order to not reveal her work as a ventriloquist. Ventriloquism operates on stereotypes and labor that often hide in plain sight. For cultural theorist Sarah Kessler, ventriloquism “produces an intimate relationship between one human agency and one or more nonhuman agencies [. . . and is] associated with a perverse desire, and even a need, to speak through someone else in lieu of being able to speak for oneself.”¹⁶ Like ventriloquism, voice modulation couples dehumanization with servitude.

Voice-modulation technology often casts women’s labor and artistry into doubt or erases it altogether. In Ngai’s history of gimmickry, “Women continue to be, as they historically have been due to the gendering and subsequent devaluation of specific activities [. . .], capital’s most popular and longstanding profit-protecting device.”¹⁷ Notably, women’s labor to operate the talking voder, which preceded the

vocoder, was also ignored while inventor Homer Dudley and his male-gendered voder nicknamed Pedro were celebrated by the press at the 1939 World's Fair. An exhibition photo bills Pedro as "the only actor in the Bell Telephone Exhibit," omitting the woman who "puts Pedro through his paces."¹⁸ By placing women behind a curtain or even hiding them in plain sight, voice modulation often effaces the female face of labor.¹⁹

From Luise Rey to Pedro the Voder's operators, women were often hidden while men or the ventriloquists' dummies were seen as active voice modulators. Women were further outshone by male virtuosos of the talk box, a box-shaped loudspeaker connected to a guitar output and to a microphone with a tube fed into a vocalizer's mouth. Artists like Pete Drake and Peter Frampton used the talk box as their signature gimmick, though a short-lived one: as Ngai explains, "The perpetual reuse of a device for producing an effect is often exactly what transforms it into an impoverished gimmick."²⁰ And yet, a vocal gimmick framed as an artist's default act can lead to new sounds and visions of humanity and futurity, to showcase women's labor, as we have seen, as well as to showcase racialized labor, like Roger Troutman's talk box.

Roger Troutman produced varied characters with the talk box, from Donald Duck to a sexy persona to his "martianlike chorus" on "California Love" (1995) with 2Pac and Dr. Dre. Voice type was not a preset for Troutman, but modulation was, as were the bodily sacrifices of blood, spit, and tears that the talk box demanded. As vocoder historian Dave Tompkins writes, Troutman, like other talk box users, developed dental infections by reusing the tube.²¹ However, Troutman's earthly labor of using the talk box was often labeled as "extraterrestrial"; critics described his vocal effects with comparisons to aliens and space imagery, rather than the Motown and funk histories central to his sonic archive.²² The tension between alien and human sounds and even between human and animal sounds (as in Troutman's Donald Duck) also conditioned the vocoder's WWII military use, as "Eisenhower did not want to sound like a chipmunk."²³ Anxieties over emasculation in pitch modulation thus arose long before critic Sasha Frere-Jones labeled T-Pain's Auto-Tune use as a "gerbil" voice.²⁴ Voice modulation has long drawn on and even fused animal and mechanical traits, from 18th-century automata like Jacques de Vaucanson's 1738 defecating duck and flute player (mechanical objects that equated animals and machines) to anthropologist Donna Haraway's entwined theories of cyborgs and dogs as companion species. From 18th-century automata to today, the visual iconography of voice modulation is full of animals and robots—imagery that often links to purposive distortions of humanity. As Ngai asks, "Given the consistency with which gender and race get written off as peripheral to capitalism, does the relation of those marked by these categories to the superfluous/necessary gimmick become especially charged?"²⁵ Luise Rey's ventriloquism and Troutman's Donald Duck reveal minoritarian artists' labor as

a preset of new instruments' development and aesthetics. The same would be true for Auto-Tune's human adaptations.

AUTO-TUNE AS AUDIOVISUAL CAPITALIST COMMODITY

Near the end of 20th-century voice modulation, the Milli Vanilli scandal paved the way for Auto-Tune's label as a gimmick. Pop duo performers Robert Pilatus and Fabrice Morvan lip-synced their way to three number one hits but lost their 1990 Grammy when their producer, Frank Farian, admitted to manufacturing a record deal that used Pilatus's and Morvan's lip syncing as a front for uncredited, underpaid singers.²⁶ Fans even sued the group, illustrating reactions to gimmicks where, for Ngai, "our feelings of misgiving stem from a sense of overvaluation bound to appraisals of deficient or excessive labor encoded in form."²⁷ Post-Milli Vanilli, Auto-Tune's inventor, Hildebrand, said that "the public was weary of the idea of 'fake' or 'affected' music. [. . .] What they don't understand is that the method used before—doing hundreds of takes and splicing them together—was its own form of artificial pitch correction."²⁸ Milli Vanilli exposed the hidden labor of recording studio engineering, where voices had been manipulated for decades. But when recorded voices were ventriloquized onstage at Milli Vanilli's "live" performances—mirroring the ventriloquy displayed in prior voice-modulation technologies—they prepared the preset judgment that Auto-Tune made voices too close to extractive machines.

Extraction is at the heart of Auto-Tune's origin story—not only extraction of capital through marketable recordings but also extraction of oil. Prior to his work on music technologies, Hildebrand was a signal-processing engineer for Exxon, beaming down sonic frequencies to detect seabed rocks that had oil deposits. Hildebrand used the mathematical tool of autocorrelation—comparing the similarities of waveforms over time²⁹—to plot data points about rocks' locations, densities, and deposits onto a visualization that identified potential oil extraction sites. After the NAMM woman suggested the idea of a tuning box in 1995, Hildebrand adapted autocorrelation for pitch correction by comparing a singer's attempted waveforms to those with accurate pitches. He drew on his musical background as a Jacksonville Symphony Orchestra flutist in high school and as a Rice University composition student as the grounds for his adaptation. Instead of using autocorrelation to discern rich matter in rocks for oil drilling, autocorrelation in Auto-Tune moves sonic matter to more tuneful places, which is valuable currency in popular music. Of course, there are many computational differences between oil and pitch detection. But Hildebrand found a common interface for these previously invisible commodities: an audiovisual map that made their frequencies visible and controllable.



FIGURE 13. Screenshot of the drop-down menu for scales in Auto-Tune Pro. Courtesy of Yibao Zhang.

Auto-Tune debuted in 1997 as a plug-in by Antares Audio Technology (Hildebrand's new company) for Pro Tools, the industry standard digital audio workstation (DAW). Autocorrelation matches input pitches to a scale chosen by the user—typically in Western popular music, equal temperament, which evenly subdivides the 12 pitches in a scale. In the default automatic (now called auto) mode, users select the key and scale of the song (e.g., A minor); then, the program snaps or slides the pitches that are out of tune to the correct notes of that scale (figure 13). There is no singular preset for Auto-Tune because it is used in relation to a multitude of factors: how in tune the singer's take is; the scale and key of the song; and the song's speed, which determines Auto-Tune's retune speed. Unlike the push-button car radio presets with a binary of on and off, Auto-Tune's retune speed is represented by a dial so that an up-tempo EDM song can have a faster retune speed than a slower ballad, which requires the pitch to change more gradually. The dial offers fine-tuning for different sonic contexts.

Retune speed determines whether Auto-Tune has overt or covert sonic effects, which are key to deciphering how Auto-Tune's binaries and effects have congealed in cultural history. Hildebrand built the device to imperceptibly correct pitch, but he also set wide parameters for retune speeds that would make Auto-Tune's intervention much more noticeable sonically. "Just for kicks," he stated in an interview, "I put a 'zero' setting, which changed the pitch the exact moment it received the signal. And what that created was the 'Auto-Tune' effect."³⁰ When a musician dials the retune speed to zero milliseconds, they create alien-sounding voices—and

retune speeds 15 and below flatten vibrato and produce noticeable artifacts. These effects happen through quantization, which music technology scholar Robert Strachan explains as the “fit with a predetermined grid relating to pitch in terms of timing. [. . .] In normal operation [of retune speeds above 15], when quantizing is less pronounced, Auto-Tune allows for a more ‘natural’ sounding pitch correction whereby the microtonal shifts remain perceptible.”³¹ In other words, the predetermined grid in which Auto-Tune plots pitch shapes listeners’ perceptions of sounds, especially when they are quickly snapped in tune and produce a robotic or mechanical effect. But this sonic re-gridding, as with push-button radio presets, played a major role in forthcoming musical genres and aesthetics.

The interface’s potential grid of uses has unlocked two main vocal presets in music today: the covert mechanization of being in tune to maintain profit and the overt mechanization of the voice through accelerated retuning speeds as potential profit sharer (or gimmick). Hildebrand did not encourage the overt use, perhaps reminded of the shame provoked by the NAMM woman’s suggestion. As Hildebrand often remarks, “I just built a car, I didn’t drive it down the wrong side of the freeway.”³² But the misuse of his device nevertheless helped him mine the tuning of human voices for significant profit. And both uses adapted musical labor.

Just as labor unions feared that synthesizers and Fairlight Computer Musical Instrument (CMI) samples would replace orchestral musicians, critics worried that Auto-Tune’s ease and speed of pitch correction would replace producers’ labor or even turn non-singers into pop stars. Auto-Tune’s preset dial facilitates ease and speed in adapting voices, supposedly saving both time and labor, but still requiring a trained ear that comes from many applications of Auto-Tune over time. The binary of skill/trick is one that Provenzano also works to debunk: “To say that Auto-Tune works automatically obscures not only the highly-skilled labor that professionalized uses of the tool requires, but also the enormous amount of programming, coding, and computational labor that goes into making this pitch shifting happen. The program’s algorithm is sophisticated and intricate, working in a way meant to conceal its presence, to keep the software in the vocal signal ‘inaudible.’”³³

In its covert use, Auto-Tune parallels gimmicks that simultaneously hide or show off their workings—like P. T. Barnum’s hoaxes (of Barnum and Bailey Circus), which included the Fejee (Fiji) Mermaid, a fish and monkey hybrid. Barnum’s shows revealed how such fakery was achieved, emphasizing the labor of trickery to audiences in what cultural historian Neil Harris calls an “operational aesthetic,” “a way of reducing a hostile and threatening environment to human scale by manipulating its elements, and so demonstrating control over them.”³⁴ Like Barnum’s monopoly on the circus in the United States, Auto-Tune’s facilitation of pitch correction incited a monopoly on pop vocals as a preset production tool—and sound.

Given its extensive use in popular music since its inception, Auto-Tune has generated a material change in pop voices, flattening them into noticeably more

mechanical sounds, with dead-center pitches and glossy timbres that have become a vocal standard of airbrushed perfection. As Strachan observes, compared to overt Auto-Tuning, the covert, “normative use has had pervasive yet less explicit consequences for accepted norms with regard to the sonic attributes of the voice in pop production more generally. [. . . It] often produce[s] particular audible qualities in the voice.”³⁵ Carlo “Illangelo” Montagnese, who has produced for artists from Florence and the Machine to the Weeknd, explains, “If you don’t pull a vocal through Auto-Tune these days, it almost does not sound normal! So you have to use it, though I apply it very subtly. You might not even notice it, but for me it makes a huge difference.”³⁶ Auto-Tune has become a preset for polishing timbres to be in tune with the type of personas recurrent in the pop music industry. Notice how Auto-Tune’s tuning has shifted from musical to bodily and affective, often in raced, gendered, classed, and other ways.

As just one example of Auto-Tune’s persona shifting, Lady Gaga, who has worked with Montagnese, juxtaposed her Auto-Tuned vocals with her jazz duets with Tony Bennett in 2014: “There’s a part of me that has been quiet for a long time that is now being reawakened, after years of producers and record label people telling me to make my voice sound more radio-friendly [. . . via] auto-tuning it more, or changing the timbre. They take the vibrato out so you sound like a robot.”³⁷ Despite some input on her songs in production, Gaga lamented that her voice was not hers to control and that her persona was too polished. Gaga reveals the ubiquity of both Auto-Tune’s tone-polishing and persona-producing effects that make pop stars robotic. The Auto-Tune persona produced for Gaga fit the contemporary pop aesthetic, but other artists use Auto-Tune to adapt their personas and demonstrate their virtuosity, rather than the status quo of pitch-corrected perfection. While Auto-Tune’s covert use harnesses pitch-shifting for an adaptive, sonic airbrushing, its overt use has more wholesale persona-shifting effects.

THE VISUAL ADAPTATIONS OF AUTO-TUNE’S PERSONA SHIFTS

Auto-Tune’s persona effects are not accomplished through sound alone. Auto-Tune grew up in a post-Milli Vanilli era when pop music was becoming more of an arena for image-makers than it was for the solely vocally talented, given the rise of choreographed concert tours and DVDs, reality TV shows, and the internet as new forms of marketing pop stars. Auto-Tune has allowed singers like Charli xcx to hone their visual presentation over their vocal accuracy. Leading pop’s visual promotion since the 1980s, music videos are playgrounds for production teams to construct stars’ personas through colorful and varied costumes, settings, and props. As pop scholar Kai Arne Hansen has written, pop personas are also shaped in other media like concert tours, album covers, and interviews, as well as by their fans. Music videos can unveil audiovisual consequences of Auto-Tuning

by presenting pop personas and glitch effects that critique airbrushed star images and voices: the music video for then-Kanye West's "Welcome to Heartbreak" (dir., Nabil Elderkin, 2009) is just one example.

In the case of Auto-Tune, descriptions of voices as robotic often are accompanied by cybernetic images in music videos. By creating a metallic sheen for Cher, T-Pain, and more, these voice modulations prompted aesthetic preset correlations in music videos too. As chapter 3 explored, music videos often visually accentuate a song's major attractions, with correlations, for example, between vocal and instrumental timbres and colors. For music video theorist Carol Vernallis, "Blues and greens seem emotionally cool to suggest a slower speed, and to become solemn or subdued [. . . in] a mood of youthful moroseness," a claim that she shores up by referencing studies that say blue temporarily lowers one's blood pressure.³⁸ Music videos with overt Auto-Tuning, especially from 1998 to 2009, prominently feature blue and green, but in this period, the color use yokes more to science fiction and futurism. These videos' visual imageries offer ways to decode how Auto-Tune adapts singers' personas, especially through futuristic image presets of cybernetics, visual distortion, and surveillance. In Auto-Tuned music videos, human figures and their environments are increasingly adaptable.

Auto-Tune became a preset for visual manipulation, not only metaphorically but also through its interface, like the Fairlight CMI did for DAWs. Skilled producers work in Auto-Tune's graph mode, which resembles the Fairlight's computer interface where users drew in sound with wave-shaping tools. Unlike the Fairlight's light pen, graph mode works with a computer mouse, where users adjust points and curves on waveforms by clicking and dragging pitches into new contours. Graph mode encourages fine-tuning of the singer's voice to create pitches or effects that work in the context of the song. In recent years, Auto-Tune's graph mode workflow has begun to resemble Melodyne, one of Auto-Tune's competitors, made by the German company Celemony (figure 14).³⁹ In Melodyne, notes are represented as "blobs," variously shaped to correspond with "height (pitch), size (amplitude), and shape (timbre)"—which expands on the visual representation of pitch through lines in Auto-Tune's graph mode.⁴⁰ The materiality of Melodyne's interface emphasizes the mutable shape of each note. Melodyne furthers the goal of visualizing sound that has been present throughout both cinema and DAW history. The increased plasticity of pitch corrections' user-friendly interfaces has only added to media workers' ability to adapt to changing industry norms.

It is no accident that music videos with Auto-Tune mirror their sonic experimentation with similar imagery. Auto-Tune parallels the history of computer-generated imagery (CGI), because Auto-Tune took center stage with Cher and T-Pain, then mainly retreated into the background but is still widely used. Similarly, CGI was shown off in music videos like Dire Straits' "Money for Nothing" (dir., Steven Barron, 1985) and science fiction and action movies like *Terminator 2* and *Jurassic Park* (dir., Steven Spielberg, 1993).⁴¹ But CGI has since permeated contemporary

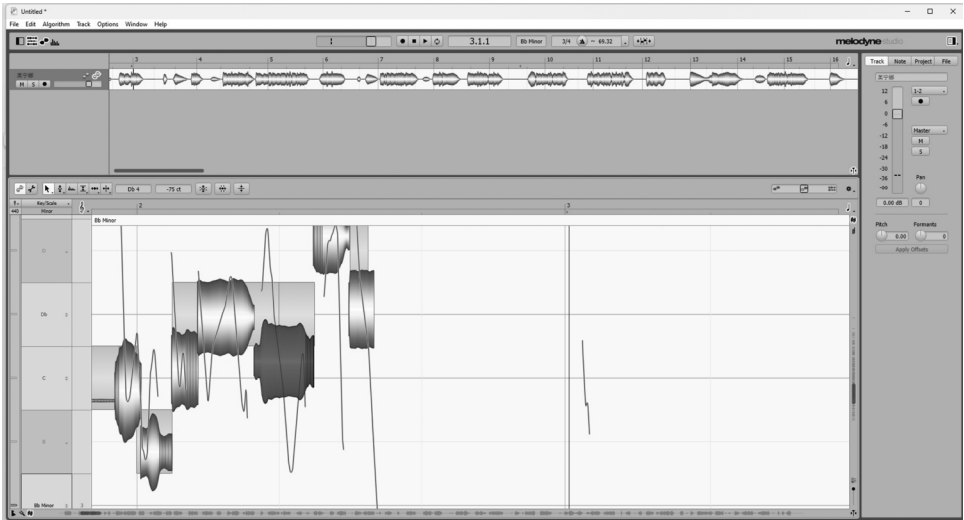


FIGURE 14. Screenshot of Melodyne “blob” adjustment that emphasizes the plasticity of waveforms. Courtesy of Yibao Zhang.

media, in backdrops and elements such as crowds and weather particle effects that blend into backgrounds. Like covert uses of Auto-Tune, CGI has become a preset meant to be overlooked even though it is everywhere.⁴² CGI’s terminology shift from “special” to “visual” effects parallels Auto-Tune’s shift in use from virtuosic to ubiquitous. As cinema scholar Stephen Prince explains, visual effects “include the creation of fantastic, attention-grabbing creatures prevalent in everyday conceptions of what a movie special effect is, but visual effects [. . . often] are subliminal and invisible to viewers, and by no means are they confined to genres like science fiction and fantasy.”⁴³ CGI’s and Auto-Tune’s once-futuristic effects were adapted in utilitarian uses by media industries as presets to make a scene or song sound right.

Auto-Tune is mobilized in music videos as a fundamentally audiovisual effect that can transform stars’ images and adapt pop industry norms. Especially in overt uses, Auto-Tune is a preset for adaptive audiovisual and persona experimentation—a timeline that begins with Cher.

THE ADAPTIVE AGE OF CHER

Purposefully distorted uses of Auto-Tune have allowed Cher and a long line of musicians, including racialized and trans artists, to distort their voices strategically—whether for a gimmick or for throwing down the gauntlet for social or political power. Through an overt use of Auto-Tune, Cher’s 1998 hit “Believe” transformed her image and revitalized a fading career.

Cher was the ideal person to debut Auto-Tune as a special effect, since she was a visual icon from her extravagant costumes on tour and shows like *The Sonny and Cher Show*. First, though, Cher had a “conventional-with-a-slightly-hippy twist image” during the time of the duo’s hit “I Got You Babe” (1965), and during their divorce in 1975, coverage emphasized Cher’s family’s poverty growing up.⁴⁴ In the 1970s, Cher shed her impoverished background for glitzy gowns and torch songs like “Dark Lady” (1973). Cher is an adaptation artist. By adopting Auto-Tune and Europop in “Believe,” Cher dressed up her voice and body for disparate audiences, from youth to queer communities.

Cher’s voice modification was prefaced by her visual modification; her synthetic voice in “Believe” echoes her many plastic surgeries. This queen of self-construction has spoken out about ageism toward music industry women who are held to high beauty standards. How we read Cher’s visual and voice modifications accords with how CGI has become ubiquitous, as it has become more acceptable to remake one’s image. But Cher, like the Afrofuturist and feminist icons before her, fought for her voice modification. Cher’s Auto-Tuning was judged by critics as gender-bending, animalistic, and robotic—adding a chipmunk and metallic sheen to her contralto, low voice. But her robot look could be interpreted as addressing ageism against women in media industries. Beyoncé and Janelle Monáe have also adopted robot personas, though to a different end, highlighting Black virtuosity and superhuman embodiment in pop—what Robin James calls “robo-divas.”⁴⁵ Robo-divas’ performances challenge the unfeeling/emotional binary critics have created around technologized voices and bodies.

At age 52 when “Believe” was released, Cher’s visual and vocal modifications were criticized as gimmicks for making processes of glamour too overt, especially for what was perceived as “old age” for a pop star. Hildebrand has defended Auto-Tune by saying, “to modify something isn’t necessarily evil; my wife wears makeup!”⁴⁶ We might ask a different question, however: Not whether makeup is evil, but why are women socialized to create “natural” makeup looks? This cultural anxiety measures how much a woman’s appearance or voice differs from its so-called ideal state. When Cher flaunts artifice, she threatens the system that decides those sonic and visual ideals, and she exposes the feminized labor it takes to meet them. Cher’s career, from movies to fitness videos, honed an “image [that] is bound up with a contradictory refusal of convention (about gender or age, for example) and a celebration of artifice and self-construction (surgery, workouts, wigs).”⁴⁷ As a result, Cher’s visual and vocal adaptations have encouraged others to question gender norms and other status quos. Countless drag artists lip-sync to Cher, fashioning iconic looks and multiple selves that reject the idea of one fixed and “natural” self.

Cher’s Auto-Tuning also bears on fixed notions of aging and the voice. Age studies scholars expose cultural defaults imposed on age, whether it is equated with disability, time-earned experience, or the shadowy twilight of one’s life.

Ageist defaults can be debunked through, as cultural musicologist Richard Elliott argues, “the biographical, historical, cultural and geopolitical contexts in which lateness (here understood primarily as experience) is represented in musical performance.”⁴⁸ I characterize what Elliott would call Cher’s “late voice” through these different contexts in order to understand her self-transformation and adaptation through the Auto-Tuned voice and futuristic image not as solely for commercial survival and relevance but as a sound and look she wanted to try in the age of Y2K. By attending to what a singer *does* in a context with a supposedly preset voice, we see and hear the singer attempt not continuity but continuation. As voice and disability scholar Michael Kinney explains, “The expectation of continuity presupposes a ‘listening for’ aging paradigm in which a voice that does not sound the same over time is deficient: one listens for continuity of the voice as it ages to survey the maintenance of aesthetic value. Continuation, however, endorses a ‘listening to’ paradigm by affording the singer longevity without continuity. Continuation is simply that: continuing to sing as the voice changes as it will.”⁴⁹ A focus on adaptation of presets frames voice and aging as a continuation of actions and expressions in voices and images that shift with time and context.

Cher managed to make Auto-Tune a ubiquitous fashion in vocal accessories, once ahead of its time but now here to stay. In “Believe,” Cher combines belting with the deliberately mechanized voice, which was not a patently new voice, but one indebted to Black vocal traditions. Crucially, Cher got the idea to distort her voice from the Black British artist Andrew Roachford; she asked producers Mark Taylor and Brian Rawling to duplicate a telephone-like sound she heard on a Roachford record. The producer duo distorted select syllables with Auto-Tune’s retune speed at zero “to make the whole phrase sound really arresting.”⁵⁰ Quelling fears that Taylor and Rawling had gone too far, Cher quipped, “You can change that part of it, over my dead body!”⁵¹ While for Ngai, the gimmick either arrives too early or too late, Cher’s use of Auto-Tune was timely yet quintessentially Cher.

Using Auto-Tune as sonic rebranding, Cher channeled a superhuman vocal persona into visual personas in the music video, presenting three versions of herself in a blue-and-green tinged nightclub: a robot, a pop star, and a heartbroken girl who sees her boyfriend cheat on her and is a foil for Cher. Cher moves rapidly between these personas—even swapping bodies with the clubbing woman—amid an ageist and gendered industry that would criticize a 52-year-old woman for singing youthful music. At the beginning, Cher is beamed into a cage, eyes closed, body still. As the club fills and a spacey synth pad plays, Cher comes to life in a series of robotic presets. Festooned with a crown of fiber-optic cables, her eyes open to show glowing red lights. Sonic phasers emulate jets taking off and landing every few seconds as lens flares lance around her. In Cher’s triumphant return to disco that is nonetheless tinged with melancholy, Cher sings the first verse, chorus, and second verse from the glass cage, surveilled by young and diverse fans whose receive far less screen time than Cher’s illuminated body.

Like Cher's three personas, the video's images and audiovisual effects present multiple levels of identification for spectators. The video's visual logic of shots and lighting promotes identification with Cher and her foil and evades a connection with the background figures. For Vernallis, in music videos, "Stars often possess greater mobility than do the supporting characters."⁵² Cher's image evolves when her voice does: as Auto-Tune contorts the italicized syllables in verse one's "*I can't break through*" and "It's so *sad* that you're leaving / it takes *time* to believe it," Cher's image pixelates and teleports across the screen. This motivated movement foreshadows a larger one: when the second verse ends with "I've had time to think it through / and maybe I'm too good for you," Cher teleports to a stage to sing the chorus in the guise of a pop star persona for her adoring fans.

When Cher takes advantage of Auto-Tune's instant retuning to change pitch faster than humans can, she debuts an audiovisual adaptation. Evolving from the Fairlight CMI that played sampled voices back on a keyboard, Auto-Tune approximates voices *as* keyboards by flattening their vibrato. As composer Miriama Young observes of overt Auto-Tuning, "The voice takes on a characteristic 'stepped' quality, as if it were being played back through a keyboard."⁵³ Auto-Tune chops the voice into preset samples to be able to adapt to new industry contexts. The Auto-Tuning on Cher's aging voice keeps up with pop conventions of polished voices but also moves away from those expectations—evading norms of human behavior and bridging the human/machine uncanny.

Critics often hear Auto-Tune as distorting the human qualities of pop voices, but, as my technological prehistory, Weheliye, and musicologist Deirdre Loughridge—who presents human-machine Auto-Tune relations as a gradient, not a dichotomy—show us, that claim stems from devaluing minoritized labor, as Black musicians in particular experimented with techniques of voice distortion on the vocoder and talk box. Similarly, Cher's purposeful distortions shift the voice away from industry standards of correctness and toward new forms of artistic expression enabled by technology. While critics of Auto-Tune label it as making the voice colder, flatter, and more metallic, in her Auto-Tuned moments, Cher's voice crackles with warmth, even despite the video's cool color palette (though Vernallis might say the club has "youthful moroseness"). Cher's initial position as a caged entertainer visually reinforced a chilling effect for her Auto-Tuned voice. The philosopher and pop scholar James notes that critics like Tom Breihan often label pop stars' Auto-Tuned voices as more "chilly sound-effect" than "expression."⁵⁴ For James, Auto-Tuned Black women who present as a robot-diva figure, like Beyoncé in a *Metropolis*-esque (dir., Fritz Lang, 1927) robot-Maria suit at her 2007 BET performance and Rihanna in the 2007 "Umbrella" video (dir., Chris Applebaum), "challenge entrenched aesthetic norms and gender-race politics by asserting her black femininity and technological prowess."⁵⁵ Intersectional femininity and technology are not mutually exclusive but a strategic fusion of embodiments and emotions. Like the fire sparks and water

droplets that paradoxically, simultaneously rain down in Rihanna's "Umbrella" video, "chill" and "warm" expression can coexist. While popular culture has long divided women into either Ice Queens or Snow Whites with rosy-cheeked sentimentality, the Auto-Tuned robo-diva demonstrates an evolution of coexisting femme tropes, advanced by artists like Janet Jackson and Grace Jones in both their visuality and vocality. For cultural theorist Christine Capetola, Jackson and Jones engage "*sonic femmeness*, or when one uses sound, affect, and vibration to take up what is supposedly a 'feminine' attribute (such as high pitch or supposed fragility) to expand ideas of 'femininity' and propose new ways of being together that are grounded in emotional resonance."⁵⁶ Accordingly, singers look and listen to the past as much as the future to offer forms of communal adaptation to a stultified, increasingly conservative present.

Several accounts of Cher and Auto-Tune code Cher's Auto-Tuned voice as robotic, but the *kind* of futurity they ascribe to Cher's new vocal/visual persona matters. Writing in 2001, film scholar Kay Dickinson found Cher's technologized timbre "reedy and more a 1970s or 1980s evocation of robotry than a newly contemporary effect. Like Cher herself, [. . .] it is now a deliberately vintage sound and the fact that it was once the height of modernity lends it a certain charm."⁵⁷ Rather than the chilling effect critics attribute to excessive uses of machinic gimmickry, Dickinson hears Cher's voice as vintage, imparting a nostalgic warmth to communicate visceral human emotions of love and loss. For critic Ann Powers, too, Cher's voice is "impure, quirky, a fine vehicle for projecting personality"; these critics suggest that Auto-Tune is an affordance that, rather than being patently futuristic, is more like plastic surgery for the voice, or a Grace Jones type of sonic femmeness.⁵⁸ For Dickinson, "rather than heralding some bold and pure technological futurism," Taylor and Rawling were "surgeon[s] moulding 'Cher' into something which cannot help but represent masculine dominance and the male resuscitation of a waning female singing career."⁵⁹ Dickinson rightly identifies some ingredients of Cher's pop comeback, even though she elides the fact that Cher suggested the vocal effect to her male producers. But while some of that molding was male and adaptive, it is not maladaptive: some critics see Cher as a cyberfeminist icon in "Believe." Critic Sasha Geffen describes Cher as a "cybernetic goddess"⁶⁰; musicologist Jessica Holmes and Kinney argue that "the technologic paired with Cher's awareness of pop music's ageist, ableist, and misogynist logics affords an agency to continue and to define her aging on her own terms. [. . .] Cher's use of this technology demonstrates the type of unequal gendered labor aging female pop vocalists often turn to in order to remain relevant."⁶¹ Cher's new persona embraces artifice—in visual and vocal modification—to continue to have a singing career. To remain relevant is to shore up the financial and aesthetic capital required to adapt. And that adaptation was demanded when robo-divas dominated the pop-scape post-Y2K.

Cher defies Auto-Tune's reputation as a too-past and too-futuristic gimmick by being a diva for the moment of Y2K. Read through this lens, Cher's personas in the "Believe" video reveal how new presets become present to us, much as media scholar Tara McPherson describes the early internet: "When I explore the web, I follow the cursor, a tangible sign of presence implying movement. This motion structures a sense of liveness, immediacy, of the now. [. . .] This liveness foregrounds volition and mobility, creating a liveness on demand [. . .] *a sense of causality* in relation to liveness, a liveness which we navigate and move through, often structuring a feeling that our own desire drives the movement."⁶² For McPherson, such "volitional mobility" is the (a)live feeling of user-led web surfing, led by embodied desires. Accordingly, embodied orientations to the presets of new technologies offer a strategic mobility for users to embody new personas—but only if that mobility transcends the volatility of laboring in a minoritized position. As Loughridge argues, "Twenty years later, [Cher's] image of female technological adeptness had not changed the reality of technology being primarily a male preserve within the pop music industry. An analysis of the 600 songs on the Billboard Hot 100 year-end charts from 2012 to 2017 found only 2 percent of producers were women."⁶³ Cher is the exception to the rule. Because Cher had the capital to commercially reinvent herself, we both see and hear the presets alive in her vocal and visual manipulations. Presets like Auto-Tune cannot liberate human subjects. But they can, paradoxically, loosen them from some constraints.

Sounding out the constraints of pitch, and of the supposed proper voice for a pop star, affords a strategic mobility that can both point to and dance around those sites of control presented as presets. With Auto-Tune, the Ice Queen trope is an enabling constraint. As cultural theorist Susana Loza writes of electronic music adaptations, "Instead of dreaming of disembodiment, we need to work at embodying flexible sexualities, performative sexualities that confront the cultural signs that, for better or worse, have inextricably defined the limits and spaces of our desires. We have no choice but to envision the future of sexuality from the corporeal coordinates of our presents and pasts"—or our presets.⁶⁴

Cher's video includes moments of strategic mobility for her present situation. These reveal that her Auto-Tuning might not be about a robotic state but an escape from the cage of fetishization that women have been consigned to in popular music. The video features science fiction tropes of teleportation, distortion, and body-swapping to depict profoundly human, not merely futuristic, experiences: Cher ultimately swaps bodies on the club's rooftop with a young woman who is experiencing heartbreak. This event indexes a number of visual and vocal presets, including the apocalyptic roof scene in *The Matrix* (dirs., Lana and Lilly Wachowski, 1999) that is replete with special effects and CGI, as well as metaphors for datafication, transness, and more. Cher also dons the voices and robotic

costumes of Black robo-divas and melismatic traditions in order to claim a comeback. Cher's use of Auto-Tune may be liberatory from an ageist pop perspective, but she also usurps tropes of sonic femmeness, participating in the industry's labor-plundering racial, patriarchal, and capitalist machine. By using the special effects of Auto-Tune and visual distortion, she entangles music production with machines as well as a capitalistic industry. Auto-Tune is a tool of capital, which Cher embraces as a technologically mediated practice for hit- and image-making. But she also offers, by borrowing Black vocal and visual traditions, Auto-Tune as a preset sonic and visual signal of transformation, of adaptive futures. Like Rosalía, Cher gets mobility from appropriation and capital. Audiovisual adaptation has cultural defaults and limitations for social progress.

FINE-TUNING TRANSFORMATION: JENNIFER LOPEZ

Since Cher, overt uses of Auto-Tune have mostly been discussed with male rap/hip hop artists. For Provenzano, Auto-Tune is "branded, and not always felicitously, as a black male sound, and so far the market has severely limited this sounding possibility for women."⁶⁵ T-Pain, for example, has been criticized across rap and hip hop spheres for sounding too inhuman, most famously by Jay-Z for not having an "authentic" enough voice for rap. Kanye West, on the other hand, was celebrated for his Auto-Tune-drenched *808s and Heartbreak* (2008)—created with consultation from T-Pain. But before them, Cher and Jennifer Lopez popularized Auto-Tune as a preset sound in hip hop.

Mere months after "Believe," Lopez released "If You Had My Love," produced and remixed by Darkchild (a.k.a. Rodney Jerkins) in 1999. The single's Auto-Tune use is more subtle than "Believe," though Darkchild also instantly retunes select syllables. For T-Pain, the sparing use of Auto-Tune on Lopez's voice in an R&B track "sounded cool. I thought, somebody should do a whole song like that."⁶⁶ Auto-Tune may have become a preset in popular music as a covert way of pitch-correcting and polishing voices, but its continuous use in a song to support a continuous persona became a preset through T-Pain's rebranding of the Cher effect as the T-Pain effect. That novelty quickly wore off; as Ngai observes, gimmicks often are unable to sustain a tradition, particularly with raced and gendered reception.⁶⁷ However, a version of Auto-Tune's story that includes Lopez reevaluates Auto-Tune from a gimmick to a tool that unites tradition and innovation, since she uses a preset in Black vocality that has long been integral to popular music—the melismas that have wound their way from R&B to hip hop and pop.

Similar to Zapp's "Computer Love" (1985), Lopez's "If You Had My Love (Darkchild Remix)" incorporates voice-modulated riffs at the ends of lines—for example, in italics, "I need to feel true love or it's *got to end, yeah*"—and punctuations like "baby" and "ooh." The single's use of Auto-Tuned melismas links Lopez

and Darkchild to a tradition of technologized soul in R&B, fueled by the use of the vocoder since the 1980s. As Weheliye observes, “The interaction between the audibly mechanized and more traditionally melismatic and ‘soulful’ voice in contemporary R&B indicates [. . .] a posthumanism not mired in the residual effects of white liberal subjectivity.”⁶⁸ Following Weheliye, Lopez’s Auto-Tuned riffs, like Cher’s overt Auto-Tune, reject the presumed white male subject of cybernetics and make way for alternate versions of futurity—and presentness. This robo-diva adaptation continues to call back to innovations beyond a white racial frame, even while it racializes and sexualizes Lopez in complex ways. But Lopez, like Cher, needed to adapt her career in order to truly break out in the pop star arena; as the star of *Selena* (dir., Gregory Nava, 1997), she showed that she could sing, but she became a truly chameleonic singer with hits like “Jenny from the Block” (2002). Yet her ritzy outfits flouted that song title, and she also had it both ways with vocals that “managed to feel entirely of the moment while embracing trends that were either outgoing, or else still far on the horizon.”⁶⁹ The tradition/innovation balance of Lopez’s Auto-Tuned melismas in “If You Had My Love” is key to understanding her contradictions. Her adapted voice, balancing traditional and innovative vocal practices, became a way for a nonwhite woman to act, sing, and dance her way to capitalizing on cultural hybridity.

In a less liberatory version of the future than Cher’s, Lopez’s “If You Had My Love” music video has a heavy dose of surveillance cameras—which, as Black studies scholar Simone Brown has shown, long have disciplined Black bodies.⁷⁰ Lopez and her team often borrow from Black aesthetics; for media scholar Priscilla Peña Ovalle, “As cultural tastes shifted toward a commodified form of blackness in the late 1990s and early 2000s, Lopez maximized her commercial potential by visually emphasizing the codified sensuality of her nonwhite female body in accordance with an alleged urban style (that is, a black/nonwhite/ethnic aesthetic).”⁷¹ Accordingly, the video shows surveillance footage of Lopez dancing in different parts of a house; the “footage” is hosted on a website called “Jennifer Lopez Online” that was created for the video. We see Lopez mostly through the eyes of a male voyeur who peeps inside her bedroom and other intimate spaces. Sometimes, other users pull up the surveillance footage on their own computer screens, including garage mechanics ogling Lopez while a car bursts into flames behind them, two women, and young kids. But the male voyeur often chooses the room to see Lopez in next, not only surveilling but also disciplining her body. Similarly, melismas draw out Lopez’s voice, like a gaze that lingers too long. These Auto-Tuned adaptations seem to defamiliarize preset forms of the racialization and sexualization of nonwhite bodies.

Even framed by surveillance, Lopez’s voice distortion complicates traditional modes of spectatorial identification with stars: it produces new and variable spectatorial relations. As media scholar Lisa Nakamura describes Lopez’s depiction in the video, “She becomes an object of volitional ethnicity as she is constructed as an

object of the user's volitional mobility."⁷² The male voyeur is portrayed as aggressive, choosing when to zoom in and out, and seems cast as the antagonist. But midway through the video, the voyeur clicks on "Jennifer's Dance," which triggers a *Matrix*-like trip through cyberspace and then a Latin pop dance break. While the voyeur seems to choose this, Lopez crafted the sequence to show off dance styles from house to Latin soul; she collaborated on the video editing.⁷³ Like the strategic mobility of Cher's voice distortion, this break in the video's form allows the star and production team to assert their dominance as authors of the music video, even while appearing to allow consumers the choice to access music videos online. But besides these production and distribution stories, the content of dance also showcases what Ovalle, following the work of sociologist Angela McRobbie, says are "tales of upward mobility [that] are—for women—presented as most attainable when depicted through the body and especially through dance."⁷⁴ All of these choices crack the binary of freedom/control, and they reveal how the tradition/innovation binary hastens such adaptation.

The purposeful distortion of Lopez's voice also disrupts the preset of covert Auto-Tuning to polish and tame women's voices in pop, and it has a visual analogue. By showing off Lopez's technologized voice, the video's surveillance conceit is shown to be artificial too. But the mediation of both voice and video potentially reveal industrial attitudes around a pop star's racialization and sexualization. Lopez's video centers transformation, concerning the way the fast-growing internet may change the way stars are marketed. Nakamura describes a "webbed voyeurism, evoking the visual culture of liveness through Webcams, and a particular sort of eroticized, privileged view of the star [. . . that] helped to determine [music videos] that came after."⁷⁵ Lopez's video of webbed surveillance nods to a future of MTV that is processed by the internet, whether in algorithmic logics of music video editing in the 2010s or as the preset form for distributing and watching music videos.⁷⁶ In the decade after Lopez's video, YouTube firmly established such online viewing and supplanted MTV as the preset platform for watching music videos. But the video also reaches back decades in order to understand both musical and visual adaptations for racialized and sexualized women. Cher and Lopez both offered a pop star preset based on decades-old Black vocalicity that was later taken back up in the 2000s and 2010s by robo-divas from Beyoncé to Rihanna and Janelle Monáe.

Cher's and Lopez's videos are groundbreaking in their visual and sonic persona effects, as voice distortion prompts a purposeful distortion of star images as well. Cher adapts her androgynous voice, perhaps critiquing the constructedness of contemporary pop stars who pass as natural and authentic. Lopez's track and video display more racialized and sexualized personas than Cher's, framed uncomfortably by surveillance cameras; a paranoid reading might critique the music industry's fixation on stars' sex appeal. The next Auto-Tuned pop diva used

the preset of its star-making power, begun by Cher and Lopez and made even more overt by T-Pain, to construct a vocal and visual sex appeal.

TUNING OUT TRANSFORMATION: THE CASE OF KESHA

After Lopez, Auto-Tune accompanied increasingly sexualized personas. In the late aughts, one hypersexualized female voice in particular paralleled T-Pain's rampant use of Auto-Tune in tracks like "I'm Sprung" (2005) and "Buy You a Drank" (2007): Kesha (full name Kesha Sebert). Kesha's and T-Pain's frequent Auto-Tune uses circulated in the mainstream via a complex duality of party rock and recession pop, cosigned in 2011 alone by LMFAO's "Party Rock Anthem" and the Black Eyed Peas' "Don't Stop the Party." But arguably no one squared this duality like the hyper-promiscuous yet also self-aware Kesha—in her early years, stylized as the persona Kesha. In 2019, the *Switched on Pop* podcast described Kesha as "this bratty, somewhat annoying persona," somehow managing to simultaneously label her as juvenile and sexually promiscuous.⁷⁷ Like Britney Spears, Kesha's clearly mediated voice and image also were controlled by male figures and legal battles. In October 2014, Kesha sued producer Lukasz Gottwald (a.k.a. Dr. Luke) to be released from her contract due to sexual, emotional, and physical abuse; he countersued for contract breach, resulting in 10 years of legal strife and Kesha's step back from the spotlight. As it turns out, Kesha's career also is rife with dualities.

Kesha's overt Auto-Tuning and party-girl image built on T-Pain's party preset to carry pop through the Great Recession. Kesha is a foil for market fluctuation. As much as Kesha has been critiqued for sounding (and perhaps looking) artificial, her creation, rise, and decline were also constructed. As artist-scholar micha cardenas puts it, "The performance of Kesha, as distributed across songs, videos, and interviews, [. . .] is largely a product of the collaboration between Kesha Sebert and the producer Lukasz Gottwald."⁷⁸ Much of Kesha's sexualization may have been created by, and for, a male gaze. From this paradigm, cardenas analyzes "Kesha, a self-declared sleazy girl who 'want[s] to get naked' and fails to meet the standards of many feminists, as a possible model for new forms of agency within networks of existing norms."⁷⁹ We might think we know what this looks like, but what does it sound like? As we've seen, Auto-Tuning is both a covert and overt preset that hinges on sonic and embodied presumptions—how a voice is supposed to match a body according to cultural expectations. Auto-Tune's covert uses like sonic airbrushing intersect with keeping-up-appearances aims of white feminism, and overt uses often index postfeminism, which for media scholar Sarah Banet-Weiser marks a shift "from women as a vague mass of passive consumers to girls and young women as active, increasingly individualized entrepreneurs."⁸⁰ The overt, postfeminist uses, as I've argued, tend to spur on

pop star transformations and persona production. But as we can see, overt versus covert Auto-Tuning and their overlaps with feminism map onto market flows: the charts reveal a status quo of polished voices with covert Auto-Tuning that adds value, while they simultaneously critique overt Auto-Tuning that subtract value as a gimmick.

Kesha burst onto the scene with Dr. Luke's order to be "fun. That's all you are for your first record." Her Auto-Tune-drenched album, *Animal* (2010), caught widespread global attention with its hit single "TiK ToK," which journalist Taffy Brodesser-Akner said "was written to be more nuanced and more definitively ironic at first. But her producers and co-writers on the song, Dr. Luke and Benny Blanco, had to keep her image in mind." Kesha recalls Dr. Luke "saying: 'Make it more dumb. Make it more stupid. Make it more simple, just dumb.'" ⁸¹ In contrast to covert uses, overt Auto-Tuning accentuates Kesha's lack of polish, and the music video ties a bow on that message. According to music psychologist Tim Byron and pop music scholar Jadey O'Regan, "TiK ToK" is a morning-after-party anthem that "uses Auto-Tune sparingly, but is most effective on the final line of the first verse where it's used on the phrase 'a little bit tipsy' which is snapped hard to the melodic grid. This gives the vocal a wobbly, unpredictable sound that cleverly represents the 'tipsiness' of the protagonist."⁸² These authors note the visual distortion to Kesha's face at this moment, which visually rhymes (perhaps consciously, or not?) with that of Cher in the "Believe" video. By the late aughts, the alignment of vocal and visual distortion had become a preset form of displaying purposeful uses of Auto-Tune. In the recession pop era, this duality found its ultimate expression in the figure of, not a robo-diva, but a party girl.

In 2016, Kesha insisted on her career's duality, discussing how the party girl was a put-on persona in both voice and image. She was a self-proclaimed "superfeminist [. . .] allowed to do, and say, and participate in all the activities that men can do, and they get celebrated for it. And women get chastised for it."⁸³ The unvarnished voice of superfeminism, ironically accomplished through heavy use of Auto-Tune, was not interpreted as such by critics—rather, it became a preset for not taking women's voices seriously when it was paired with party-rocking imagery. Kesha wanted to party and be a rocker, like some of her heroes, including the Beastie Boys (think "Fight for Your Right," 1986) and Johnny Cash. But critics did not see the deep rocker roots, only a surface vocality and imagery. As Brodesser-Akner reports, "They didn't get that the dollar sign in her name was ironic—that it was not an image, but a kind of comment on image. They didn't get that her talk-singing wasn't an attempt at rap; it was its own thing, just a way she made music."⁸⁴ Kesha, like fast capitalism, could modulate her voice and image in the blink of an eye. But her persona wasn't understood as an adaptable preset; it was grasped as a party favor.

The year 2016 was a big one for American personas; it also ended up being the year that Ben Folds recognized Kesha's malleable artistry. At the Billboard Music

Awards in 2016, Folds played piano with Kesha to usher in her equivalent to T-Pain's NPR Tiny Desk concert, where stripped-away Auto-Tune gives way to another kind of vocal performance. Given Provenzano's analysis of the T-Pain "stripped back" performance, I will not rehearse here the debates about a singer's "authentic" or "natural" voice, but the natural/unnatural binary also shaped listeners' and critics' reactions to Kesha's cover of Bob Dylan's "It Ain't Me Babe."⁸⁵ Users' comments on a YouTube video of the performance predictably referred to her voice as "pure without autotune"; "I falsely assumed that she couldn't sing because of the overproduction and the constant rebellious, party-goer music themes"; "we finally know what she is capable of and what her real voice sounds like."⁸⁶ The acoustic performance and Kesha's white nudie suit—with rainbows on the lapels—affirmed the "natural" side of these narratives. Folds both contributed to and negated these false natural/unnatural binaries; he said, "She's the only performer I can think of that has gone from being packaged to real. [. . .] What she's actually doing is the opposite, where she's now showing that actually, there is something really huge beneath the whole thing."⁸⁷ And yet, Kesha long has been packaged for different people, audiences, and moments of her life.

In the mid-2010s, amid legal battles that Dr. Luke or the courts rejected, Kesha's output began to reflect a new image of a pop victim. As Kesha described her 2017 album *Rainbow*, "I've written a record that reveals my vulnerabilities, and I have found strength in that."⁸⁸ But vulnerability—like authenticity—drips into which-ever moment is appropriate to a pop release, whether recession pop or #MeToo. For feminist scholars Rosemary Lucy Hill, Bianca Fileborn, and Catherine Strong, Kesha's mixture of vulnerability and strength in *Rainbow* portrays a nonlinear survivorship that is often rife with contradiction.⁸⁹ In such a framing, vulnerability can sound both soft and hard; it is a process of redirection from defaults that can consign survivors to limiting subject positions. As Provenzano writes in her forthcoming book, *Emotional Signals*, Auto-Tune's emotional expressivity works on a binary of hard/male, soft/female, especially in rap. But many artists including Kesha show that hard-tuned (or overtly Auto-Tuned) vocals can maximize "soft" expressivity. Artists, however, can only have a platform to express vulnerability if they have capital—in money as well as in a fan base.

As of 2026, Kesha has gone from what Charli cxc would call a "365 party girl" to a self-recording artist—she has her own record label now. Kesha plotted her comeback with an album entitled "—" released on July 4, 2025. Its most puzzling single—but also perhaps its most predictable, given the post-2016 reign of country crossovers in the pop sphere—is a country song, "YIPPEE-KI-YAY," a collaboration with T-Pain. In this song, Kesha's white nudie suit image and Auto-Tuned past yoke Black country music to lyrics that yearn to travel in between genres, new and old careers, and "the king and queen of Auto-Tune."⁹⁰ But while Kesha and T-Pain may have aimed for something like Shaboozey's "A Bar Song (Tipsy)," a 2024 upbeat dance anthem, their mix of styles falls flat. Kesha's self-aware lyrics

poke fun at herself singing karaoke drunkenly and not in tune continues the Auto-Tuned talk-singing from her first album, though not in a way that works in country; this vocality feels out of line whereas T-Pain's verse feels at home in the contemporaneous Shaboozeian Black country context. When Kesha returns to the preset of her early career party-girl image and sound, she mixes in more on-the-nose ingredients—the overt T-Pain modulated voice and the party anthem lyrics. But the country sound seems to nod toward a self-selected authentic genre that can be her savior, or at least for this next moment of recession pop. Kesha is not so much finding her own voice or probing authenticity as she is finding the presets for a hit—whether in vocal styles or personas.

UNAPOLOGETICALLY AUTO-TUNED: HYPERPOP

Kesha may have attempted capitalization on a country crossover with T-Pain, but “YIPPEE-KI-YAY” found a more appropriate sonic context in a remix by A. G. Cook—the most famous hyperpop producer. Hyperpop emerged toward the end of the 2010s as a mix of many prior genres, including industrial rock, emo, EDM, and noise. Its hyperproduction throws everything but the kitchen sink into the mix, with electronic instruments, samples, and Auto-Tune's hyperproduced voice dominating these soundscapes. Perhaps the Auto-Tune aesthetic found its home because party anthems and celebrations of queer joy have reached an apotheosis framed in hyperpop soundscapes. By mainstreaming hyperpop, Charli xcx codified Auto-Tuned brattiness in an album title and definitive chartreuse color in summer 2024.

Brat was a monocultural moment of careful calculations; Charli xcx said in a TikTok that she had been planning the album's marketing for two years like a limited “fashion drop.”⁹¹ But then “brat summer” spilled beyond its chartreuse borders until even Kamala Harris was brat. As Robin James observes, “*brat* looks inward to modern rock itself to disidentify with a mainstream white femininity centered around the eschewal of transgression and the appropriation of femme indie rock sound.”⁹² In other words, *Brat* adapts—in every way, looks, lyrics, samples, and sounds, and even from a word that used to mean spoiled child but now means unapologetically self-aware. And Auto-Tune is at the heart of this paradigm shift. From Cher to T-Pain and Kesha, overt Auto-Tuning became a preset for disavowing *some* industry norms in order to adapt artists' personas (read: sounding pure, natural, and beautiful). These artists' use of Auto-Tune often capitalized on commercial appeal. But what happens when a preset sound crosses enough of these bounds to become an adaptive tool for artistry—offering a potential for disidentification that is self-disclosed and, perhaps, political?

When Auto-Tune distorts the pop industry's ideals of control and normalization, it becomes a tool of disidentification: what performance studies and queer theory scholar José Esteban Muñoz calls “a performative mode of tactical

recognition that various minoritarian subjects employ in an effort to resist the oppressive and normalizing discourse of dominant ideology.”⁹³ Disidentification is a possible effect of adaptation—given, of course, these politically charged circumstances. On one level, Auto-Tune disidentifies the voice or perhaps, more accurately, defamiliarizes it—makes it strange. Yet, once Auto-Tune becomes the preset sound for an artist’s voice, it becomes an adaptive and tactical instrument. Much of Charli xcx’s career is owed to Auto-Tune; she has joked about it in a *Saturday Night Live* monologue and agreed to the sentiment that the hard-tuning of albums like *Brat* “embraces Auto-Tune as an instrument” and a preset manifesto for life: “I drink and I smoke and I use Auto-Tune.”⁹⁴ Charli disidentifies with Auto-Tune’s covert, polishing function, rather using it to turn up the brat. As one fan reports, “What I love about charli is that she always leaves faults in her autotuned vocals they’re not always clean or on pitch / It always has so much textures with the wobbliness and the distortion that it adds an emotion and conveys it very efficiently.”⁹⁵ Auto-Tune allows artists to disidentify with pop music’s preapproved voices and identities. Auto-Tune’s adaptive persona effects allow artists to bend their voices toward other goals than pop perfection. Especially in their music videos, artists form new associations between their voice and body by producing creative personas that untether them from having one perfect star image.

Charli xcx’s videos are a close study in disidentification, though one that is more tactically tongue-in-cheek in “resist[ing] the oppressive and normalizing discourse of dominant ideology.” She destroys her image—a billboard of herself—in the video for “party 4 u” (dir., Mitch Ryan, 2025), released on the song’s five-year anniversary, given that COVID-19 lockdowns stymied live video production. Back in 2020, Charli xcx rented a green screen in order to convert her basement into a video shoot for “claws” (dir., Charlotte Rutherford). At the beginning of that video, the singer gives viewers a sneak peek of the set, but this is not the only disruption of the default glossy production of many pop videos.⁹⁶ The green screen is the true star of the video, the preset ground on which a panoply of Charli’s outfits and backdrops, from cars and rainbows to animated butterflies and robots, appear to adapt before our eyes. Like Charli’s overtly Auto-Tuned voice, we know very well the roots of that adaptation. But nevertheless—we take in maximalized pop pleasure.

As one YouTube commenter put it, “I think it’s safe to say this is the best character development in the music industry” when the “claws” video associates the most hard-tuned moments with a robot that appears in the song’s first bridge, a foil for Charli with the letters xcx on its chest.⁹⁷ Given that “she’s been known to sing like an anthropomorphic AOL dial tone or a glitched-out ‘femme-bot’ deep in the uncanny valley of AutoTune,” this robotic emblem recalls the robo-diva of Auto-Tune’s cybernetic associations.⁹⁸ But a more novel image accentuates the inhuman-inside-the-human of the hard-tuning in the second iteration of the bridge, when the green screen displays a metallic snake coming out of a

woman's mouth. When considering Charli's hardened tuning and feminism, however, a medusa-like image grittier than Cher's fiber-optic wig makes sense. More interesting still is that the metallicized throat image appears in the Antares Throat plug-in. Created in 2006, Throat is a "Physical Modeling Vocal Designer" that allows users to "adjust the shape of the lips, mouth, throat, [and] vocal cords" with knobs that stretch, squash, widen, and constrict them, thus "go[ing] beyond the limits of human anatomy."⁹⁹ The plug-in promises to perform beyond preset human anatomy, allowing Charli to enjoy her bratty persona and sound while also poking fun at it. If Cher displays strategic mobility by teleporting across the screen in her music video, Charli obliterates science fiction continuity, planting its cybernetic emblems but also winking at the multiple personas and associations she has created with the self-disclosing gimmicks of Auto-Tune and the green screen. This self-aware persona effect allows us to see what could be thought of as parallel audiovisual efforts behind Auto-Tuned adaption.

Auto-Tune effects are always created through collaboration—the singer with the software, a mic connected to Auto-Tune live, and the producers who work the settings. "claws" was made into a glittering hyperpop jam—yet with bubblegum lyrics—by producer Dylan Brady of the hyperpop band 100 geecs. Charli xcx, 100 geecs, and A. G. Cook (who worked with Kesha) are associated with PC Music, hyperpop's main record label and artist collective based in London. As critic Joe Lynch observes, PC Music artists combine "Auto-Tune, saccharine synths and ear-splitting distortion to make music that both celebrates and parodies the mainstream"—allowing many of its personnel to create disidentification.¹⁰⁰ The trans singer/producer SOPHIE (d. 2021) exemplified hyperpop hard candy that bit back at those who might not understand the flavor. Hyperpop has been a sandbox for developing trans vocal practices, but it was not the first genre to cut teeth; the punk/rock of Jayne County or hardcore punk of G.L.O.S.S. also disidentified with vocal defaults, and more work must be done on trans vocality's chosen genres and technologized forms.

By drawing attention to the constructed voice, SOPHIE critiqued norms of gender performance. For example, in "Immaterial" (2018), a bouncy hit that presages "claws," SOPHIE uses Auto-Tune to pitch her collaborator Cecile Believe up several octaves, akin to the Chipmunks. For Geffen, the track hails "pop icon Madonna's 1984 hit 'Material Girl' while gently undermining the restraints of material reality, outlining a vision of consciousness unburdened by the body's narrow social connotations."¹⁰¹ Through Auto-Tune, SOPHIE voiced experiences that disidentify with the way society conditions bodies for certain gender norms, as her album art and other music video imagery also attest. SOPHIE harnessed disidentification to show what new forms of creation rise from the ashes of social norms.

In SOPHIE's wake, artists like 100 geecs took the hyperpop trend of distorting vocals to new heights. The video for 100 geecs' "money machine" (dir., Gabe Howell, 2019) particularly models how visual and vocal modification achieved

with Auto-Tune leads to greater malleability of gendered—and, more broadly, human—norms. Trans singer and 100 geecs member Laura Les uses abundant Auto-Tune, as she “itches up her vocals, puts a lot of Auto-Tune in there and uses that to scream and express all that raw emotion.”¹⁰² This pitched-up style of voice modulation is called “nightcore.” Nightcore achieves higher pitch by speeding up a track by about 35 percent, imitating the effect of playing 33 1/3-inch vinyl at 45 revolutions per minute. It operates like varispeed tape did for the Chipmunks. But while some nightcore videos on TikTok use it for a comedic effect, many artists use its nonhuman sounds to intensify emotion. Nightcore vocals also sound like a Vocaloid, a vocal synthesizer software that gave voice to the most famous voice-bank-turned-manga-character Hatsune Miku (more on her in chapter 5); nightcore videos on YouTube often feature images of anime women. Les has discussed in interviews her use of nightcore to navigate gender dysphoria: nightcore is a vocal tool for trans and nonbinary artists to shape their voices flexibly on gendered spectrums. Accordingly, Les’s 100 geecs collaborator Brady also itches up his voice. Hard-tuned vocals allow for the modulation of identity alongside the modulation of pitch.

The “money machine” video reaches a far greater pitch of visual distortion than the videos discussed earlier, which arguably matches the significant vocal adaptations of 100 geecs’ voices. In the video, Les and Brady pose as angry truckers to critique the “money machine” of monetizing content on the internet. The video is reminiscent of the Gregory Brothers’ *Auto-Tune the News* YouTube videos circa 2010. The white comedy musicians used Auto-Tune to satirize public media institutions, but they also flattened and racialized people as memes, as in Antoine Dodson in the “Bed Intruder Song.” For internet music scholar Paula Harper, the Gregory Brothers’ Auto-Tuning “served to standardize acts and practices of objectification, flattening out voices and converting human subjects into pre-musical potentially-viral data.”¹⁰³ 100 geecs operates differently: while its trucker showdown might first appear spiritually akin to the Gregory Brothers, 100 geecs metalicize their own voices with Auto-Tune to disidentify with truckers’ voices. The glitching of both their voices and images suggests the complex opacity of gender norms as well as internet culture and AI under late capitalism. 100 geecs use Auto-Tune as a self-aware gimmick to critique ideals of money-making, toxic masculinity, and surveillance, while at the same time making money, ironically, by following the meme trail of *Auto-Tune the News* and others.

In this way, 100 geecs supersede Cher’s presentation of age and plastic surgery as alternative to commercial pop stars. 100 geecs use Auto-Tune as a sonic foil to facial distortion technologies that disrupt systems of surveillance and facial recognition, which they nod to in their glitched images. Both personas and their pitch-shifted voices destabilize identity norms and reflect the complex opacity of queer and trans expression on the cusp of the 2020s. For trans artist-scholar Lisa Karolyn Holte, “The audiovisual symbolism of ‘money machine’ disrupts notions of stability and

causation between chromosomal sex and gender, opening up a space for the audience to redefine categories, boundaries, and, ultimately, themselves.”¹⁰⁴ 100 geecs pushes past gender binary as a preset, in a way using the master’s tools by emulating symbols—monster trucks and Monster energy drinks—of those who seek to destroy rights to gender expression. “Hyperpop’s vocal processing and digital remixing” are also the master’s tools, which cultural theorist Cameron MacDonald encourages us to “read not as transcending the materiality of the body, but rather as a recognition of how the body offers sensorial, affective, or erotic expressions in excess to how it is linguistically scripted under the biopolitical management of cis-normativity.”¹⁰⁵ In hyperpop, language and bodily scripts collide with genre forms in webbed opacities and volitional mobility. MacDonald also connects “the poetics and praxes of obscurity in hyperpop” to cultural theorist Kodwo Eshun’s work on “the sonic and creative experimentations with technology pioneered by Black and diasporic artists, whose receptivities to the alien forces that create and are created by machinic music were just as responsible as queer and trans contemporaries in collapsing the boundaries of ‘alien identity, human organism and organized self’ to generate other trajectories of selfhood.”¹⁰⁶

By using Auto-Tune to instigate audiovisual distortion as a form of critique, 100 geecs and other candy-coated hyperpop uses of Auto-Tune weave together Top 40 aesthetics with self-reflexive artifice. Following this trajectory, Auto-Tune has become not a passing trend, but a sustained tradition, opposing Ngai’s observation that gimmicks have an “immediately vanishing aesthetic payoff.”¹⁰⁷ Over two decades, Auto-Tune artists have dug into Auto-Tune’s gimmicky status to disidentify with industry norms or mainstream aesthetics. By using Auto-Tune as a tool of self-fashioning, both vocally and visually, these artists open up ways of expressing varied identities—aging, racialized, feminized, and trans—that disrupt a pop industry that would hold them to narrow norms of “authentic” voices. The case of Auto-Tune shows how the technological labor of minority voices has transformed pop music history. Moreover, the iconography that has developed out of critics’ and artists’ judgments and uses of the technology lays bare the stereotypes it perpetuates, but also provides alternatives to the status quo.

While Auto-Tune began with gendered shaming, from the NAMM wife’s suggestion and the dehumanizing of Cher as a robot and gerbil, the vocal preset of overt Auto-Tuning became a tool of gendered adaptation—and also of class, racial, and sexual adaptation. Such vocal and visual transformations grant strategic mobility and adaptive futures, especially for minoritarian artists fighting against presets in both music and culture. This raw materiality connects back to Auto-Tune’s history as a mining technology, probing depths far beneath topographical surfaces, to find raw materials that remake seemingly preset subjects—from rocks to pop singers. In Auto-Tune’s remixed resource of the human voice, much like voice-modulation technologies did before it, preset inputs and outputs make something hybrid that recontextualizes—*adapts*—those presets.

Sometimes it can be difficult to recognize and accept new presets. The evolutionary potential of cybernetics and Auto-Tune, through presets that adapt the human, lies in not only their futuristic aesthetics but also their project of remaking a cultural default with a sonic preset. As the women synth artists in chapter 2 used the master's tools to build a different house, so too can Auto-Tuning provide a volitional mobility for racialized, gendered, and trans people. Negotiating the plasticity of vocality and identity, artists' movements along media editing and playback screens, as in chapters 1 and 3, suggest the gridding of new horizons for expression. By both building and destroying machinic presets, Auto-Tuned artists who dis-identify are creating spaces to highlight different communitarian aims, navigating the contradictory webs of self-making amid assumptions of one's identity held to cultural defaults. Turning toward synthetic media in deepfakes' and holograms' similar goals of ventriloquizing, synthesizing, and extending humanity, I continue to investigate the freedom/control and human/machine binaries initiated with silent film music and push-button presets, probing the contradictions of a spectrum of preset yet mobile, and sometimes dangerously fast-moving, possibilities.

Human Presets

Synthetic Voices and Instruments of Semblance

From lip-syncing models being credited for singers' labor, like that of singer Martha Wash on "Gonna Make You Sweat (Everybody Dance Now)" (dir., Marcus Nispel, 1990) or ghost singers like Marni Nixon, who sang for Audrey Hepburn in *My Fair Lady* (dir., George Cukor, 1964), to Milli Vanilli, Lina Lamont (the *Singin' in the Rain* character whose voice did not fit Hollywood's transition to sound cinema), and Lil Miquela (a recent fictional singer/influencer), fake singers fascinate me. I am enchanted by the way their voices come from external sources through ventriloquism—the art of throwing the voice, accomplished through lip-syncing, dubbing, and other technological processes. But ventriloquism cuts both ways; it is not just an instrument of fantasy but also one of fiction, controlling the voice of another person or avatar and turning them into a prop, a puppet.

This chapter explores fake singers in synthetic media, from hologram singers made from voice bank software like Vocaloid and SynthV, to the motion-capture animated avatars of livestreaming VTubers (virtual YouTubers), to the audiovisual algorithmic fakery of deepfakes. I consider how these synthetic media singers play with preset "human" forms. For example, in 2007, the fake singer Hatsune Miku was created from recordings by a Japanese voice actress stored in Vocaloid voice bank software boxed with her likeness, a teenage girl with blue pigtails. Users write songs from the presets of Miku's voice with this software, and then they circulate those songs through social media, manga, and more, accompanied by her image. Creators' audiovisual encounters with Miku involve sanctioned ventriloquism, as they purchase the software and are free to replicate Miku's voice and image through a Creative Commons license. The fact that Miku becomes a mouthpiece for any user's desires, however, becomes more pernicious when she is handled by those who write lyrics or represent her in ways that gender, racialize,

or sexualize her. Fake singers are projections of who is pulling the strings. Miku is an embodied puppet that people can shape differently, pushing and pulling the preset of her persona.

I analyze synthetic media figures as puppets, in conversation with media scholars who address the systemic biases encoded in the age of AI and “surveillance capitalism”—sociologist Shoshana Zuboff’s term for “global architectures of behavioral monitoring, analysis, targeting and prediction.” Zuboff’s questions about information infrastructures—“Who knows? Who decides who knows? Who decides who decides who knows?”—are crucial foundations to the twinned rise, from the early 2000s to the 2020s, of media ventriloquism and Google, Facebook/Meta, and other Big Tech companies.¹ Wealth and power puppeteer digital and vocal assets; as Zuboff elaborates, “Surveillance capitalism is the puppet master that imposes its will through the vast capabilities of this connected puppet [. . .] replacing the engineering of souls with the engineering of behavior.”² I also draw inspiration from performance scholar Marissa Fenley’s work on puppetry, which lays bare the malleability and construction of personhood; I translate questions of predictability and power to presets. As I argue, puppets are a preset form of a person—a material substrate, like a Fairlight floppy disk, a pressed-out form that is circulated and reanimated. I theorize Vocaloid and other technologies as puppets with gendered and racialized voices and images often at the control of white producers, drawing from my own prior discussions of feminized and ageist portrayals of Cher and Taylor Swift in podcasts and from scholars who have analyzed radio shows like *Amos ‘n’ Andy*, where white actors replicated Black speech in what journalist Mel Watkins calls “racial ventriloquy.”³

To study preset forms of puppetry and ventriloquism, I probe how 21st-century synthetic media like voice banks and deepfakes are built from chains of aural and visual samples. These samples are the grounds for adapting human presets, whether through voice or appearance. By approximating audiovisual likeness, synthetic media rely on presets for replicating humanity, boiling down a (fake or real) celebrity’s supposed essence to make them instantly believable to audiences as the “correct” and true form of that person. When fans make and remake synthetic pop personas, they reveal which forms of humanity we value or take for granted, for pop stars but also for ourselves as fans and critics. Accordingly, 21st-century presets often harness ideals of realism, norms that presets enforce but also can, in critical settings, expose as ageist, sexist, and racist.

My study of synthesized voices and norms begins with how Miku’s associated imagery gives vocal samples the necessary representational grounding for people to invest belief and meaning in a synthetic pop star. Such investment of belief in mechanical fusions of voices and bodies is not new but dates back to 19th-century talking machines and early sound film. I then discuss how realism is encoded in Synthesizer V, a voice synthesizer software launched in 2018 to attempt to sound more “realistic” than Vocaloid’s robotic voices. SynthV applies machine learning

models to vocalists' recorded samples, aggregating multiple voices from pop stars to create avatars. SynthV users also have at their fingertips several presets for adapting the voice, from operatic pronunciation to loudness, as if they were the singer themselves—and a puppet master, with outcomes that run the gamut from creativity to capitalistic gain.

Voice banks' algorithmic voices, the images that accompany their use in fan videos, and their stakes on humanity only scratch the surface of their complex presets. Vocaloid and SynthV users remake a voice bank's voice, appearance, and personality amid a Japanese-turned-global "media mix" that surfaced in the 1960s. Media industry scholar Marc Steinberg defines media mix as "a mode of creative practice supported by a particular deployment of media that includes manga, anime, and games, as well as fan-produced works, and the media mix intertexts and paratexts a[re] the tissue that supports them."⁴ Those paratexts are stoked by fans inside and outside of Japan, who are drawn to the ways the media mix produces "soulful bodies," as animation scholar Thomas Lamarre observes, with "movements of heart, soul, and mind [. . .] inscribed onto the surface of the character."⁵ Miku is certainly part of this transmedia and fan-driven fabric, which includes other figures like Hello Kitty, and which continues to garner more international audiences with the popularization of *kawaii* (cuteness) and Cool Japan. Beyond this aesthetic level, media mix characters' soulful presets recall Zuboff's point that technologized consumers are puppeteered not by engineered souls but engineered behavior: "Surveillance capital wants more than my body's coordinates in time and space. Now it violates the inner sanctum, as machines and their algorithms decide the meaning of my sighs, blinks, and utterances; the pattern of my breathing and the movements of my eyes; my jaw muscles; the hitch in my voice."⁶ The media mix prompts users to act on such fantasies of control by synthesizing and adapting human presets. In this way, synthetic media voices can be entangled in ventriloquism, which, as Fenley argues, "does not simply index relations of power and powerlessness, but creates the conditions for domination, aggression, tenderness, and love—affects that constellate relationships of power."⁷ Teetering between lines of capital and expression, voice bank users remix vocal, visual, and cultural presets to create songs and stories across transmedia that traffic in ventriloquized complexities.

From sample-based presets for synthetic voices, I turn to deepfakes, or synthetic videos, images, and recordings that have a similar mixture of samples and generative AI. Deepfakes have been made of various figures, from the former Queen of England to Tom Cruise and Barack Obama. But as with Vocaloid/voice banks, deepfakes do not recreate these people out of thin air but rather rely on countless samples of their speech and footage of their movements. In a popular genre of face-swapping deepfakes, early (ca. 2017) deepfakes also used impersonators, which translated voice banks' audio sample logic to the audiovisual realm: like SynthV, these deepfakes meld an actor's voice into the target celebrity's vocal database. But they also map the impersonator's mouth movements and facial

expressions onto those of the target celebrity's likeness. The deepfake's synthetic essence of a human strives to fool people into believing this is a person they have seen before on the news and on their phones. Deepfakes aggregate characteristics from an algorithmic recipe much as voice banks do. Moreover, voice banks' and deepfakes' ideals of simulated and mediated presence have pernicious parallels in history, including ventriloquism in Blackface minstrelsy and forgery in talking machines and deepfake pornography. In these cases, deepfakes are built and used to instrumentalize humanity and humans themselves, as shadow puppets with moldable forms.

Voice banks and deepfakes, two preset-based synthetic media, show how technologies use samples of voices and bodies to instrumentalize reality and authenticity. Across this book, presets develop in and as instruments but also become instrumentalized. The surge of deepfakes in phone call banking scams, as well as deepfakes that stand in for aging or deceased actors, show how media industries desire shorthands for human labor. In the 2020s, the inhuman personification of voice banks and deepfakes are used by film industries to replace aging actors with digital puppets that have controllable assets. Yet, for sound studies scholar Jonathan Sterne, synthetic media from digital assistants like Siri to software like Auto-Tune and Vocaloid do not merely "supersede[e] a humanist vocal subject" but also possess a sliding scale of subjectivities and embodiments.⁸ What happens when presets reset humans—or supersede them—in service of alternate realities? Inspired by conversations I have had with film music scholar James Buhler, who proposes that ChatGPT only offers semblances of thinking, I theorize voice banks, deepfakes, and other synthetic media presets as instruments of "semblance," a word that derives from seeming and simulating to mean "the outward appearance or apparent form of something, especially when the reality is different."⁹ Semblance grounds the creation of puppets, ventriloquism, and synthetic media and sustains their believability, investing in what they do and not just what they are.

A BRIEF HISTORY OF SYNTHETIC MUSICAL ARTISTS

Hatsune Miku is by no means the first synthetic pop star. Several artists have appeared as emblematic animated characters in their music videos, from the Beatles to Björk. Perhaps the most famous of these is the British band Gorillaz, which formed in 2000 as avatars drawn by artist Jamie Hewlett, known for the comic book *Tank Girl*.¹⁰ The band's music videos juxtapose what film scholar Marsha Kinder termed the live-action "performance" music video with animation to make a pointed critique of boy bands. As founder and frontman Damon Albarn put it, "Everything is so manufactured these days [. . .]. Gorillaz are different. They may only appear in cartoon form but, believe me, they are larger than life."¹¹ (Much the same could have been said about Alvin and the Chipmunks nearly half a century earlier.) The band's artificially constructed, preset images lay bare the

manufactured personas in the pop industry, much like Cher and other Auto-Tune artists have reinvented themselves and their careers through new personas. In another form of critiquing the homogeneity of the pop industry, Gorillaz pitch themselves as puppets that play live concerts as holograms, using technologies similar to Miku's shows.

Miku was marketed by Crypton Future Media as a virtual idol, a popular form of entertainment in Japan that includes imaginary figures like Hello Kitty and Sailor Moon. As these idols' likenesses are inscribed all over visual culture, Miku's image in turn made her voice more spreadable on various media platforms.¹² Similarly, Gorillaz have collaborated with artists from Ike Turner on the song "Every Planet We Reach Is Dead" (2005) to jazz guitarist George Benson and pop artist and actor Jack Black (in the music video for "Humility," dir., Hewlett, 2018). The versatility of the band's animated image is a flexible preset for collaboration, especially for musicians from vastly different genres. In the case of Miku, her visual flexibility and the infinite iterability of her vocal presets prompt consumers to use her voice in genres from pop to opera to death metal.¹³

And yet, virtual idol bands experience varying degrees of preset flexibility; while not frequently virtual, K-pop idols often are held up by fans to god-tier pedestals.¹⁴ But bands like BLACKPINK have likenesses that balance charisma and boy- or girl-next-door qualities in order to pass off achieving fame and perfecting dance routines and vocals as effortless. This canvas is carefully constructed and hard-won, which the UK reality TV show *Made in Korea: The K-Pop Experience* (2024–) attempts to show by training five British boy band hopefuls at illustrious Seoul K-pop talent agencies. *Made in Korea* reveals the preset forms of pop idols, which are difficult to fit into cross-culturally, even if you know the formula. But idols importantly also are preset forms with which their fans and others can interact. For pop scholar Kai Arne Hansen, "narratives concerning pop artists' identities are partly defined also by journalists, critics, and audiences, whose responses to the persona play a part in shaping it."¹⁵ Fans play a leading role in shaping Miku's puppet forms, constructing her vocal presets and personas. But, like any puppet, they also confront the preset of her existing image and characteristics.

THE CANONICAL PRESETS OF VOICE BANKS

Only a few years after Auto-Tune blurred the lines between humans and machines by temporarily manipulating voices, Vocaloid software made synthesized voices available as customizable instruments for consumers. The voice synthesis software was developed in 2000 at Pompeu Fabra University (Spain) in conjunction with the Yamaha Corporation; the software debuted in the United States in 2004. Vocaloid software consists of human-recorded voice banks of samples that consumers use to create avatar-like Vocaloids that can "vocalize" (a term I will use for Vocaloid singing throughout this chapter to describe how a computer produces

singing via playback) any song users desire by inputting lyrics and notes. Vocaloid software is like a complex musical version of text-to-speech, where users choose a particular voice—called fonts, fitting with the text-to-speech metaphor—and can add dynamics, vibrato, and more. But these vocal presets really came alive when they were paired with images and avatars known as Vocaloid. The Vocaloid media mix became what it is today in 2006–7, when a video-sharing platform called NicoNico (initially, Nico Nico Dōga) launched, allowing fans to comment in real time on viral Vocaloid videos. Then, the Vocaloid Hatsune Miku was created by the Japanese company Crypton Future Media. Through NicoNico fan videos, Miku became a vocal sensation in and far beyond Japan, even touring as an anime-style hologram.

Vocaloid software is sold as a boxed set of thousands of samples recorded by one singer. These singers record for approximately eight hours a day for five days to create extensive combinations of consonants and vowels (called phonemes, or discrete units of speech), all on different pitches for consumers to manipulate. This process breaks the voice into recombinable assets. While not the first voice synthesis program, Vocaloid made song creation accessible: users simply type in their desired lyrics and pitches for prerecorded voice bank presets to vocalize these combinations in playback. In voice bank and Vocaloid software, the recorded samples of the singer are presets that combine in myriad ways—for musicians and nonmusicians alike and for any kind of genre or any preexisting or original song.

Like puppets, Vocaloids are packaged with names as well as personality and physical traits. Initially, Vocaloid software could vocalize only in English and Japanese, but Vocaloid 3, released in 2011, expanded to Spanish, Korean, Mandarin, and Catalan (a fascinating choice for the language's minoritized position). The additional languages broadened the software's appeal, but it became a global phenomenon by packaging a synthetic singer's voice bank with a fictional name and image on the box cover art. Crypton gave Miku the physical parameters of being 16 years old, five feet two, and 93 pounds. Her box art has a fitting image for a name that means "the sound of the future"—an anime-style girl based on graphic novelist Kei Garō's design with long legs and blue pigtails, which emulate the teal glow of Yamaha DX7 synthesizers. As a result, the visual register and malleable lyrics of Vocaloids are blank-slate presets that fans can customize. But "customize" is a complicated word when it comes to who "owns" which aspects of Miku.

When a fan purchases Miku's software, they have the opportunity to give her, as media and dance scholar Hilary Bergen writes, "an identity, lyrics that read like diary entries, and an overall semblance of interiority, and yet she has no agency—no control over her image whatsoever"—much like a puppet.¹⁶ In 2012, Creative Commons teamed up with Crypton to license Miku as free to share and adapt for noncommercial uses as long as credit is given to the creator and the user links to CC BY-NC. As Hiroyuki Ito, CEO of Crypton Future Media, Inc., said in the news release, "I hope that this encourages cross-border collaborations among creators

and enables them to deepen their understanding of each other's culture and respect to creators through their works and creation." As of 2012, Miku remixes globally included over 500,000 illustrations, 170,000 YouTube videos, and 95,000 songs.¹⁷ While users are free to do what they will with Miku's puppet likenesses—perniciously, sometimes casting her in pornography—Crypton is still a puppet master that scripted Miku as a particular voice and image. The media mix is a mesh of competing interests that enable voice manipulation and racial ventriloquy. For example, the traits for Vocaloid boxed singers often traffic in racial stereotyping. Released in 2004, the first Vocaloids, Lola and Leon, were advertised as soul singers despite the multigenre prowess of the Black artists who recorded their samples. Zero-G, a British audio software company, branded soul with Blackface tropes on the box's packaging, as voice scholar Nina Sun Eidsheim has argued.¹⁸ The singers' likenesses influenced users' visualizations of the Vocaloid's racial identity and the musical genres they composed with it as they strove to make "realistic" art.

In this two-step process of creating the singer's recorded presets and then pairing the box art's suggestive images with them, the separation of voice and body in Vocaloids is reminiscent of early sound film, which also relied on tropes of "realism" to synchronize recorded voices and recorded bodies together onscreen. Previously, film organ presets were used during silent playback to provide live characteristics for images. To smooth the transition to synchronized sound film, many of the stereotypical silent film presets like "Mexican or Spanish Music," described in the introduction, carried over into sound films. In audiovisual art, supposedly unrealistic separations of body and voice have long been "remedied" by pairing a racialized—or feminized or sexualized—body with a notorious stereotype, ventriloquizing them. As cinema scholar Alice Maurice has written, early sound films with Black casts exploited "the 'realness' and 'authenticity' of the performers" by exaggerating stereotypes of Black voices and bodies in order to conversely invest moviegoers in the "realness" and "authenticity" of the new synchronized sound technology.¹⁹ Elsewhere, I have connected early Black sound film and Enlightenment-era talking machines—early automata with human likenesses attached to keyboards where keyboard players could make the machine "talk" or "sing"—as ventriloquized entities when technicians and users seized control of their aural or visual playback.²⁰ Joseph Faber's Euphonia talking machine had a painted head attached to a keyboard that synthesized speech; this exaggerated persona made an unfamiliar phenomenon more believable to new audiences. Vocaloids, too, were soon made highly visual affairs, surpassing box art to encompass fan- and artist-made drawings and videos, and concerts that feature Miku in hologram form.

As of 2026, Miku gives tremendously popular live concerts as a hologram created by a projector behind a screen (figure 15). The Miku hologram has appeared, notably, in a 2009 Tokyo concert produced by Sega and Crypton, ads for Toyota Corolla, a 2014 Lady Gaga tour as her opener, and the *Late Show with David Letterman*. In only a few years, Miku went from a voice in a box, to a billboard

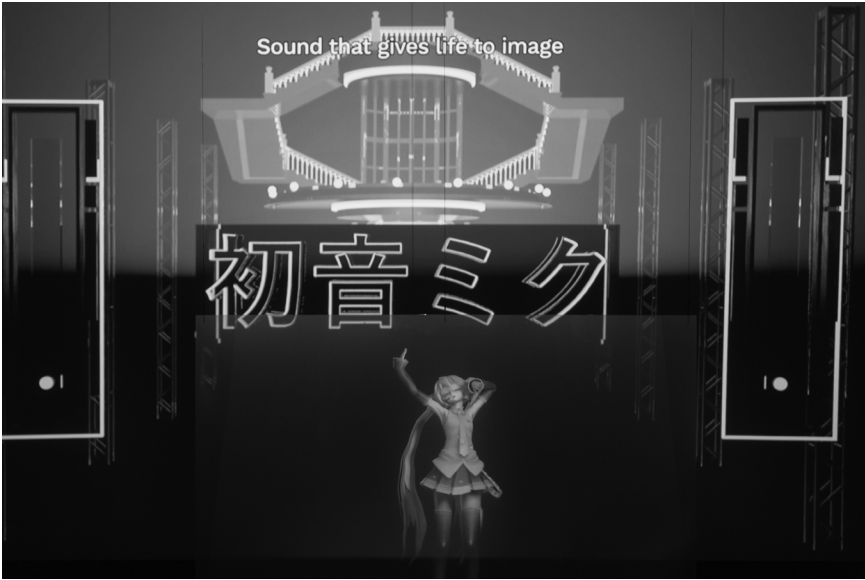


FIGURE 15. Hatsune Miku in the collaborative performance *Still Be Here*, 2016. Photograph by transmediale / design akademie berlin, which commissioned (along with CTM Festival) the performance. Photograph from Flickr, licensed under CC BY-NC-SA 2.0.

for corporate interests, to a frequent collaborator with famous artists—including Pharrell Williams, SOPHIE, and Ashnikko.²¹ Her concerts showcase a highly visual participatory culture: fans commune with the hologram through preset glow stick choreography (fans know in advance to synchronize their glow sticks' colors, directions, and more), dance choreography from Miku videos, and cosplay. At what point have fans become the puppet? These visual expressions of Miku's music playfully acknowledge the synthesized nature of both Vocaloids and holograms and the pleasure of cocreating Miku's songs, music videos, looks, and choreography. Hologram concerts collapse the distance between fan and star, reflecting the intimate interactions between fan and idol in Japan, Korea, and elsewhere.

Because audiences greet Miku's hologram with realness and authenticity, much like the spectators of 19th-century talking machines and 20th-century sound films, fans experience her image as a preset pretense for a pop star. When they customize her voice through their own songs, they engage a complicated form of ventriloquy that calls back to the 19th century. Talking machines had preset phonemes and musical pitches that operators played in multiple combinations, using organ bellows as breath to make the machine speak or sing. The Euphonia had a customizable image too: it was cast first as a woman, then had a beard, then was a Turkish man. Like this gender-bending puppet, Miku can similarly be made to gender-bend, to talk or sing, and to deliver a range of communicative meanings.

The preset aspects of speech synthesis machines with bespoke faces also resonate with the talking head presentation of voices in documentaries—which, for media and voice scholar Pooja Rangan, provides “a way to place a frame around sound and to reel in the inhuman, lawless otherness of the voice” and renders cinema as a “machine of ‘facialization,’ [...] a signifying system that privileges the face as a tether of meaning and relational possibilities.”²² Rangan’s invocation of the facialization of the talking head, much like Miku’s hologram, and Fenley’s work on puppets, also recalls the dehumanizing ventriloquism of Charlie McCarthy in chapter 1. Charlie McCarthy produces a one-way ventriloquism: the puppet’s handler, Edgar Bergen, is the preset voice of McCarthy. But with Faber’s Euphonia and Miku’s range of fan media, the terms of operation of these humanoid figures are flexible enough for several different people to adopt their voices in several different styles.

In an alternative to the voice-body tether that Rangan suggests is a preset for voice, the Euphonia’s and Miku’s operators, preset keys, and artistic representations offer multiple origin points for voicing. For Sterne, these origin points are physiological and phenomenological:

Larynxes suggest an alternative point of origin for voices. [...] They also open out into thinking about voices as instruments, and they are perhaps even more open to interpretation when compared to the mouth. Visual representations of the voice as an event or effect in the world unspool it as they render it in two dimensions, but they also present, in stark visual and sometimes diagrammatic terms, the tender tether between a voicing subject and a voice as an operation. [...] Vocal signals also starkly demonstrate the arbitrariness of the link between voice and sound—and therefore also any particular source, kind, or quality of sound. [...] Voice has no necessary bodily or sonic dimension.²³

Sterne debunks one-way ventriloquy, the idea that there is one fixed origin point or person to provide voices for certain bodies. Sterne’s phenomenology of voicing thus readily applies to nonhuman voicing but also takes seriously the multiple dimensions of voicing in a given singer or a puppet. All of these dimensions add up to the realness or authenticity of the vocal act, even though a direct alignment of voice and source is often predicted on one “true” alignment.

Many people and pop stars hold the common Western philosophical belief that an individual’s voice is a unique sonic fingerprint. But voices also are subject to groupthink, as we can see in movies like *Singin’ in the Rain* (dirs., Stanley Donen and Gene Kelly, 1952), *Sorry to Bother You* (dir., Boots Riley, 2018), and even daily scrolls on TikTok: media encourage us to match a voice to a particular image of a body according to our expectations and stereotypes. Doubling down on this logic, media industries typically manufacture one kind of image for each pop star in order to build an audiovisual, authentic brand. But Miku’s many audiovisual iterations challenge a direct tethering of voice to body, whether she is drawn in

different styles or vocalizes in unexpected genres. The case of Miku hyperbolizes the way in which a pop artist's voice is not only singularly authentic to them but also is a multi-sited voice created by collaborations between recording artists, producers, technicians, and fans.

While the Japanese voice actress Saki Fujita created Miku's vocal samples, Fujita is not commonly understood as the origin point of Miku's voice. Fujita's voice may have set the puppet's foundation, but she in no way is the puppet master. Through fans' use, Miku's voice becomes an amalgam of Fujita, the layered persona of Miku, and the fans themselves. As media anthropologist Rafal Zaborowski observed at a Miku hologram concert, "Her dynamic, crowdsourced personality was what audiences used to evaluate the experiences in terms of authenticity and reality"—Miku felt real to fans because they had imbued her with their fantasies across media.²⁴ Miku accommodates a wide range of backstories even while her blue pigtails prevail. Each user perceives her multi-sited voice with a different sense of realness, whether she is babyish or sexualized, punk or traditional. Miku, the ultimate persona-producing puppet, is an important visual aid for understanding the range of personas that a supposedly real or fake pop star can have.

The multi-sited voice has been parsed as "multivocality" by Zaborowski, an ethnographer of Japanese Miku fandom who has studied her "co-evolution: [the] collaborative work of audiences and amateur producers, clashing with regulating interventions by the managers and the industry."²⁵ Miku demonstrates path dependence, a socioeconomic character arc, in a few different aspects. The vocal samples of Fujita determine the sounds of Miku's voice as presets for her vocal creation that fans can remix and recast in their own diverse musical compositions. But then the fans also create certain characteristics for Miku that become canon (or "fanon," in Zaborowski's formulation), directing how people might compose for her to reflect those characteristics. This process is similar to how an opera or musical theater composer may keep in mind characters' voice types, or *fächer*—which, from high to low voices, are stereotyped through physical and affective traits and certain modes of training and conditioning (such as the lyric soprano as high-feminine heroine and the low bass as deep-voice untrustworthy villain). Over time, Miku accrued stereotypes from her tinny robotic voice that condition general practices for writing songs for her. A wide swath of songs applies Miku's voice and likeness to dark subject matter. I have alluded to the more pernicious uses of Miku, such as inserting her in pornography; the following case study deals with depression and suicide.

As a transmedia franchise, it may not be surprising that Miku has a video game series, *Hatsune Miku: Project DIVA* (for PlayStation, Nintendo Switch, and arcades), developed by Sega—the progenitor of the *Sonic the Hedgehog* video games—in collaboration with Miku's parent company, Crypton Future Media. In the rhythm game—a genre that includes *Dance Dance Revolution*—players must execute Miku's (or another Vocaloid's) dance moves to a given song. Players can

also customize music videos for the game's preset songs—choosing costumes, backdrops, and choreography—or players can upload their own songs and make a Vocaloid lip-sync to them. Since gameplay revolves around modifying presets (moving game controls in preset patterns by adapting levels of difficulty, icons, and even character hairstyles), in turn, the game inspired customized preset play with Vocaloid, especially generating new songs and music videos.

With “over 35 million views across video-sharing websites,” “Karakuri Pierrot” (Clockwork clown) is a 2011 song created in the arcade version of the game with music and lyrics by Vocaloid composer and illustrator 40mP.²⁶ Doubling down on the interventions Miku makes in human presets, the song positions Miku as a Pierrot, a French clown with a sad-painted face that has been a preset character in opera, film, and literature. With this backstory, the Pierrot preset is mapped onto the Miku preset to present her as a sad, spurned lover who has been manipulated like a puppet and who sings about being a Pierrot for any desired kind of control. The self-conscious lyrics present heartbreak and yet strike some aesthetic distance from the singer's realness. This Pierrot/Miku walks the line between expressive lovesickness and wooden control. Moreover, the music video casts Pierrot/Miku as not just one persona but two: she is both a singer-songwriter figure with signature blue pigtails sitting at a piano, framed as a self-conscious narrator, and she is also the clown character the lyrics describe that dances and juggles, framed as a puppet. The video takes full advantage of the game's customizable presets, alternating perspectives as well as the costumes and presets of both narrator-Miku and clown-Miku. Perhaps this fan/creator aims to control two sides of a narrative, serializing Miku in real time.

Early in the video, clown-Miku is introduced with a slow, jerky walk, as if on marionette strings, while narrator-Miku wears a Victorian costume, plays piano, and sings. Clown-Miku then juggles in a pastiche of a poor clown costume with a large bow tie, patched pants, Pierrot makeup, and a hat perched on top of her signature blue pigtails. But when she suddenly drops her juggling balls and picks them up, her clothes instantly change to a carbon copy of the narrator-Miku's Victorian garb, albeit still with the clown makeup. In a flash, the Mikus are seen to be the same character before narrator-Miku's costume changes. The animation's sleight of hand (and that of the game's player pressing a button to change costumes) is sneaky yet obvious, which also plays into the song's narrative that Miku realizes she has been cheated on but is “pretending not to know [. . .] I'm just a clown to you, right?” At the end of the song, another trading-places incident puts clown-Miku facing backward in order to rip off her mask and then spin around in a dramatic reveal, now without the clown makeup—again suggesting that the two Mikus have switched places. Even narrator-Miku has several frames of animated hustle getting back to the piano bench, teasing the eye that she was just clown-Miku—a perspective that is aided by the fact that we only see the two in separate frames besides shots of both at the very beginning and very end of the video.

While the song is cute and fun, it is also creepy and even moribund. The lyrics frame the discovery of cheating as exhaustion, even hinting at a dance of death in lyrics about exhaustion and expended breath. The song also will not let you forget that these lyrics are sung by a robot, from the robot walk of clown-Miku to, of course, the singer's timbre. In addition, the song's bright, tinny beat is relentless until only one moment of respite, a piano outro that gradually slows down while clown-Miku, in a white tutu that makes her wraith-like, gracefully but slowly turns away. As if confirmation of the breath-stopping line, the fade to white that ends the video seems to hint at a bleak but up-for-grabs end.

On many game systems, such as Sega, Miku continuously is used to platform mature issues of adolescent depression, self-harm, and more. These issues especially congeal around Miku's age, 16, which seems to make her a preset for discussing dark adolescent experiences. Miku has been used as a voice box for many bleak songs, from the punk metal "Failure Girl" (Kairiki Bear, 2015) to "Motivation Is Dead" (PinocchioP, 2015). The music industry scholar Zoë George observes that the majority of songs about difficult girlhood are made by male producers. Based on extensive lyrical analyses of songs and reactions to them on Japanese forums, she concludes, "Narratives are frequently told from the perspective of schoolgirls [. . . by] male Vocaloid producers, dependent on the female personas created in their lyrics, [who] forfeit their own voices in an act of 'digital drag,' generating a conspicuous disconnect between producer and creation"—as well as fans who are largely girls.²⁷ While both the male producers and young fans use Miku to address difficult issues, the former seem to mold girlhood to their will by perpetuating cultural defaults, and the latter, the fans, become pawns in those defaults—perpetuated presets. Why use a form that is not real to reinforce harmful aspects of humanity? It is not entirely clear whether Vocaloid was designed to have a slightly inhuman timbre for anticipated uses, like the creation of Miku and other personas. Perhaps darker topics like mental illness and abuse need Miku's artificial voice and puppet form in order to articulate those topics for adolescents, but that abstraction also perpetuates the culture of dark girlhood.

The line that Miku walks between child and adult is emphasized by lyrics, her appearance and mobilization as a puppet, and even her voice. According to sound artist Mari Matsutoya, the voice actor Fujita was "chosen specifically for the 'Lolita-like' quality of her voice." As seen in the "Karakuri Pierrot" video's alternation between a dark piano bar/circus stage and white clothing, Miku's image also participates in a dichotomy of lightness/darkness, even down to the physical/virtual production of her image. Matsutoya writes, "Her image is completely dependent on the light waves and particles catching on a treated screen, or else she slips away."²⁸ Miku's dependency on platforms, as well as fans, also seems to rely on darkness physically and metaphorically—a dark stage and dark content—for fan communities to believe in the illusion. As George writes, "Her voice, her body, her presence—each is endlessly recombinant, simulated and shaped by user

projection. Miku does not gesture toward the future so much as she loops it: a shimmering artefact of progress assembled from the stylised remains of futures already imagined.”²⁹

Visual platforms—whether NicoNico, concert holograms, or video games—fundamentally shape Miku’s pop star image and reframe debates raised in chapter 4 about a pop star’s authenticity and artificial construction. For example, Miku’s tour with Lady Gaga raised comparisons: as pop scholar Ken McLeod writes, Miku looks “as ‘real’ as any other traditionally constructed pop star. (Indeed, how ‘real’ is Lady Gaga?)”³⁰ And cultural theorists Louise H. Jackson and Mike Dines found “little difference between an external manipulator working with [vocal] samples and what is employed on a recording of Lady Gaga.”³¹ Accordingly, Miku’s voice and image lay bare the pop industry conventions that construct ideal personas to market them. Like the women-identifying artists who use Auto-Tune to construct personas against pop industry ideals, Miku’s makers—the fans—understand her synthetic voice as a multi-sited vehicle for customizing their own stories and songs.

As with the purposefully digital sound and imagery of exaggerated Auto-Tune uses, Vocaloid users celebrate the digital construction of their personas. As voice scholar Katherine Meizel explains, “Vocaloid voices capitalize on and tend not to disguise their technological manipulation; the transitions between phonemes, their onsets and offsets, can sound mechanical to listeners.”³² Miku’s virtual image and voice occupy many spaces simultaneously, perhaps begging for comparison to what philosopher Jean Baudrillard calls simulacra, or copies that lack originals. But Miku’s digital reproducibility in fan art and on YouTube channels carries creators’ signatures, revealing the human effort behind them, from Fujita’s vocal samples and Vocaloid software engineers to the users who manipulate the voice and image as ventriloquy and puppetry. Their labor enables this digital, audiovisual spreadability: the iterability of the machinic voice samples and of portraying Miku in different art styles and venues allows users to customize her personas. But what happens when an artificial construction of voice that opens onto multiple constructions of self is made less apparent and more . . . real?

SYNTHETIC REALNESS? SYNTHV

Synthesizer V, more colloquially known as SynthV, built on Vocaloid’s principles but also incorporated AI speech synthesis, launching in 2018. The software licenses a recorded singer as the source of an ideal voice type. But it then uses AI to join that singer’s voice with a matrix of situational data. On VI Control, a virtual instruments forum, a user states that SynthV uses “a neural network-based synthesis engine that learns the singer’s timbre, vocal habits, vocal technique, the way different phonemes are articulated, and other details from real vocal material recorded by the vocalist, and applies them to the synthesis of the song.”³³ This synthesis lays the ground for presets that control a SynthV singer’s timbre, pronunciation

of lyrics, and more. But besides these instrumental presets, SynthV also traffics in semantic and cultural presets: it aggregates a recorded singer's voice with similar voices to which a maximum number of people can have a meaningful connection. This algorithmic reasoning helps SynthV's voice banks sound more "realistic" because their voices are more "real" to a greater number of people.

SynthV may use real voices, but its marketing toes the line between real and fake, ethical and unethical. Take a promotional video from 2022, where a Black woman in a recording studio performs "Amazing Grace." Midway through, the woman suddenly claps a hand over her mouth while the voice continues. As the woman frantically looks for the source of the voice (who is ventriloquizing her?), the image turns into a black-and-white horror film, ushering in the text, "This voice isn't real, but [in larger font] it's real."³⁴ This ad might recall the cassette tape ad of Ella Fitzgerald, "Is it live or is it Memorex?" where, as John Mowitt argues, "we resort to listening with our eyes and reducing the qualitative significance of musical expression to the technical perfection of its reproduction."³⁵ SynthV might similarly encourage us to listen with our eyes, asking "Is it real or is it SynthV?"

The sleight of hand that SynthV requests of users is complex. Synthesizer V Studio 2 Pro promises on its website to "Us[e] AI the Ethical Way," claiming it is "keeping true to your creativity [. . .] whilst remaining ethical. All voices are officially licensed, and each one sung by a professional singer."³⁶ And yet, SynthV carries the pretense that it is a black box for that singer's recordings, when indeed it marries their samples with AI in order to smooth the user's experience of shaping the recorded singer's voice: AI algorithms draw on the choices and practices of multiple professionals to aid the synthetic vocalizer in delivering their custom lyrics, pronunciations, and emotional peaks and valleys as these aggregated recorded singers might. To the questions "is it ethical?" and "is it real?" SynthV answers that it pays singers and strikes an agreement with them regarding the different ways in which their voices will be used. In Zuboff's framing of surveillance capital puppet masters, SynthV engineers own not just the soul, but the behavior, of singers—and their audiences.

SynthV's supposed realism paved the way for one of the biggest fake singer hoaxes, Kasane Teto. Debuted in 2008 on the Japanese bulletin board site 2channel (akin to other anonymous chan sites) as an April Fool's Day joke, Teto was pronounced a new virtual idol with a fake age and appearance that was meant to prank fans of another fake singer—Miku. Only two weeks later, Teto was marketed as a "real" voice through several vocal samples recorded by singer-songwriter Mayo Oyamano, which were put into free software for fans to download and use as the voice of Teto in their own music. Teto's voice was first provided in 2008 through the free (unlike Vocaloid) software UTAU, which allows users to create their own voice banks and also use others' voice banks. But UTAU voice banks tend to have less polish than those created in Vocaloid or SynthV, due to Vocaloid's professional recordings of singers' samples and SynthV's additional algorithmic processing. When Teto's voice debuted for SynthV in April 2023, the robotic essence of the

UTAU voice that fans loved was preserved. On a UTAU/SynthV comparison YouTube video of Teto's voice, a commenter wrote, "Teto has always been incredibly electronic sounding and that's part of her charm. SynthV really answers 'What if she sounded human?' and it's fantastic. She didn't lose her voice either, you can still tell it's her."³⁷ By bottling up the preset characteristics of Teto's voice as software, fans could sample and remix the voice much as push-button radio presets did. Teto is a preset to be played with and puppeteered. With each new version of Teto, fans invested her with more reality and humanity but not without dashes of whimsy.

For example, a 2023 fan-made video by YouTube user JandroYanch uses multiple Tetos to cover Queen's "Bohemian Rhapsody," playing with the many sides to her personality and vocality.³⁸ In this video, Teto is not even assumed to be human, though her voice bank was recorded by Oyamano; Teto is called a "chimera," which was an amalgamation of a lion, goat, and serpent in Greek mythology. On Teto's website Q&A, a fan asked, "What does it mean to be a chimera of gender?" and the answer was: "The meaning is unclear. [. . .] In reality, Tet is often treated as a woman due to his [*sic*] appearance and voice quality. It is up to you to interpret Tet's official setting in any way you like."³⁹ The "Bohemian Rhapsody" video makes Teto a superhuman puppet, singing all of the voices of Queen—and several others besides. Paralleling Freddie Mercury's gender fluidity, Teto is malleable. When fans ask whether Teto is 31 or 15.5 (the latter being the age that her "girl" form is said to take), the answer is: "Users are free to interpret and apply these settings as they wish, so there is nothing wrong with changing the settings in your own works." Relevant here is the gender preset, which, according to SynthV's manual, "adjusts the formant (voice thickness [vocal tract length]) of the voice. Can be set between -2 and +2, default value is 0."⁴⁰ With the default value of gender as zero, the parameters allow for gender play on a numerical scale that is not anchored to a binary. Fans express Teto's polymorphousness through song titles, lyrics, and SynthV presets that change the singer's pronunciation, timbre, and pitch. In Studio 2 Pro's enhanced vocal modes, these parameters can be dialed up and down on knobs to fit different categories of airy, bright, musical, operatic, and powerful. The semantics of these categories are fascinating as cultural presets. How can one of these adjectives be more "musical" than the other? The philosopher Roland Barthes may have been dissatisfied with the paucity of the adjectives to describe musical qualities, but SynthV takes them seriously as cultural capital.⁴¹

Much as each technical preset here quickly becomes a cultural preset, so does the idea that each of these presets allows a user to "build [their] ideal vocal performance with realistic details and life-like nuances," which sounds a lot like puppeteers. A demo (figure 16) shows the aforementioned parameters working in service of such realism. The Synthesizer V Studio 2 Pro walkthrough video narrator says, "We discovered that people have different definitions of what makes up a natural-sounding voice. As a result, thanks to all the new possibilities of controlling the voice, we are delighted to have finally reached human level naturalness."⁴² Just as the Melodyne interface groups vocals in blobs versus



FIGURE 16. A screenshot showing dialed parameters within vocal modes in SynthV Studio 2 Pro. Courtesy of Yibao Zhang.

snapping to a grid in Auto-Tune's interface, SynthV maintains an idealized plug-in naturalness. Realism remains the preset of making voices, whether modulating or synthesizing them.

The realness baked into SynthV's parameters also recalls the prepackaged cake mix example from the introduction, where bakers still needed to possess enough baking skills to add water and eggs—and that this hybrid cake mix sold better than the completely deskilled version. As we have seen, preset use often leads to a *reskilling*. In the case of Teto, a myth was spread through marketing that Teto was not good at singing. According to Teto's Q&A, "You can think of the character setting of 'not good at singing' as being separate from the actual singing, or you can think of some other reason, such as 'I was bad at singing, but I overcame it with effort.'"⁴³ That myth made room for the UTAU voice bank to fail upward, as with users' technical prowess. In this way, users' skills and the assumed skill of the voice bank as a synthetic vocalizer develop in proportion to one another: as the user labors, Teto is invested with realness. To use virtual instruments to stand in for humans as puppets is to align enough musical presets with cultural presets so that people will buy the voice as real—or real enough.

BETWEEN A VOICE BANK AND A DEEPPAKE: VTUBERS

The advent of Twitch, Instagram Live, and other on-demand channels generated a match for synthetic performers like Hatsune Miku: VTubers, or virtual You-Tubers, who use motion capture and anime-style skins to livestream themselves

as animated avatars while they make art or play games, thereby connecting with viewers in real time as virtual characters. The VTuber Kizuna Ai, who burst into popularity in Japan in 2016, has striking parallels to Miku in her image as a girly adolescent adorned in pink; she is a virtual idol but on different terms. VTubers, as ethnomusicologist Yun-Kiu Lo writes, “have fictional lore, while their real-life faces and identities are hidden away from the audience as an untouchable taboo. They sing and dance on the streaming platform, using personae that are often pre-designed before their debuts.”⁴⁴ Lo summarizes three main presets of VTubers: fictional lore, covert identity, and pre-designed personas. Two of these are essential to Vocaloids, but covert identity is the opposite of Miku’s open-source text. VTubers are cloaked by motion capture, their fans barred access to the person behind the mask. The puppet is the preset, created by the VTuber that holds the strings. Unlike Vocaloid fans, VTuber fans are discouraged from digging up their beloved characters’ origin stories; they suspend disbelief that there is a human operator of their animated avatar. The fans are not the handlers here, unlike with Miku and Teto. The preset of a VTuber’s single identity is controlled by the handler, the VTuber themself, who is screened off from their fans.

The screen and the livestream feed are the terrains upon which VTubers produce ventriloquy. By managing their own image, the handler/human is screened twice, first through their own motion-capture technology—which sometimes takes the form of a suit that covers their skin and allows them to project another skin—and second through the virtual screen of the platform through which they livestream or upload their videos. VTubers surpass postmodern senses of simulacra—a voice overlaid over a voice, a photo overlaid over a photo, preventing access to the real. But the real identity of VTubers is moot anyway. For VTubers, representation is not the crux of the matter—recontextualization and mobility are, as when artists reroute stereotypical presets for new purposes. That is, presets might have been considered frozen in representation, but they are in fact manipulable in ways that either participate in or unveil crucial things about the workings of art and society.⁴⁵

Several VTubers have close to half a million fans, like CodeMiko, who “spawned” in 2020. In videos, CodeMiko depicts the handler/handled relationship, appearing as The Technician wearing a mo-cap suit. She visualizes ventriloquism while letting her fans project words onto her avatar’s body, putting words in Miko’s mouth while others put words on her, doubling the ventriloquy. While the operations of ventriloquism are often done behind the scenes, VTubing exposes them in real time, as VTubers produce livestreams. Their avatars’ everyday activities are broadcast to the world, offering fan intimacy without access, paratext without the promise of crossing a threshold to truly know a VTuber’s identity. In this way, VTubers pull the strings in a way that flexes more ownership than Vocaloids—which were created to have particular presets that gave fans permission to manipulate personality traits and musical genres as long as they stuck to the visual pretext/preset. Yet fans’ control is an illusion—only the puppeteer can puppet.

VTubers often cover voice bank songs, blurring these two worlds. For example, the VTuber Yam Albat works in meta ways to “make analysis videos about VTuber design and culture. I also play the viola!”⁴⁶ Albat ventriloquizes voice bank characters in look and sound, which aids fans in investing realness into the fabric of Vocaloid lore. VTubing, for journalist Tom Faber, “combines the intimacy and spontaneity of livestreaming with the interactivity and limitless possibilities of the virtual world,” thereby mediating the two.⁴⁷ For example, Ai stretches the possibilities for her own voice synchronization by playing a game in which she controls an avatar with her voice, where sustained vocals make her go forward and sudden exclamations make her jump—the handled becoming the handler.

With VTubers, the voice is a preset for the virtual personality: they stream live as a human voice actor hidden behind an animated avatar that masks their identity. Liveness raises the stakes of realness. While the artificially constructed avatar is fooling no one about their human identity, they are also fooling everyone. A common conception of synthetic voices is that voice can be boiled down to zeroes and ones, abstracted data that becomes a person’s essential expression of themselves. But voice is always already an abstraction. Like personas, voices can be tried on in different styles for different contexts. As one’s voice is conditioned by many different factors, from their upbringing to the cultural values and spaces they inhabit, the voice is flexible enough to be believed as an animated avatar for many different voice bank personalities. Imagine, then, how many more assumptions about the voice’s realness are recomposed by the concert hologram tour circuit as well as audiovisually synthetic deepfakes.

PUPPETS FROM THE PAST: HOLOGRAMS

What does it mean to make puppets from the past—especially when the deceased cannot represent themselves? Software developments since 2000 have introduced increasingly unethical tensions into the simulation of singers’ voices and likenesses. On the eve of Vocaloid’s US debut, in 2003, the *New York Times* reviewer Bill Werde wondered if the software heralded “a time when anyone with a laptop will be able to repurpose any singer’s voice or even bring long-gone virtuosos back to life.”⁴⁸ In 2012, the latter came true not through Vocaloid software but rather through a Coachella performance. Tupac Shakur, who died in 1996, appeared as a virtual figure through the Musion Eyeliner projector system alongside Dr. Dre and Snoop Dogg. Samples from recordings and concert footage, as well as digital simulations, composed Tupac’s voice. While Tupac’s mother Afeni Shakur permitted Dr. Dre to use Tupac’s likeness, the audiovisual illusion nevertheless elicited an uncanny response from audiences. As McLeod observes, “Audiences are paradoxically attracted to the familiarity of the hologram while simultaneously being repulsed by its seemingly artificial, trans- or post-human unfamiliarity.”⁴⁹ This mixture of delight and distrust recalls the two-pronged aesthetic judgment

of Ngai's gimmick theory and the "operational aesthetic" of P. T. Barnum's hoaxes that claimed to show audiences the full illusion but hid something more sinister in plain sight (see chapter 4). When faced with a celebrity's likeness that appears fully synthetic, audiences wonder whether they should revel in the resurrection's power to activate old memories or whether technology should let the dead rest.

But around 2018, there was a surge in dead singers touring as colloquially known holograms, largely ones that society considers as divas. From the opera singer Maria Callas to pop artist Whitney Houston, audiences flock to see their divas reincarnated, though not with flesh, but with light and projections. Inspired by a 19th-century illusion called Pepper's ghost that used glass to backward-project the reflection of an actor below or behind the stage, the Musion Eyeliner system that created the Shakur hologram projects a two-dimensional image onto transparent plastic sheets so that it appears three-dimensional; the technology that projects Miku at concerts is similar, and none of these systems create holograms per se. In this way, the hologram genealogy also includes sleights of hand like Princess Leia's message to Obi Wan Kenobi as her only hope in *Star Wars*, achieved in the first film's post-production.

The "holograms" of virtual idols are not only science fiction, remaking the human and what is possible for humans to do, but also deeply human, synthesizing presets that we celebrate and feel to be deeply human. Futurism and humanism, and immortalization and fallible mortality, collide in these illusions. As queer theorist Wayne Koestenbaum observed 25 years before Callas's hologram concerts, "She was Callas long before she died, but she would be a little less Callas if she were still living. Untimely death assists her legend."⁵⁰ It is not uncoincidental that another touring hologram sensation, Houston in 2020, also had an untimely death, and we go to see her dance, preserved as legend.⁵¹ But hologram-like technology also has been harnessed to immortalize living singers, as with ABBA Voyage. The stakes of immortalization for living singers seem tied not to fallible mortality, as with the legendary status of dead performers' holograms, but rather to pop perfection. As music industry scholar Samuel Murray has asked, can we "consider ABBA Voyage as the preset of the perfect performance of the group, which I believe [is] their intention—but is perfect wanted for live music?"⁵² These hologram performances slip along the razor's edge of life and death, perfect and imperfect, human and puppet, art and capitalism. There is endless capitalization at stake for whomever resurrects these dead celebrities or prematurely resurrects themselves, dead while alive. The question of profit share is also deeply political—that is, necropolitical.

Hologram tours capitalize on ability to make money for whoever holds, or grabs, the rights to likeness. Crucially, the holograms at the center of the Callas and Houston tours are created from footage of actors mimicking the singers, not from recordings of the singers themselves—they employ CGI face mapping and a "military-grade" Epson laser projector, with this technology again immortalizing

the necropolitical for capitalistic gain and putting a certain kind of valuation on human life, where resources are spent for living people to relive death again and again.⁵³ But as with stylized films like *The Act of Killing* (dir., Joshua Oppenheimer, 2012) and *The Hurt Locker* (dir., Kathryn Bigelow, 2009), their visuality and conceits show that necropolitics are eroding people's views on reality. So it also is with hologram genealogies: as opera scholar and critical theorist João Pedro Cachopo writes, "What the fans of Whitney Houston and Maria Callas might have in common [. . . is] a penchant to fall for the thrill of attending a *live* concert with a *dead* singer."⁵⁴ Hologram concerts are at a necropolitical razor's edge, urging fans to believe in the copresence of someone's voice or image. But at what point do these alive-but-dead likenesses alter reality? Given our mediascape from fake news and fake singers on Spotify to AI, when are audiences inserted into preset alternate realities, and when do puppet masters become puppets?⁵⁵

VENTRILOQUIZED PUPPETS: DEEPPAKES

While 2012's technologies could not yet fully synthesize Shakur's voice, around 2017, deepfakes would make it possible to make a dead celebrity say anything technicians desired—removing barriers to ghostly shadow puppetry. As the electronic musician Holly Herndon puts it, "In the '70s, Miles Davis criticized hip-hop as 'artistic necrophilia' for relying on the past artistic decisions in our shared archive. I disagree with him, but I love that phrase. With AI, you could have a Tupac hologram and create an entirely new Tupac catalogue using his voice model, and it could be something he would've never opted for. What does it say about us as a society that we keep reanimating the dead for our entertainment?"⁵⁶

But deepfakes do not only use dead celebrities. As music scholars Jason Stanley and Benjamin Piekut write, "The deeply held desire to rejoin elements that have been desynced is itself a product of reproducibility, for synchronization only becomes thinkable once there is a perception that sound and image, voice and body, bodies and other bodies, have first been divided."⁵⁷ Though technological resurrections are ethically dubious, so are deepfakes' current ability to make a politician or actor say and do things they never did or never could do.

The term "deepfakes" combines "deep learning" and "fakes." To make them, hours of audiovisual recordings of the target subject are run through an algorithm that boils down the essence of how that person typically looks and sounds. Much of deepfakes' power comes from GANs (Generative Adversarial Networks), two neural networks that generate fake footage—one that can identify real audio or video and one that, as the word "adversarial" suggests, tries to create audio and video that will fool the other network.⁵⁸ GANs aid deepfake creators in mashing up video and audio clips into a video of a simulated person who can lip-sync any audio one desires—in fact, researchers call these lip-syncing deepfakes. Sometimes, as in the case of Jordan Peele's 2018 deepfake of Obama as a

PSA for BuzzFeed about disinformation threats, an impersonator (Peele) reads a script on camera, and his footage is composited into footage of the targeted subject (Obama).⁵⁹ Through compositing audiovisual footage from an impersonator or stock video onto a target subject, and GANs that synthesize the impersonating voice with an archive of the target subject's vocal samples, deepfakes aim to reproduce the presets of a person's voice and likeness, combining ventriloquy and puppetry.

Preset logic runs through deepfakes, from audiovisual footage that supposedly presents a person's "essence" to the scripts that impersonators use based off of their target subject's speech patterns and habits. Since deepfakes rely on training sets of data from the past, or an impersonator's knowledge of a celebrity, they employ prior, well-known (preset) instances of a celebrity's public appearances to convince audiences that the synthetic audiovisual manifestation is the person they know. The reason why there are so many deepfakes of former President Obama, for example, pertain to issues of both analytics and semantics. The glut of video and audio footage of celebrities and politicians online feeds the large data sets required for algorithms to accurately produce deepfaked images and voices.⁶⁰ At the time of this writing, however, this is nowhere near a fast or automated process. Countless hours are required for neural networks to run and synthesize footage, and significant human manipulation—deepfakes still require puppet masters—is needed to composite or edit footage to make the synthesized version as much of a celebrity look-alike (and sound-alike) as possible.⁶¹ Thus, a semantics of semblance overtakes the deepfake process.

By "a semantics of semblance"—what I am more broadly in this chapter calling "instruments of semblance"—I refer to the many meaning-making elements tangled up in audiovisual deepfakes. To achieve semblance, the surfaces of deepfakes need to be convincing along the lines of script, idiolect, and context. A convincing script is convincing because it sounds like the target celebrity would have used that vocabulary, those idioms, and more. A convincing idiolect includes their diction—how that person pronounces something. Former President Obama and former Queen of England Elizabeth II have distinctive styles of speaking, from speech patterns and cadence to intonation, which are ripe for parody, whether in the Obama BuzzFeed video or in the 2020 "Alternative Christmas Message" by the deepfaked Queen on British Channel 4 News. The Queen's English was as recognizable as her corgi cortege. And a convincing context, like the visual tableau (*mise-en-scène*) of corgis or the statesperson's desk, sets up significant grounds of believability for viewers of deepfakes. Context relies on realness—the deepfake's where (the set), why (the reason for making a speech), and timeliness (why this content at this time), and, of course, the what and how (the accuracy of the likeness). Context and idiosyncrasies are presets for human essence and contribute to a semblance of believability. In these deepfakes, impersonators perform the

semantics of semblance, and the scripts and visual contexts become instruments of that semblance.

Taken together, these semantics or instruments of semblance charge deepfakes with their affective, ideological power. These are the multiple sites through which a deepfaked subject can be ventriloquized; as Jaimie Baron says of the Obama deepfakes, media makers “speak through” a subject’s voice and body like a ventriloquist’s dummy.⁶² But the multi-sited sources of ventriloquism also help us determine what the purpose of the deepfake’s realness might be. Peele’s Obama deepfake is a PSA, and the Queen’s Christmas speech is a parody. Both have moments where they point to their obvious artificial construction—when Peele appears on a split screen and when the image and background of the Queen glitches to show what is computer-generated and what has been filmed with an actress impersonating her. The videos’ revelation of these various instruments of semblance as simulations shows just how much context and idiosyncrasies are presets for human “realness.”

Ventriloquy hinges on “realness,” a term used in drag and ball culture, referring to capabilities for impersonating or alluding to authenticity. In deepfakes, realness is the fabrication of authenticity. But as with Vocaloids, Auto-Tune, the Fairlight Computer Musical Instrument, synthesizers, and push-button radios, deepfakes still operate at the fulcrum of the human hand—in the labor involved in creating them and in the ability to use them for commercial or creative purposes. Human biases, like collapsing a person’s public persona into their private self, shape how deepfakes produce not a spontaneous variance of expression but the particular traits people exhibit during public or political performances—the refrain of realness. Deepfakes feign to know a person’s true face and voice intimately, yet they merely abstract the sum of a person’s parts from official footage. They aim to boil a person down to presets. Yet, the only real face and voice audiences witness is a celebrity’s put-on public persona, which is more often than not mobilized to bring singers back from the dead or to otherwise attribute music and actions to people who do not authorize them.

In their insistence on replicating a celebrity’s truest persona, deepfakes parallel Auto-Tune’s logic of pitch correction, which assumes that there is one preset way to sing—on key. Thus, the internal logic of deepfakes is at odds with Vocaloid’s multiple and flexible personas created by participatory culture. But there are interesting resonances between the two synthetic media: as author and cultural theorist Daniel Black points out, Vocaloid software allows “all aspects of idol performance [to] be created by the fan—Miku can sing a song she has never before sung and do a dance she has never before performed at the behest of her *otaku* [fan (sub)culture] owner.”⁶³ Miku becomes a puppet for other people’s designs but was fundamentally designed as a participatory product. She is an instrument of ventriloquy, a fake character whose presets are taken seriously to the point of seeming real, but she has a built-in suspension of disbelief that is meant to be up for grabs.

Deepfaked people, however, often do not consent to being puppeteered or ventriloquized. The infrastructures of Miku's celebrity—Vocaloid, NicoNico, and concerts—openly celebrate fans' collaboration, but deepfakes hide their authorship altogether to convince audiences that they really see that person in the flesh. Instead of having Miku's overt multiauthorship, deepfakes tether the supposed essence of a celebrity's voice to their likeness and index believability to audiences. Like Auto-Tune's one true version of pitch, preset ideals of true and false voices are endemic to deepfake technology. When apps like Face Swap or AI platforms like Grok allow anyone to make a celebrity say or do anything, cultural producers—from people like Miku content creators to AI proponents—use cultural defaults for virality, like erotic deepfakes, which have been attached to celebrities from Scarlett Johansson to Taylor Swift.

Like the women artists who subverted Auto-Tune's internal logic for their own creativity instead of correction, deepfakes can be used in multiple ways. At one extreme, they are used for disinformation and on the other, for satire, PSAs, or new models of artistic expression. Deepfakes as new models of artistic expression are exemplified by Holly Herndon's 2021 AI "twin," a puppet-like deepfake called Holly+, which probes the ethics of deepfakes and their possible benefits for pop artists. Herndon has long created computational music (she studied machine learning models for the voice in her PhD from Stanford University's Center for Computer Research in Music and Acoustics), including an "AI baby" named Spawn that she and her husband, artist Mat Dryhurst, trained with their own and others' voices to sing with, according to critic Hua Hsu, "an eerie, frayed, metallic quality, something like a swarm of bees."⁶⁴ Hsu's animal metaphor recalls the discourse of voice-modulation technologies, as do his questions for deepfake music: "Do voices make us human? Do we own the sound of our own voice? And, as robot ethicists have begun wondering, is it possible to exploit a machine? Hatsune Miku, a holographic Japanese pop idol, makes hit records in Japan and tours the world, yet she isn't paid."⁶⁵ Hsu extends voice-modulation debates about human-machine authorship up to Miku and deepfakes, much like internet musicologist Paula Harper "challenge[s] utopian claims of Web 2.0's digital democratization by explicating the iterative processes through which material, work, and labor were co-opted from amateur content creators and leveraged for the profit of established media and corporate entities."⁶⁶ It is in this landscape that Herndon endeavors to create ethical practices for singing with, and not against, AI.

Herndon's 2021 work navigates the rise of deepfakes in the music industry and the threats they pose to artists' autonomy to make music, since people can deepfake artists' voices for their own ends. She teamed up with Never Before Heard Sounds, an AI music startup, to create Holly+, an instrument and a website "to allow people to perform through my voice, reduce confusion by establishing official approval, and invite everyone to benefit from the proceeds generated from its use."⁶⁷ Users can upload audio files of their choice and then download a version

of that audio sung by Holly+—in her words, preset “audio from one voice can be converted to resemble the target voice, a kind of vocal puppetry.”⁶⁸ Holly’s audio can be used in many ways, but licensing is regulated by a decentralized autonomous organization (DAO), a governance model associated with cryptocurrency because the DAO’s members collectively make decisions. Herndon mobilized this collective of token holders to protect the use of her vocal likeness, and she and other members traced and approved derivative works created with her voice. Like Miku, Holly+ has sanctioned ventriloquy, ceding different kinds of control to her voice and likeness.

Herndon’s work, though a privileged example, shows both aural and visual aspects of deepfakes and their ethical implications for popular music. Much as pop stars have become increasingly known as image-makers since the 1960s—as in Jennifer Lopez’s transmedia success as an actor, dancer, and singer—singing deepfakes are now becoming increasingly audiovisual as technology improves. To this end, Herndon shares artists’ video imagery for music created from Holly+ on her X feeds, @hollyherndon and @hollyplus. In exchange for her fans’ labor, she gets self-promotion and clicks.

Holly+ allows Herndon to sing in multiple languages and technically difficult songs that would take hours to learn. But besides Holly+ being a labor-saving device (for herself), Herndon praises its ventriloquizing affordance of “identity play.” Herndon uses this term in a TED Talk demonstration of Holly+ to address those wary of AI’s potential theft of artists’ intellectual property.⁶⁹ Peculiar optics ensue when Herndon takes the stage only to play a recording, leaving her voice to be ventriloquized—first by playback, then by another artist, Pher, a Black musician. They collaborate, but not in the sense one would think of in a live concert. Rather, he duets with Holly+ while Herndon looks on behind “them,” smiling and laughing. This is Herndon’s fantasy, which envisions Holly+ as multiple band members. But puppetry and racial ventriloquy are at work. As a handler, she has taken the idea of Miku identity play and applied it to herself, here with the semblance of an interracial fantasy, as is often the case with Miku too (and gendered and ageist fantasies). In conjuring cultural capital, racial ventriloquy perpetuates cultural defaults like model minorities and what music scholar Matthew D. Morrison calls “Blacksound,” the sonic correlate of Blackface minstrelsy.⁷⁰ Vocaloid, deepfakes, and more make racialized voices and images available for manipulation as stereotyped puppets. As Ngai describes racial puppeteering, “The racialization of animatedness converts a way of moving others to political action (‘agitation’) into the passive state of being moved or vocalized by others for their amusement.”⁷¹ In racialized (and feminized, etc.) instances of handler and handled, ventriloquism equates semblance with realism.

As much as deepfakes, AI, and internet culture repurpose artists’ voices without their consent, these technologies can also forge bonds between artist and user. For example, in 2023, Grimes offered her AI-generated voice for fans to “borrow.”⁷²

With pop's increasing entanglement with online platforms, the voice has become ever more spreadable: the ownership of a voice has become more porous with streaming platforms like Spotify that allow users to access decades' worth of music—and images—for very little money and yet offer a semblance of owning a voice through often nearly unmitigated access to an artist's catalog. Voices and music are increasingly distributed and visualized across humans and machines, more than early voice-modulation artists could ever have dreamed. But the trade-off is their commodification as puppets and instruments of semblance. Musical and audiovisual likenesses can be co-opted by users of these synthetic media for nefarious ends, from the gendered power play of male producers enforcing Miku's dark girlhood to Herndon's racial ventriloquy. In these cases, ventriloquy fetishizes semblance as realness.

OF SEMBLANCE AND REALNESS

As this chapter has argued, voice banks and deepfakes offer not only new modes of audiovisuality but also of programmability. The presets of what make us human—our voices, speech patterns, likenesses—are fetishized in these synthetic media. In their quest for realness, synthetic media often essentialize cultural presets of sexism, racism, ability, classism, and more. Human presets are fetishized to have, media theorist Wendy Hui Kyong Chun observes, “a semblance of control over future events.”⁷³ With synthetic media, human presets are conflated with technological instruments. This programmability's control will depend on regulation and policy around AI going forward, as well as how many people choose to involve AI in their day-to-day lives.

As I write this in 2026, tumultuous governments, AI advances, and more are shifting human presets with democratic pretenses. But there are too many moving parts to be restored to factory settings. Amid cries for “new normals” throughout the 2020s, people desire a semblance of realness. Perhaps an ultimate goal of presets, at least in this day and age, is to offer shorthands and semblance. We see ChatGPT offer some users a semblance of human interaction as they use it to write emails or term papers, or to consult with an “expert.” But could such presets alternately be instrumentalized as semblance for humanistic, democratic, or anti-capitalist principles?

Semblance has long been invoked as a critique of art. In 1970, critical theorist Theodor Adorno wrote: “The rebellion against semblance, art's dissatisfaction with itself, has been an intermittent element of its claim to truth from time immemorial. Art, whatever its material, has always desired dissonance, a desire suppressed by the affirmative power of society with which aesthetic semblance has been bound up. Dissonance is effectively expression; the consonant and harmonious want to soften and eliminate it. Expression and semblance are fundamentally antithetical.”⁷⁴

Unless we want semblance to be the rule, Adorno argues, we need to find ways to fight for expression. To counter semblance, Adorno proposes dissonance, which has the potential to disrupt standards and institutions, to speak out against suppression. Dissonance is a strategy familiar to the avant-garde, but it would be a mistake not to see dissonance within semblance in Holly+—while still recognizing the technology’s potential racial ventriloquy.

As another example, dissonance within semblance permeates the music video for Kendrick Lamar’s “The Heart Part 5” (dirs., Dave Free and Kendrick Lamar, 2022): the singer performs in front of a red curtain while his face blends into deepfakes of several Black public figures, from O. J. Simpson and Will Smith to Kanye (“Ye”) West and Kobe Bryant. The deepfakes were created by Deep Voodoo studio, led by *South Park*’s dissonants-in-chief Trey Parker and Matt Stone—known for their own synthetic and unabashed political commentary. Lamar’s face-shifting is consonant and harmonious at the same time that it is dissonant and expressive: lyrics and deepfaked faces collide in multiple ways, such as a verse where Lamar-as-Nipsey-Hussle speaks from beyond the grave, imploring listeners to tend to their own needs before those of the world.⁷⁵ These lyrical collisions are purposeful puppetry and ventriloquy, recognizable to listener-viewers who know the subtle homages; for some audiences, there might only be facial dissonance. Lamar and his collaborators use semblance as a crucial mode of cultural expression, dissonance, adaptation, and storytelling—all resting on presets of face, voice, and story that are central to the synthetic media discussed in this chapter. These human presets, even when used in knowing artificiality, hinge on semblance to turn puppets back onto puppet masters. The work asks, as Zuboff does, “Who knows? Who decides who knows? Who decides who decides who knows?” These questions must be our presets, our blueprints, for the future.

Conclusion

The Preset Polemic

NORMS—OR, WRITING FROM THE 2020s

I hope this book can be a preset for others to pick up and use as a model for their own work on technological or cultural defaults. Writing from the 2020s, I am drawing on a vast, interdisciplinary literature on what constitutes standards and norms at the same time that I am responding to a cultural moment of “new normals,” from the COVID-19 pandemic to climate change. Norm studies crop up in sociology: Marcel Mauss’s “techniques of the body” (1934), Erving Goffman’s *Stigma* (1963), and Norbert Wiener’s *The Human Use of Human Beings* (1989) laid ground rules for the control of social behaviors. In science and technology studies, Jonathan Sterne probed “the meaning of a format” and “making a standard” with *MP3* (2012). And Karen Tongson’s *Normporn* and Katherine Zien’s “On Performance, Liminality, and Normativity” identify a transdisciplinary, transcultural firmament of norms that have cropped up especially during the first Trump presidency and COVID-19.¹

These last two works in particular indicate that new waves of normalization are coming faster than you can say—much less define or learn to live in a—“new normal.” The new normal is reworked frantically in the 2020s as we weather the turbulence of global pandemics, flurries of executive orders, disappearances, stock market crashes, and more. Zien captures the tumult of this moment with a reading of a particular lawn sign that has propagated in suburban America: “In this house, we believe: Science is real. Love is love. Black Lives Matter. Immigrants and refugees are welcome [. . .]” But much like lawns erode over time without tending or with onslaughts of wind and water, these very tenets that uphold human truths

to be self-evident are being eroded in 2026. As a result, preset studies has never been more crucial.

Presets are prevalent in the 2020s. Smartphone owners carry around an infinite number of presets in their phones' apps and software. Open a messaging app, and your phone will try to compose your text for you—predictive text is a preset form of correspondence where large language models (LLMs) lasso your text-based personality based on predictions made from past usage patterns. So, too, does your phone train you to take and edit photos or use an app in a certain way. The freedom to use a device is an illusion, a hall of mirrors of feedback loops made in the past that train (and trade) on empty promises for the future. We work and play under restrictions. The 2020s, if we pay attention, are helping us to see and take seriously more and more presets, to ask more questions: Is democracy a preset? Is my face, scanned into my phone and used to cross borders or to unlock accounts, a preset?

So many of the ways we have been accustomed to moving through the world cannot be taken for granted when they bar access and cause pain for others. As Neta Alexander writes of navigating facial recognition technology with facial paralyses,

The growing ubiquity of biometric technologies that encode certain assumptions about the so-called normal human face [. . . are] produced by the quantification and algorithmization of faces. Translating a set of features such as eyes, nose, and mouth into the probable distances between pixels transforms face recognition into a mathematical problem: "Eyes" are nothing but the distance between two or more darker pixels in an image. The algorithmic systems supporting this biometric technology, however, have been trained on datasets of mostly white, symmetrical human faces, making its widespread adoption potentially disabling for people with darker skin tones or, as in my case, facial paralyses.²

Alexander, along with a panoply of scholars working on questions of embodied equity in a goalpost-moving world, asks questions about what we do with data and what data does with us. (Say it with me and Zuboff: "Who knows? Who decides who knows? Who decides who decides who knows?") These inquiries show how ontological questions like "What are eyes?" can translate to political questions about what training sets are used to gather preset data points, and to what sexist, racist, or ableist ends they might be put to in deepfakes or surveillance cameras like Amazon's Ring system. As artificial intelligence scholar Kate Crawford writes in *Atlas of AI*, "Machine learning systems are, in a very real way, *constructing* race and gender: they are defining the world within the terms they have set, and this has long-lasting ramifications for the people who are classified."³ Humans have long put people into preprogrammed or predictive boxes. Presets undergird and perpetuate that logic.

Once you start to think about presets, you find them everywhere: in emojis, predictive text, microwave popcorn settings, gravity, DNA, and more. New standards and paradigms are being defined every day, and ones as old as time govern the ways we spend our days, with sunrise, sunset, and calendars marking the passing of time. Much like we can ask “Is a hot dog a sandwich?” we can test if a sunset is a preset. A sunset divides the days like a calendar grids time, systems long ago set in stone, witnessed during solstices at Stonehenge when the sun aligned with the monument’s design. While not mechanical, a sunset still operates through pre-determination and facilitates control, to recall the *OED* definition of preset—“a control on electronic equipment that is set or adjusted beforehand to facilitate use.” Presets aid us in deciding what is in our power to control and what is not. In this conclusion, instead of closing things off, I leave openings for the reader to identify, in turn, presets as recipes, paradigms, systems, standards, defaults, and norms that operate as both mechanisms and metaphors, in scholarship and in day-to-day life. The conclusion maps several origin points for presets so that we might use their multi-sitedness to deconstruct binaries and instruments of semblance—and move toward, or dream toward, shifting their axes of power.

RECIPES

This book began with cake mix and microwave popcorn. When making those items, humans have minimal control over the ingredients. And machines do what they do in the baking process—or burning process, if you are making microwave popcorn and you have pressed the microwave’s preset button rather than following instructions on the bag that instruct you *not* to use the microwave preset. Many contemporary recipes’ claims of human control—as we have seen from 1930s push-button radios to 2020s deepfakes—tell us something about claims of confluations of machine automation and autonomy, especially in today’s age of algorithms and LLMs.

From earlier button-pushing desires for control like buttons to call servants, remote controls, or car radio presets, presets have downshifted human autonomy. Starlink and satellite radio grid the sky and grant new access to music listening in previously remote locations, and yet it is harder than ever to discover new artists other than those boosted by algorithms. And sample packs available for bedroom and studio music production alike are the recipes for success in songs such as Sabrina Carpenter’s 2024 hit “Espresso,” but those loops by DJ/producer Vaughn Oliver were purchased through the subscription music generation platform Splice that does not give him royalties.⁴ While these new technological standards seem to claim more autonomy and choice for humans—at least on one side of this exchange, for Carpenter and her team—they work through a sleight of hand and semblance, shackling us to new forms of biopolitical control. In the 2010s, for example, the artist collective Sonic Robots, led by Moritz Simon Geist, put



FIGURE 17. The *MR-808* in 2015 at Krake Festival Berlin. Photograph by Jürgen Lösel, <https://www.moritzsimongeist.com/works/mr-808>.

the zeitgeist into preset art with his *MR-808*—a wall-sized robot drum machine that is played via tablets by groups of the installation’s visitors (figure 17). The *MR-808*, first installed in Dresden, Germany, in 2012, adapts the beloved Roland TR-808 drum machine (from the interlude) into a larger-than-life instrument, where human intervention is still necessary, but the terms have changed completely. With the Roland TR-808, humans meet the interface with a tap of the finger, a twist of a knob, another finger tap. They bend their bodies only a fraction of what people do to interact with the robot model. With the *MR-808*, humans are the machine’s subjects who position themselves in front of it with tablets that may seem to control the machine but also control them as they orchestrate commands through multiple bodies on multiple tablets. Maybe it is fairer to say they have become the machine’s presets, since they must operate it as a team (is this a metaphor for democracy?).

Perhaps the most remarkable thing about the *MR-808* is its un-black boxing of drum machine presets. Those are all made visible above the old design’s preset buttons; when a visitor presses a preset on the tablet, they can see how the sound is made instantaneously (not unlike the synth oscilloscope demonstrations, or the Fairlight Computer Musical Instrument’s (CMI) screen and Herbie Hancock demo). The visitor can see the hi-hat and handclaps responding in real time to their command. It is at once disembodied and reembodied, out of but also in their hands. *MR-808* makes the push button larger than life to see how it works on us.

While *MR-808* scales up the drum machine, the Easy-Bake Oven, which debuted in 1963, scales down the stakes of cake baking to introduce children to preset buttons, especially in white suburbia. Similar miniature-yet-mature interactions occur with the Game of Life (invented in 1860) and Battleship, which was a pen-and-paper game in the 1930s and debuted as a plastic version in 1967. These board games are not just fun and games; their objectives have become the recipes for war video games, social media influencers, and more. In a more sinister register, the Stanley Milgram experiment (early 1960s) and Stanford Prison Experiment (1971) reveal the power dynamics of following a made-up preset. The former introduced a simulated scenario for participants to operate a staged electric shock

button and corresponding sound, and the latter randomly assigned participants the roles of guards and prisoners. These experiments expose the benefits and perils of discrimination and disability in creating power on demand (especially a button that incarnates power on demand). The banality of evil pervades a world where the same knob mechanism applies to the electric chair as it does to the Easy Bake Oven, or where role-playing sweeps people up into executing a recipe for evil that they feel empowered to complete. Recipes for button pushing and role-playing involve presets much like the instruments of semblance discussed in chapter 5; even with synthetic media or scenarios, essentialized aspects of humanity rise when activated by a leavening agent, colliding with other ingredients. We might also consider memes as recipes, such as “cooking with gas”—a gas industry-planted catchphrase that put automation and capital over public health. It takes only one bad apple to turn a preset rotten, as we have learned from the many paradigms that unfold on the world stage.

PARADIGMS

A preset is like a sunset, a calendar—paradigms that loom large over us and feel so ancient we have no power to intervene. They are models for humanity that feel immutable, and yet, the urtext of a paradigm often is accompanied by a word of transformation: paradigm *shift*. Etymologically, paradigm is from the Greek *paradeigma/paradeiknunai*, to “show side by side.”⁵

This book argues for attention to binaries, from audio/visual to gender. These often contrasted concepts must be shown side by side in order to understand how they influence one another. To recouple the audio/visual binary often pulled apart in scholarship as well as media viewing, visual accompaniment is tantamount to the ways both makers and fans today make sense of sonic presets and their affordances. That is why each chapter of this book connects a music technology to a media phenomenon in order to better understand presets’ side-by-side paradigms. Push-button radio and windshield cinema; synthesizers and demos; music samplers and Auto-Tune with music videos; and voice banks and deep-fakes with fan videos all show how presets are side by side with modes of visual and cultural entertainment, education, and more. Consider the glow stick choreography at Hatsune Miku concerts or the wristbands popularized at stadium concerts such as Taylor Swift’s Eras Tour. These visual representations of music enfold audiences into a collective audiovisual experience informed by the presets of bracelets and glow sticks and their accompanying protocols. But fans also “hack” or shift these paradigms, like those who engineer light-up bracelets to “long live” their intended ephemeral use and allow fans to reenter the rituals of preprogrammed visual choreography.⁶

Audiovisual content today is filtered through preset interfaces, durations, and technologies, which have deep ties back to silent film catalogs that regulated

moods. Whether on YouTube or TikTok, we experience music streaming and moving image media in predetermined ways. Streaming is spectral, compressing music into zeroes and ones, transmuting tastes through app playlists, and sanctioning the music and profits of fake artists. The 2025 annual Spotify Wrapped veered into fairground attraction territory by attempting to guess users' ages, trying to apply the psychological model of a "reminiscence bump" that was calculated by a birth date and other data but felt algorithmically arbitrary to many consumers. Spotify's reliance on shadowy figures like this has given many of us pause to consider what presets about musical value exist and continue to decay, upholding the default of streaming as proliferating capital not for artists but for oligarchs. Beyond platform and infrastructure studies, the preset frames and technological constraints that govern audiovisual production and consumption often remain overlooked. As sociologist Ruha Benjamin writes, "We are pattern makers and we must change the content of our existing patterns."⁷ What patterns of consumption will lead music streaming platforms to create sustainable models in a way that will not feel like a perpetually rigged ring toss, where money does not make a drop in the bucket? Can paradigms be shifted like Duchamp's *Fountain*—a displaced urinal—shifted ideals of ownership and high/low pedestals in art? How might streaming, or fan practices, be reprogrammed across time and geopolitics like Fairlight samples or mail art, which constantly redrew a map of communication and transmission—all the while participating in a "given" system?

SYSTEMS

Social and bureaucratic systems preset countless aspects of citizens' lives. State-controlled systems, from the mail to border control, govern the flows and jams of bodies, creating conditions for censorship, signal-jamming, and failure. Many of this book's concerns emerge out of having a body in systems that are either constantly changing to benefit white cultural elites or not changing fast enough to protect and serve those who are not.

This book highlights how social systems minoritize labor through stigma against disability, race, class, gender, age, citizenship, sexuality, and more. The etymology of "queer" as "twist," cultural theorist Sara Ahmed observes, helps us consider how those in power perceive certain bodies as out of alignment with social norms and spaces. Preset systems twist people into roles that have been predetermined by "rightful" systems, from compulsory heterosexuality to white upper-class suburbia. These systems colonize labor in the name of capital and disenfranchise the feminized, racialized, and classed workers who have no systemic mobility and yet make it possible for money to change hands, bypassing themselves. I follow Ahmed's lead to "tell a larger story; a story not only of 'things' changing hands, but of how things come to matter by taking shape through and in the labor of others."⁸ Systems allow things to change hands, and they also irrevocably mark how

things change hands, much as they mark the hands themselves. Various methods, from path dependence to audiovisual close reading and critical interpretation, trace presets' development to make palpable previously invisible or excluded labor. This button-pushing labor and systems history tips the narrative from handler to handled.

Presets also can establish new systems. For example, the Instagram square grid seemed like a given, its interface shaping our vision of social media into Instagram squares. But then its grid turned to rectangles, redrawing the detective strings between content and delivery. In a similar vein, inventor Harry Chamberlin created his Chamberlin tape organ after realizing, "If I can put my finger down and get a Hammond organ note, why can't I get a guitar note or trombone note and get that under the keys somehow and be able to play any instrument?" As long as I know how to play the keyboard, I could play any instrument.⁹ Chamberlin dreamed outside yet within the system. He sidestepped an old system to create a paradigm shift and overlay a standard, the piano, shaped by path dependence—to create new standards of use. Such shifts can establish new standards for aesthetics and for enterprise.

STANDARDS

Aesthetics and enterprise collided in midair when I was on a United Airlines flight while finishing this book. I scrolled through the seatback screen's entertainment options and decided to test out the "Sleep Section," even though I needed to be working. United partnered with Spotify in 2025 and had selected some playlists for consumption under the preset categories of: "Deep Sleep," "Nature," and "Cities." Once I chose my category, the screen turned to images of the bespoke category—for "Deep Sleep," it was "Big Skies," "Drifting Nebulas," and so on—and auto-selected a playlist, "Relax with classical music." Classical music was first on a series of playlists titled "Relax with [. . .]" that featured everything from meditative sounds to, unsurprisingly, lo-fi hip hop and ambient music. This ambient music was, of course, made in the outsized tradition of Brian Eno, with virtual instruments and loops and paired with images of farmland ("Big Skies"). I played with pairs of presets but only became more confused about United's/Spotify's top selections. Why would "Relax with classical music," with the extreme variances in volume level and instrumental sounds (solo piano versus an entire orchestra!) be ideal for sleeping—especially to those anticipating the auditory rise and fall of those pieces? What do these preset playlists say about cultural standards and defaults?

On planes, the entertainment system parallels the temperature system: climate control and aesthetic control stem from an airline's desire to keep customers comfortable, not to mention safe, and for that, we need standards. We need standards of measurement, even if they entail the biopolitics of a "foot" rumored to have been fit from a king, because the client and manufacturer need to agree on how to build something. Measuring the weather required degrees in Celsius or Fahrenheit.

RealFeel algorithms help us decide whether we need a coat, rather than getting the real feel ourselves by going outside (and how might RealFeel algorithms shift with climate change?). These standards have political implications, to be sure, but would we be safe, comfortable, or satisfied by going without standards? Would we experience aesthetic pleasures in the same way?

From the push-button radio to synthesizers, Fairlight CMI to Auto-Tune, voice banks to deepfakes, all of the technologies in this book deal with replicating and producing new standards, from their interfaces to sounds. As chapter 5 argued, synthetic media are constantly reproducing new standards for pop stars, raced and gendered bodies, and more. But there are plenty of examples about reproducing old standards, like Taylor Swift rerecording the albums for which she did not own the master recordings, in order to monetarily and metaphorically re-own her voice. The rerecordings render her as an instrument of semblance as she tries to faithfully recreate functional equivalents, but she also twists the temporal and trademark gaps by colliding the old with the new, putting them side by side as she offers a paradigm shift and puts a wrench in an ageist white male system.¹⁰

But standards also create a monoculture of capitalism, creativity, and aesthetic control. Swift participates in a system of fast capitalism where turnover is the norm. From Apple headphone jack adapters to AirPods and from one LLM to the next, new standards and planned obsolescence force users to learn something and then learn a new system that far surpasses each new era of Taylor Swift Easter eggs. Labyrinths of manuals and YouTube videos entrap us. In an age of tutorials, the standards of any system, musical or bureaucratic, are overturning rapidly. LLMs, for one, keep introducing presets like a snake eating its tail. Like the ever-present Ouroboros, this era of ever-recycling “new” normals has infinite loops of regression and return that show few signs of slowing. At what point does an app’s predictive text subsume one’s personality, succumb to cultural defaults, and swallow us whole?

DEFAULTS

Amid swaths of new normals, we have a choice to not take presets or their outcomes as givens but instead to examine our world critically with awareness of how presets shape our thinking and actions. What is preprogrammed is also linked to the dialectic of preset/default, where presets are coupled with cultural defaults, both as mechanisms and metaphors. Such a dialectical diagnostic can, I think, take on complex issues where there often is not a simple solution. In these cases, we must work from within the problem, untangling the knot, getting creative with the preset, the default. As much as I show how the preset is a technological fossilization of actions and equal and opposite reactions, I am interested in interrogating the forms they press out—why was a preset built (upon which action) and why does it give me this reaction? Defaults, by default, go unquestioned. We do not wonder enough about the default uses or users of a preset. But presets often

are created in the first place to police or engender a cultural default, such as the dishwasher's design to enforce lower-class femininity.

The word "default" derives from the Old French *defaut*, from *defaillir*, which means "to fail" and branches from the Latin *fallere*, or to "disappoint, deceive."¹¹ Ideally, cultural analysis unmaskes deceptions about the constructions and configurations of power. Dominant culture rests on assumptions of users, like the raced, classed, and gendered aspects of social mobility, and installs those in technological presets. In 2026, Pantone enshrined whiteness as the color of the year ("Cloud Dancer"), supposedly so that it could, according to ad copy, make other colors shine.¹² But by standardizing hue control across industries and shifting the economic and political terms of color production, this cultural meme also is a dog whistle for whiteness. As media theorist Lida Zeitlin-Wu writes, "White is a racial descriptor that postures as the absence of race: a blank slate onto which difference can be projected, made visible, and felt."¹³ Sometimes, a preset's default purpose or user is deceptive, hidden and humming away in the background; other times, the default user or purpose can fail. Adaptations and modifications of presets then especially become crucial. Presets can reinforce or reinvent behaviors and biases that are default in society. Cultural presets like compulsory heterosexuality and Western privilege can limit artists and audiences. But presets also can reshape cultural defaults by opening up more inclusive spaces for art-making and consuming.

As this book's chapters probe how supposedly arbitrary norms are established by industries and individuals, we can question how the grounds of reality—what we often take for granted—are founded. What if the new normal is not tied to maintaining norms that enshrine systemic inequalities but instead unlocks paradigm shifts that shift axes of power? Which new, sustainable presets can we create in universities, in the humanities, and in our communities? Probing presets in music and media technology, even on our phones' editing software, teaches us that presets are malleable if we know the right buttons to push. Presets can be tweaked ever so slightly and open up a new world of sensations or ways of thinking. Even a tiny adjustment can chart a different course, leaving new and needed tumult in its wake.

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NOTES

INTRODUCTION: SETTING THE PRESET

1. Duff and Dietrich, Dehydrated flour mix, 1.
2. *Oxford English Dictionary*, “preset (*adj.*)” accessed July 2023 <https://doi.org/10.1093/OED/7572163622>.
3. For more on the TikTok example, see Harper, *Viral Musicking*.
4. Ahmed, *Queer Phenomenology*, 67.
5. “Preset,” *Sound on Sound* Glossary, last updated July 6, 2025, <https://www.soundonsound.com/glossary/preset>.
6. Davis, *How Artifacts Afford*.
7. Searcy, “Pattern of Progress.”
8. “Programming Patterns.”
9. Nakamura, “Indigenous Circuits,” 931, 921.
10. “IBM Punched Card.”
11. On player pianos and early histories of musical automation, see Michaud, *Automatic Artistry*.
12. Patteson, “Player Piano.”
13. Altman, *Silent Film Sound*.
14. Altman, *Silent Film Sound*, 205.
15. Deaville et al., “Introduction.”
16. See, for example, Anderson, *Music for Silent Films*.
17. @RudyAyoub, “Didn’t expect this,” TikTok video, August 31, 2022, <https://www.youtube.com/shorts/ub1BAokgj9s>.
18. Cook, “Music as Performance”; Leppert, *Sight of Sound*. On Deaf music-making, see Maler, *Seeing Voices*.
19. Valéry, “De la Diction des Vers,” 1255.
20. Quoted in Denyer, “No Presets Allowed.”
21. Ngai, *Theory of the Gimmick*, 3.

22. Benjamin, "Work of Art," iii, 5, iv, 6.
23. Lipsitz, *Time Passages*, vii.
24. See, for example, Giddens, *Songs of Our Native Daughters*; Royster, *Black Country Music*; Beyoncé, *Cowboy Carter*.
25. Gitelman, *Always Already New*, 8, 7.
26. Alexander, *Interface Frictions*, 4.
27. See Harkins, *Digital Sampling*, which follows Pinch and Bijsterveld, "Sound Studies."
28. Tom Gunning, "History of International Cinema, Part I: Silent Era," course lecture, University of Chicago, fall 2016.
29. Tu quoted in Wong, *Louder and Faster*, 56.
30. Sterne, *Audible Past*, 15.
31. D'Errico, *Push*, 45.
32. Quoted in de Duve, "Readymade and the Tube of Paint."
33. Sterne, *MP3*, 130.
34. Manning, *Always More Than One*, 111.
35. Skjerseth, "Voice Modification Menagerie."
36. Noble, *Algorithms of Oppression*.

1. MOBILE MUSIC

1. Urry, "'System' of Automobility," 30.
2. On vinyl fetishism, see Sterne, *MP3*; Bates and Bennett, *Gear*; Bimm, "Time Is a Click Wheel."
3. Plotnick, "Time's Up for Screens in Cars."
4. On haptics, see Paterson, *Senses of Touch*; Parisi, *Archaeologies of Touch*; Bates and Bennett, *Gear*.
5. Gopinath and Stanyek, *Oxford Handbook of Mobile Music Studies*.
6. Bull, "Soundscapes of the Car"; Bijsterveld et al., *Sound and Safe*.
7. Hagood, *Hush*.
8. Hilmes, "New Materiality of Radio," 49.
9. Packer and Oswald, "From Windscreen to Widescreen." Windscreen is UK parlance for a windshield.
10. Alonso, *Radio for the Millions*.
11. Packer, *Mobility without Mayhem*, 25.
12. Urry, "'System' of Automobility"; Dant, "Driver-Car."
13. See Plotnick, *Power Button*; Plotnick, "Force, Flatness and Touch," 1642.
14. Plotnick, *Power Button*, 231.
15. Puskar, *Switch*.
16. Benjamin, "Work of Art," 6.
17. Russo, *Points on the Dial*, 156.
18. "Auto Radio on Safety's Side," 18.
19. "Perfected Automobile Radio Demanded" 5.
20. Coddington, *How Hip Hop Became Hit Pop*, 4.
21. Douglas, *Listening In*, 226.
22. Wall and Webber, "Changing Cultural Coordinates," 123.

23. Wall and Webber, "Changing Cultural Coordinates," 123.
24. Loviglio, *Radio's Intimate Public*.
25. Russo, *Points on the Dial*, 172.
26. For more on car radio and control, see Messbauer, "As Time Goes By."
27. Wall and Webber, "Changing Cultural Coordinates," 124.
28. Williams, "Cars with the Boom," 112.
29. McLeod, *Driving Identities*, 78.
30. *Master Key to Auto Radio*.
31. Douglas, *Listening In*, 253.
32. David Deacon-Joyner, "'(We're Gonna) Rock Around the Clock'—Bill Haley and His Comets (1954)," Library of Congress, 2017, <https://www.loc.gov/static/programs/national-recording-preservation-board/documents/RockAroundTheClock.pdf>.
33. Schiller, "Effects of Mass Media," 193.
34. Hilderbrand, "Sex Out of Sync," 52.
35. Weisbard, *Top 40 Democracy*, 1, 2.
36. Muñoz, *Cruising Utopia*, 1.
37. Muñoz, *Cruising Utopia*, 1.
38. National Association of Broadcasters, *Radio*, 64.
39. Hulser, "Visual Browsing," 20.
40. Arnheim, *Rundfunk als Hörkunst*, 164.
41. Morse, "An Ontology of Everyday Distraction."
42. Gudis, *Buyways*, 74–75.
43. Verma, *Theater of the Mind*.
44. Hoeckner, *Film, Music, Memory*, 3.
45. Blake, *Radio, Race, and Audible Difference*, 10.
46. Packer, *Mobility without Mayhem*, 172.
47. Kalinak, *Film Music*, 1–21.
48. Sandoval, "Lowriders," 20–23.
49. Morris, "Cars with the Boom," 336.
50. Cook, *Analyzing Musical Multimedia*, 102.
51. For more on the radio usage in *Born in Flames*, see Palmer, "Do the Loud Thing."
52. Quoted in Kostelanetz, *Conversing with Cage*, 51.
53. Quoted in Kostelanetz, *Conversing with Cage*, 187. Cage, "For More New Sounds," 65.
54. Dyson, "Ear That Would Hear," 401.
55. Cage, *Silence*, 30.
56. Worby, "Turn On, Tune In."
57. Osterweil, "Radio Daze," 12.
58. Reynolds, "History of Failure," 197.
59. Rubin, *Christmas on Earth* projection instructions, 163. Barbara Rubin preferred this setup for first-time viewers but sometimes screened other arrangements. Filmmaker Jonas Mekas, who lent his camera to Rubin for the film, recounts that she sometimes projected the reels "side by side or superimposed with one reel inverted or cut into four frame shards and respliced at random." Print description for *Christmas on Earth*.
60. Marks, *Skin of the Film*, 159, 183.
61. Rubin, *Christmas on Earth* projection instructions.

62. Hilderbrand, "Sex Out of Sync," 52.
63. Douglas, *Listening In*, 260.
64. Kogawa, "Radioart Manifesto."
65. Enzensberger, "Constituents of a Theory," 97.
66. Rossi, "Acousmatic Presences," 91.
67. Suárez, "Pop, Queer, or Fascist?," 124.
68. Quoted in MacDonald, *Critical Cinema* 5, 41.
69. Ashby, *Absolute Music, Mechanical Reproduction*, 187.
70. Sitney, *Visionary Film*, 104–5.
71. Quoted in MacDonald, *Critical Cinema* 5, 35.
72. Regelson, "Where Are 'the Chelsea Girls' Taking Us?"
73. Quoted in Moore, *Mix Tape*, 35.
74. Muñoz, *Cruising Utopia*, 55.

2. SYNTHESIZER STUDIOS

1. Gordon, *Composer's Black Box*.
2. Pinch, "Why You Go to a Music Store," 381.
3. Moog, "Some of Bob Moog's Comments."
4. *Oxford English Dictionary*, "oblique (*adj.*, *n.*, and *adv.*)," accessed March 2025, <https://doi.org/10.1093/OED/1275922823>.
5. Buhler, "Blank Music," 95.
6. Rodgers, *Pink Noises*, 11.
7. While the cards are produced as physical decks, a list of prompts is available here: <https://mattrickard.com/list-of-all-oblique-strategies>.
8. Lorde, *Master's Tools*.
9. Kedves, "Pump Up the Jam."
10. All italicized phrases in these subheadings come from Eno and Schmidt's *Oblique Strategies*; see note 7.
11. Rockmore quoted in Hiser, "Electronic Musical Sounds," 180.
12. La Rosa, "Theremin in the Press," 262.
13. Cage, *Silence*, 3–4.
14. Sam and Robertson, "Navigating Identity, Timbre, and Tradition," 416.
15. Hiser, "Theremin's Voice."
16. Hiser, "Electronic Musical Sounds," 288.
17. Gassmann quoted in Acevedo and Baltes, *Electrifying Music*, 16.
18. Truffaut, *Hitchcock*, 224.
19. "Oskar Sala—Mixtur-Trautonium."
20. Patteson, *Instruments for New Music*.
21. "The Music and SFX of Forbidden Planet."
22. Niebur, "Delia Derbyshire," 35, 36.
23. Quoted in Cairns, "Regeneration Game."
24. Quoted in Cairns, "Regeneration Game."
25. BBC, "1965"
26. Bates and Bennett, *Gear*.
27. Rosental, *Demonstration Society*, 8.

28. Danz CM, "Oscillators."
29. Satz, "She Recalibrates."
30. BBC Archive, "1970."
31. See Carlos's personal website, such as the page "On Prurient Matters," last updated November 2000, <https://www.wendycarlos.com/pruri.html>.
32. Quoted in Moog, "Wendy Carlos," 60.
33. Quoted in Bell, "Playboy Interview," 100.
34. Lacey and Hilmes, "Editors' Introduction," 1.
35. Quoted in Oteri, "Wendy's World," 3.
36. Dubowsky, *Intersecting Film, Music, and Queerness*, 109.
37. Bates and Bennett, *Gear*, 51.
38. Bates and Bennett, *Gear*, 51.
39. Quoted in Wright, "Only Human."
40. Dubowsky, *Intersecting Film, Music, and Queerness*, 122.
41. Quoted in Moog, "Wendy Carlos," 59.
42. Bell, "Playboy Interview," 75.
43. Kheshti, Wendy Carlos's "Switched-On Bach," 50.
44. Steinbock, "Wavering Line of Foreground and Background," 172, 176.
45. Eidsheim, *Race of Sound*, 4.
46. Eidsheim, *Race of Sound*, 4.
47. Peraino, "Synthesizing Difference," 301.
48. Geffen, *Glitter Up the Dark*, 87.
49. Quoted in Bell, "Playboy Interview," 106.
50. Quoted in Baker, "Interview with Wendy Carlos."
51. Spiegel, "Thoughts on Composing with Algorithms," 106.
52. Peter Kirn, "Laurie Spiegel's Music Mouse Is Available Now from Eventide," Create Digital Media, February 17, 2026, <https://cdm.link/musicmouse-arrives/>.
53. "Wendy Carlos Interview 1989 BBC Two."
54. "Suzanne Ciani on the David Letterman Show."
55. "Suzanne Ciani on the David Letterman Show."
56. Hutchinson, "Making Sounds with Suzanne Ciani."
57. Quoted in Pinch, "Why You Go to a Music Store," 381.
58. Quoted in Gardner, "Interview—Suzanne Ciani."
59. Quoted in Jenkins, *Analog Synthesizers*, audiobook.
60. Gordon, *Composer's Black Box*.
61. Quoted in Hutchinson, "Making Sounds with Suzanne Ciani."
62. See, for example, Coates, "Teenyboppers, Groupies, and Other Grotesques"; Vesey, "Playing in the Closet"; and Bayton, *Frock Rock*.
63. Quoted in "Suzanne Ciani on Modular Synthesis."
64. "Q + A with Suzanne Ciani."
65. Krishnaswami, "Amplifying Value"; Taylor, *Sounds of Capitalism*; Frank, *Conquest of Cool*; Love, *Soda Goes Pop*.
66. Quoted in "Q + A with Suzanne Ciani."
67. Quoted in Hutchinson, "Making Sounds with Suzanne Ciani."
68. Quoted in Jenkins, *Analog Synthesizers*, audiobook.
69. "Suzanne Ciani."

70. Quoted in “DAVID BOWIE on Synthesizers.”
71. Quoted in Marshall and Loydell, “Control and Surrender,” 179.
72. Quoted in “1982: Brian Eno.”
73. Marshall and Loydell, “Control and Surrender,” 177.
74. Szabo, *Turn On, Tune In*, 9.
75. Tamm, *Brian Eno*, 3.
76. “Laurie Anderson—Home studio.”
77. Shewey, “Performing Artistry of Laurie Anderson.”
78. *Oxford English Dictionary*, “vocoder (n.),” accessed September 2025, <https://doi.org/10.1093/OED/9606866051>.
79. Reed, *Laurie Anderson’s “Big Science,”* 24.
80. Ahmed, *Queer Phenomenology*, 26.
81. Quoted in Anderson, “Laurie Anderson Has a Message.”
82. “Herbie Hancock Yamaha DX7.”
83. Lavengood, “What Makes It Sound ‘80s?”
84. “Herbie Hancock Yamaha DX7.”
85. Yamaha, *DX7 Operating Manual*, 1.
86. Quoted in Goldmann, *Presets*, 63.
87. Yamaha, *Authorized Product Manual*, inside front cover.
88. Yamaha, *Authorized Product Manual*, inside front cover.
89. “Rock School—Series 2—Episode 2.”
90. Théberge, *Any Sound You Can Imagine*.
91. Vangelis quoted in Goldstein, “Soil Festivities.”
92. Kedves, “Pump Up the Jam.”
93. I thank Davindar Singh for sharing these insights at Weisbard, “Amy Skjerseth with Catherine Provenzano.”

INTERLUDE: DRUM BREAK

1. Herbert’s “Personal Contract for the Composition of Music” used to be available at www.matthewherbert.com/manifesto/, but that page is no longer on Herbert’s website or available on the Wayback Machine. Users still reference the manifesto on forums as an example of strict no-presets rules.
2. I thank Tara Rodgers for sharing this meme at Weisbard, “Amy Skjerseth with Catherine Provenzano.”
3. loudluck, Reddit, r/EDM post, 2014, https://www.reddit.com/r/EDM/comments/26e2vw/i_thought_using_loops_was_cheating.
4. McGrath, “Return to Craft,” 70, 72.
5. Quoted in Toop, *Rap Attack*, 63.
6. Mills and Sterne, *Tuning Time*, forthcoming.
7. Heath, “Gear Tribute.”
8. D’Errico, *Push*, 215.
9. Quoted in Goldmann, *Presets*, 187.
10. Corbitt, “808.”
11. McKittrick and Weheliye, “808s and Heartbreak.”
12. Sterne, “Spectral Objects,” 99.

13. Corbitt, "808."
14. "Jam & Lewis."
15. Veal, *Dub*.
16. Katz, "Wayne Smith's Under Mi Sleng Teng"
17. Brett, "Prince's Rhythm Programming," 246.
18. Brett, "Prince's Rhythm Programming," 258.
19. Prince quoted in Tudahl, *Prince and the Purple Rain Era*, 239.
20. Riddle and LUXXURY, "Sly and the Family Stone's 'Thank You.'"
21. Brøvig-Hanssen and Danielsen, *Digital Signatures*, 49.
22. Charnas, *Dilla Time*, 6–7.

3. SAMPLING BY MAIL ART

1. Among many resources on sampling, see, for example, Rose, *Black Noise*; Katz, *Capturing Sound*; Schloss, *Making Beats*; Burton and Oakes, *Oxford Handbook of Hip Hop Music*; Harkins, *Digital Sampling*.
2. Quoted in Blanton Museum of Art, "Curated Conversations."
3. Wielk quoted in Blackburn, "Responding to Misrepresentation," 230.
4. Chapman, *Guide to the Qasar*, 3.
5. Dawson, "Machines Alive," 333.
6. "Orchestra for Sale?"
7. Levine and Mauchly, "Fairlight Computer Music Instrument," 566.
8. Fairlight user Dave Beatty quoted in Young, "Classic Keyboards," 54.
9. Paine quoted in Tingen, "Fairlight"
10. Bennett, *Modern Records, Maverick Methods*, 10.
11. For example, to Mark Mothersbaugh (Devo member and composer of *Pee-wee's Playhouse* and several Wes Anderson films), Fairlight samples "sounded like acoustic instruments as much as Formica wood paneling looked like real wood. It was better, but not as good—it was very limited, but for a certain aesthetic, it was better, in a way." He went on to sample a toy piano "that became the musical universe for *Rugrats*." In Goldmark, "Interview with Mark Mothersbaugh," 214.
12. Morley and Dudley quoted in Tilden, "How We Made Art." Christina Aguilera's "Back in the Day" (2006) also uses what sounds like the "hey" sample.
13. Bennett, *Modern Records, Maverick Methods*, 23.
14. Quoted in Harkins, *Digital Sampling*, 57.
15. Sterne, *Audible Past*, 282.
16. Blom, "How to (Not) Answer a Letter," 6.
17. Gosse, "From Art to Experience."
18. Kienle, *Queer Networks*, 7.
19. Wilson, "Ray Johnson and Dick Higgins."
20. Bonk, *Marcel Duchamp*, 147.
21. Gosse, "From Art to Experience."
22. Vigo and Zabala, "Arte-Correo."
23. Valdés, "Eugenio Dittborn."
24. Harkins, *Digital Sampling*, 17, 162.
25. "Fairlight Collection."

26. Wielk, "Fairlight CMI IIx Sound Library."
27. Vogel quoted in Warhurst, "Which Aussie Invention."
28. Leete, "Fairlight Computer Musical Instrument."
29. Stewart, "Story of SARARR."
30. Wielk, "Fairlight CMI IIx Sound Library."
31. Sterne, *MP3*, 144.
32. Quoted in Harkins, *Digital Sampling*, 30.
33. Godfrey, "Creative Sound Design for Music."
34. Quoted in Warhurst, "Which Aussie Invention."
35. Burgess, *Art of Music Production*, 243.
36. "'Countdown' Kate Bush Interview (Australia, 1980)."
37. Quoted in "Kate Bush Profiles in Rock."
38. Morse, "Postsynchronizing Rock Music and TV."
39. Cawood, "'Don't Let Me Go!,'" 60.
40. Ahmed, *Living a Feminist Life*, 49.
41. Vernallis, *Experiencing Music Video*, 151.
42. Quoted in Monkman, "Sampling Synths."
43. Quoted in "Kate Bush Documentary."
44. Banes, "TV-Dancing Women," 330, 325.
45. Diliberto, "Kate Bush," 72.
46. Quoted in "Peter Gabriel and Fairlight CMI."
47. Morse, "Postsynchronizing Rock Music and TV," 21.
48. Quoted in "Kate Bush Documentary."
49. Turner, "Confronting the Monster," 53; Turner, "What Women Write," 100–101.
50. Kienle, *Queer Networks*, 19.
51. Langley, "Borrowed Voice."
52. "Fairlight CMI—Original Brochure."
53. Quoted in "Peter Vogel and Thomas Dolby."
54. Lavengood, "Yamaha DX7 in Synthesizer History."
55. Harkins, *Digital Sampling*, 31.
56. Quoted in Harkins, *Digital Sampling*, 31.
57. Ball, "How the Terminator 2 Music Was Made." Ball extensively explains many of Fiedel's Fairlight samples in this YouTube video.
58. Quoted in Lambie, "Brad Fiedel Interview."
59. Quoted in Lambie, "Brad Fiedel Interview."
60. Parkinson and Labrouillière, *Critical Companion to Christopher Nolan*,
61. The colloquial use is ORCH5, but a 2011 Fairlight app description at Peter Vogel Instruments labels it ORCH2. I follow this company correction as Harkins does in *Digital Sampling*, 35–36.
62. Quoted in Warhurst, "Which Aussie Invention."
63. Caswell, "Sound That Connects."
64. Quoted in Puricelli, "David Vorhaus."
65. Quoted in Buskin, "Afrika Bambaataa."
66. Diliberto, "Kate Bush," 64.
67. Inglis, "Trevor Horn."
68. Fink, "Story of ORCH5," 343.

69. Harkins, *Digital Sampling*, 36. Andrew Goodwin claims this for samplers in general in “Sample and Hold,” 37–38.
70. Quoted in Buskin, “Afrika Bambaataa.”
71. Quoted in Dery, “Black to the Future,” 214. On Blackness, technology, and sound, see Weheliye, *Phonographies*; Chude-Sokei, *Sound of Culture*; Keeling, *Queer Times*, *Black Futures*.
72. Banes, “To the Beat Y’All,” 122.
73. Kinder, “Music Video and the Spectator,” 4.
74. Fink, “Story of ORCH5,” 343.
75. Womack, *Afrofuturism*, 58.
76. Shaviro, “Supa Dupa Fly,” 172.
77. Keeling, *Queer Times*, *Black Futures*, 68.
78. “Cosby Show S2e18 Stevie Wonder.”
79. Thompson and Greenman, *Mo’ Meta Blues*, 66.
80. Questlove quoted in Thompson and Greenman, *Mo’ Meta Blues*, 66.
81. Wolfer, “Stevie—That Girl.”
82. Harkins, *Digital Sampling*, 26. The 1982 Fairlight CMI IIx Sound Library labels this preset as SARARR: “from the voice box of Sarah Cohen (Sydney),” on Disk 22, HUMANS1.
83. Quoted in Blackburn and Harkins, “Following Women Users,” 347.
84. Torres, “11 Song Moments.”
85. Lai, “Robin Hatch T.O.N.T.O.”
86. Preve, “Sound Design,” 58.
87. Shi and Shirabe, “Acceptance of the Fairlight CMI,” 148.
88. Quoted in Denyer, “No Presets Allowed,” 52.
89. Quoted in Warhurst, “Which Aussie Invention.”
90. Quoted in Gardner, “Interview—Peter Vogel.”
91. Reed, *Assimilate*, 118.
92. Blom, “How to (Not) Answer a Letter,” 10.
93. Wilson, “Ray Johnson and Dick Higgins.”

4. PRESET PITCHES AND PERSONAS

1. Eckard, “How an Oil Engineer Created Auto-Tune.” Pitch correction was done prior to Auto-Tune with tape effects that altered the speed of the recording, as Alvin and the Chipmunks did. Auto-Tune, however, maintained the speed of the recording and increased consumers’ access and ability to quickly isolate and alter pitches. See Crockett, “Mathematical Genius of Auto-Tune.”
2. @rosaliarchivio, “Rosalía talking about the use of autotune on her second record ‘El Mal Querer’ (2018),” TikTok video, August 27, 2023, <https://www.tiktok.com/@rosaliarchivio/video/7271919981045075233>.
3. Rosalía quoted in Shepherd, “Work Hard, Play Hard.”
4. Hutchinson, “Rosalía.”
5. Rosalía quoted in Billboard, “Rosalía Says Flamenco Connects.” See also Manuel, “Rosalía Polemic.”
6. *Oxford English Dictionary*, “adaptation (*n.*),” accessed March 2025, <https://doi.org/10.1093/OED/5219419376>.

7. "She Can't Sing."
8. Provenzano, "Emotional Signals," 385.
9. Shepherd, "Work Hard, Play Hard."
10. Manning, *Always More Than One*, 111.
11. Quoted in First We Feast, "Rosalía Can't Stop Laughing."
12. Taylor and Rawling, "Recording Cher's 'Believe.'"
13. Ngai, *Theory of the Gimmick*, 3.
14. Weheliye, "Feenin," 37.
15. Dregni, "Heil Talk Box."
16. Kessler, "Puppet Love," 86.
17. Ngai, *Theory of the Gimmick*, 78.
18. "American Telephone & Telegraph Exhibit."
19. I refer to voice modification as a "gendered domestication of the voice" in a chapter in the forthcoming *Oxford Handbook of Media Vocality*.
20. Ngai, *Theory of the Gimmick*, 67.
21. Tompkins, *How to Wreck a Nice Beach*, 140.
22. Westhoff, *Dirty South*, 224.
23. Tompkins, "Vocoder."
24. Frere-Jones, "Gerbil's Revenge."
25. Ngai, *Theory of the Gimmick*, 17.
26. Philips, "Milli Vanilli's Grammy Rescinded."
27. Ngai, *Theory of the Gimmick*, 5.
28. Quoted in Crockett, "Mathematical Genius of Auto-Tune."
29. Provenzano, "Emotional Signals," 140.
30. Quoted in Crockett, "Mathematical Genius of Auto-Tune."
31. Strachan, *Sonic Technologies*, 153.
32. Quoted in Crockett, "Mathematical Genius of Auto-Tune."
33. Provenzano, "Emotional Signals," 148.
34. Harris, *Humbug*, 71–72.
35. Strachan, *Sonic Technologies*, 153.
36. Quoted in Tingen, "Inside Track."
37. Quoted in McLean, "Lady Gaga on Tony Bennett."
38. Vernallis, *Experiencing Music Video*, 123–24.
39. In one crucial difference from Auto-Tune, Melodyne can correct polyphonic pitches, e.g., multinote guitar chords. Antares has the software Auto-Tune for Guitar, but it launched as monophonic, with one input for each guitar string. Melodyne is not the only competitor of Auto-Tune; another popular plug-in is Waves Tune. The phrase "Auto-Tune" has come to stand in for these plug-ins; thus, Antares's plug-in isn't necessarily the Auto-Tuning software used.
40. Marshall, "Auto-Tune In Situ," 179.
41. An early form of CGI is seen in the opening title sequence of *Vertigo* (dir., Alfred Hitchcock, 1958), where animator John Whitney used an analog computer to animate the spirals. On CGI and its relation to cinematic realism, see Prince, *Digital Visual Effects in Cinema*, chapter 1.
42. For a demonstration of the prevalence of visual effects compositing for iconic locations, see Stargate Studios, "Stargate Studios Virtual Backlot."

43. Prince, *Digital Visual Effects in Cinema*, 56–57.
44. Morris, *Persistence of Sentiment*, 150.
45. James, “‘Robo-Diva R&B.’”
46. Hildebrand quoted in PBS Nova Science NOW, “Auto-Tune.”
47. Tasker, *Working Girls*, 192.
48. Elliott, *Late Voice*, 6.
49. Kinney, “Hearing beyond Vocal Twilight,” 229.
50. Taylor and Rawling, “Recording Cher’s ‘Believe.’”
51. Quoted in Strauss, “Cher Resurrected, Again.”
52. Vernallis, *Experiencing Music Video*, 61.
53. Young, *Singing the Body Electric*, 96.
54. Breihan quoted in James, “‘Robo-Diva R&B,’” 415.
55. James, “‘Robo-Diva R&B,’” 403.
56. Capetola, *Sonic Femmeness*. Capetola also covers the aesthetics of femmeness in *Sonic Femmeness*.
57. Dickinson, “‘Believe’?,” 344.
58. Powers, “If There’s One Star,” 1D.
59. Dickinson, “‘Believe’?,” 339, 342.
60. Geffen, *Glitter Up the Dark*, 200.
61. Holmes and Kinney, “Céline Dion and Cher’s Vegas Residencies,” 124.
62. McPherson, “Reload,” 203.
63. Loughridge, *Sounding Human*, 145.
64. Loza, “Sampling (Hetero)Sexuality,” 356.
65. Provenzano, “Emotional Signals,” 381.
66. Quoted in Westhoff, *Dirty South*, 225.
67. Ngai, *Theory of the Gimmick*, 64.
68. Weheliye, “‘Feenin,’” 22.
69. “This Queen Is Keeping Her Crown,” 58.
70. Brown, *Dark Matters*.
71. Ovalle, *Dance and the Hollywood Latina*, 126.
72. Nakamura, *Digitizing Race*, 26.
73. Earnshaw, “Jennifer Lopez, 49.”
74. Ovalle, *Dance and the Hollywood Latina*, 131.
75. Nakamura, *Digitizing Race*, 23–24.
76. Algorithmic editing is not just seen in 2010s music videos but also in database cinema and short films, like Arthur Jafa’s 2016 video compilation *Love Is the Message, the Message Is Death*. Jafa sets the images to Kanye West’s “Ultralight Beam” (2016), using its rhythmic, lyrical, and affective features to create “sets of affinities between kinds of movement, particularly those innovated and/or expressed through bodies of Black folk.” Keeling, *Queer Times, Black Futures*, 139.
77. Reynolds, Harding, and Sloan, “Do You Believe.”
78. cardenas, “Blah, Blah, Blah,” 176.
79. cardenas, “Blah, Blah, Blah,” 178.
80. Banet-Weiser, *Authentic TM*, 56.
81. Quoted in Brodesser-Akner, “Kesha, Interrupted.”
82. Byron and O’Regan, *Hooks in Popular Music*, 198.

83. Quoted in Brodesser-Akner, "Kesha, Interrupted."
84. Brodesser-Akner, "Kesha, Interrupted."
85. Provenzano, "Auto-Tune, Labor, and the Pop-Music Voice."
86. Comments on "Kesha—It Ain't Me, Babe."
87. Quoted in Brodesser-Akner, "Kesha, Interrupted."
88. Quoted in Goldfine, "Rise of the Vulnerable Heroine."
89. Hill, Fileborn, and Strong, *Unsilenced*.
90. Quoted in SiriusXM, "Kesha Feels 'Cosmically Connected.'"
91. @charlixcx, "i'm not readyyyyyyyyyy!," TikTok video, April 27, 2025, <https://www.tiktok.com/@charlixcx/video/7498046418699980054>.
92. James, "Antonoffed Pop Vs Brat."
93. Muñoz, "'White to Be Angry,'" 83.
94. Quoted in Tape Notes Podcast, "Charli XCX on Auto-Tune."
95. Comment on Tape Notes Podcast, "Charli XCX on Auto-Tune."
96. Garvey, "Charli XCX."
97. Comment on Charli XCX, "Charli XCX—claws."
98. Garvey, "Charli XCX."
99. Antares Audio Technologies, "Throat."
100. Lynch, "Hyperpop Pops Off," 68.
101. Geffen, *Glitter Up the Dark*, 214.
102. Lynch, "Hyperpop Pops Off," 68.
103. Harper, "Unmute This," 160–61.
104. Holte, "Vocal Processing," 52.
105. MacDonald, "Alien Resonances and Queer Obscurities," 82.
106. MacDonald, "Alien Resonances and Queer Obscurities," 82.
107. Ngai, *Theory of the Gimmick*, 64.

5. HUMAN PRESETS

1. Zuboff, "Coup We Are Not Talking About." See also Baron, Fleegeer, and Wong Lerner, *Media Ventriloquism*.
2. Zuboff, "'We Make Them Dance,'" 28.
3. Watkins, *On the Real Side*, 271. See also Skjerseth, "Podcast Reenactments"; Barlow, *Voice Over*; Kessler, "Anachronism Effects."
4. Steinberg, "Converging Contents and Platforms," 99.
5. Lamarre, *Anime Machine*, 201.
6. Zuboff, "'We Make Them Dance,'" 17.
7. Fenley, "Puppet Theory," 21.
8. Sterne, *Diminished Faculties*, 105.
9. *Oxford English Dictionary*, "semblance (*n.*)," accessed December 2025, <https://doi.org/10.1093/OED/8506859265>.
10. Richardson, "Digital Won't Let Me Go."
11. Quoted in Duerden, "Gorillaz in Our Midst."
12. On the term "spreadable" as an alternative for viral media, see Jenkins, Ford, and Green, *Spreadable Media*.
13. Bell, "dB in the.db," 227.

14. On virtual K-pop idols and more, see Kim, *K-Pop Live*.
15. Hansen, "(Re)Reading Pop Personae," 505.
16. Bergen, "Let Me In," 32.
17. chiaki, "Hatsune Miku Joins the CC Community."
18. Eidsheim, *Race of Sound*, 121.
19. Maurice, *Cinema and Its Shadow*, 180. For connections between virtual idols and realness, see Black, "Virtual Idol."
20. Skjerseth, "Electric Ladies in Playback."
21. On Miku's musical collaborations, see March, "Wrap You Up in My Blue Hair."
22. Rangan, "In Defense of Voicelessness," 119.
23. Sterne, *Diminished Faculties*, 115.
24. Zaborowski, "Fans Negotiating Performer Personas," 107.
25. Zaborowski, "Virtual (Idol) Audiences," 227.
26. "Hatsune Miku: Project DIVA."
27. George, "Synthesised Sounds, Gendered Narratives," 38, 28.
28. Matsutoya, "Joining the Dots," 43, 52.
29. George, "Towards Post-Vocal Synthesis," 20.
30. McLeod, "Living in the Immaterial World," 508.
31. Jackson and Dines, "Vocaloids and Japanese Virtual Vocal Performance," 107.
32. Meizel, *Multivocality*, 160.
33. LenKiMo, "FAQ: What is SynthesizerV?," Vocal Synthesis/Wordbuilder: SynthV, Vocaloid, etc forum, VI Control, February 10, 2023, <https://vi-control.net/community/threads/faq-what-is-synthesizerv.136072/>.
34. Dreamtonics Co., Ltd., "This Is Not Your Average Singing Video."
35. Mowitt, "Sound of Music," 215.
36. Dreamtonics, "Synthesizer V Studio 2."
37. @Accyber, 2023, YouTube comment on "Kasane Teto UTAU vs Kasane Teto SynthV (Comparison)," posted by vocaloid poco conocidos, YouTube, 7:26, April 4, 2023, <https://www.youtube.com/watch?v=hB9nRjSDF4o>.
38. JandroYanch, "Teto Sings Bohemian Rhapsody."
39. "Q&A." Translated from the original Japanese to English with Google Translate.
40. "Q&A"; Dreamtonics, "07 Parameter Panel," in *Synthesizer V Studio User Manual, Version 1*, June 5, 2025, <https://sv1.docs.dreamtonics.com/en/synthv/advanced-usage/parameters>. Additional work on SynthV gender formants is needed; as a basis, see the work of Jordan Hugh Sam.
41. Barthes, "Grain of the Voice," 179. Barthes bemoans music criticism limited to adjectives, writing on page 180, "Are we condemned to the adjective? Are we reduced to the dilemma of either the predicable or the ineffable?"
42. Dreamtonics Co., Ltd., "Synthesizer V Studio 2 Pro."
43. "Q&A."
44. Lo, "Idols Living in the Virtual," 96.
45. I thank Susan Laxton for articulating this important point.
46. Albat, "From April Fool's Joke to Star Idol."
47. Faber, "VTubers and the Women," 12.
48. Werde, "Could I Get That Song."
49. McLeod, "Living in the Immaterial World," 510.

50. Koestenbaum, *Queen's Throat*, 134.
51. On the Houston hologram, see Hu, "Whitney Houston."
52. I thank Samuel Murray for sharing these insights at Weisbard, "Amy Skjerseth with Catherine Provenzano."
53. Failes, "Future of Entertainment."
54. Cachopo, "Callas and the Hologram," 7.
55. See Goldschmitt, "Long History"; Pelly, *Mood Machine*.
56. Quoted in McDermott, "In the Studio," 70.
57. Stanyek and Piekut, "Deadness," 25.
58. Knight, "Fake America Great Again."
59. Buzz Feed Video, "You Won't Believe What Obama Says."
60. Kietzmann et al., "Deepfakes," 139.
61. Take, for example, the 2021 Tom Cruise deepfakes designed by Chris Ume, a Belgian visual effects artist. Ume took two months to train the open-source DeepFaceLab algorithm on footage of Cruise; actor Miles Fisher then impersonated Cruise based on hours of studying Cruise's mannerisms. Ume spent weeks editing the deepfakes frame by frame with CGI to address glitches. See Vincent, "Tom Cruise Deepfake Creator."
62. Baron, "Ventriloquizing Obama," 199–200.
63. Black, "Virtual Idol," 224.
64. Hsu, "Machine Yearning," 83.
65. Hsu, "Machine Yearning," 84.
66. Harper, "Unmute This," 2.
67. Herndon, "2021 Statement." The Holly+ website is <https://holly.plus/>.
68. Herndon, "Holly+."
69. Herndon, "What If You Could Sing."
70. Morrison, *Blacksound*. See Glaser, *Borrowed Voices*; Watkins, *On the Real Side*; Barlow, *Voice Over*.
71. Ngai, *Ugly Feelings*, 32.
72. Romo, "Grimes Invites Fans to Make Songs."
73. Chun, *Programmed Visions*, 50.
74. Adorno, *Aesthetic Theory*, 110.
75. Wang, "Kendrick Lamar's 'The Heart Part 5' Deepfakes."

CONCLUSION: THE PRESET POLEMIC

1. Mauss, "Techniques of the Body"; Goffman, *Stigma*; Wiener, *Human Use of Human Beings*; Sterne, *MP3*; Tongson, *Normporn*; Zien, "On Performance, Liminality, and Normativity."
2. Alexander, *Interface Frictions*, 5.
3. Crawford, *Atlas of AI*, 146.
4. Carman, "Sabrina Carpenter's 'Espresso.'"
5. *Oxford English Dictionary*, "paradigm (n.)," accessed December 2025, <https://doi.org/10.1093/OED/4784308826>.
6. I thank Morgan Bimm for this insight.
7. "Race After Technology: Ruha Benjamin."

8. Ahmed, *Queer Phenomenology*, 44.
9. Quoted in Epand, "Phantom Orchestra at Your Fingertips."
10. On Swift's battle to reclaim her masters, see, for example, Neal, "'That's Why You Have to Stream.'"
11. *Oxford English Dictionary*, "default (*n.*)," accessed December 2025, <https://doi.org/10.1093/OED/2141619824>.
12. "Color of the Year 2026," Pantone, November 25, 2025, <https://www.pantone.com/color-of-the-year/2026>.
13. Zeitlin-Wu, "Mama Don't Take My Chromophobia Away."

BIBLIOGRAPHY

- Acevedo, Christina, and Cheryl Baltes, eds. *Electrifying Music: The Untold Story of Remi Gassmann*. Irvine: University of California, Irvine Libraries, 2024. Exhibition catalog. https://exhibits.lib.uci.edu/sites/exhibits/files/docs/exhibit-item-list/Electrifying_Music-exhibit-list.pdf.
- Adorno, Theodor. *Aesthetic Theory*. London: Athlone Press, 1999.
- Ahmed, Sara. *Queer Phenomenology: Orientations, Objects, Others*. Durham, NC: Duke University Press, 2006.
- . *The Cultural Politics of Emotion*. 2nd ed. New York: Routledge, 2015.
- . *Living a Feminist Life*. Durham, NC: Duke University Press, 2017.
- Albat, Yam. “From April Fool’s Joke to Star Idol || Kasane Teto [Virtual Singer Design Deep Dive].” May 30, 2023. YouTube, 11:29. <https://www.youtube.com/watch?v=a1Q1u3WUcwY>.
- Alexander, Neta. *Interface Frictions: How Digital Debility Reshapes Our Bodies*. Durham, NC: Duke University Press, 2025.
- Alonso, Isabel Huacuja. *Radio for the Millions: Hindi-Urdu Broadcasting Across Borders*. New York: Columbia University Press, 2023.
- Altman, Rick. *Silent Film Sound*. New York: Columbia University Press, 2004.
- “American Telephone & Telegraph Exhibit—Group at Pedro the Voder.” New York World’s Fair (1939–1940: New York, N.Y.). Manuscripts and Archives Division. New York Public Library Digital Collections. <https://digitalcollections.nypl.org/items/5e66b3e8-fafi-d471-e040-e00a180654d7>.
- Anderson, Gillian B. *Music for Silent Films, 1894–1929: A Guide*. Washington, DC: Library of Congress, 1988. <https://www.loc.gov/item/87026248/>.
- Anderson, Sam. “Laurie Anderson Has a Message for Us Humans.” *New York Times*, October 6, 2021. <https://www.nytimes.com/2021/10/06/magazine/laurie-anderson.html>.
- Antares Audio Technologies. “Throat: Pitch Shifting from the Inside Out.” August 3, 2020. <https://www.antarestech.com/pitch-shifting-plugin-in-blog/>.

- Arnheim, Rudolf. *Rundfunk als Hörkunst*. Translated by Phillip Drummon. Munich: Hanser, [1933] 1979.
- Ashby, Arved. *Absolute Music, Mechanical Reproduction*. Berkeley: University of California Press, 2010.
- "Auto Radio on Safety's Side." *Radio Today*, March 1937, 18. https://lantern.mediahist.org/catalog/radiotodayo3unse_0182.
- Baker, Alan. "An Interview with Wendy Carlos." American Public Media. January 2003. <https://www.wendycarlos.com/other/AmMavIntvw.html>.
- Ball, Alex. "How the Terminator 2 Music Was Made." February 13, 2019. YouTube, 19:18. <https://www.youtube.com/watch?v=nnpYowxlwsU>.
- Banes, Sally. "To the Beat Y'All: Breaking is Hard to Do." In *Writing Dancing in the Age of Postmodernism*, 121–25. Hanover, NH: Wesleyan University Press/University Press of New England, 1994. Originally published in *Village Voice*, April 10, 1981.
- . "TV-Dancing Women: Music Videos, Camera-Choreography, and Feminist Theory." In *Before, Between, and Beyond: Three Decades of Dance Writing*, edited by Andrea Harris, 325–43. Madison, WI: University of Wisconsin Press, 2007.
- Banet-Weiser, Sarah. *Authentic TM: The Politics of Ambivalence in a Brand Culture*. New York: New York University Press, 2012.
- Barker, Andrew. "This Queen Is Keeping Her Crown: Lopez Has Shattered Conventions While Constantly Evolving," *Variety* 320, no. 10 (2013): 57–58.
- Barlow, William. *Voice Over: The Making of Black Radio*. Philadelphia: Temple University Press, 1999.
- Baron, Jaimie. "Ventriloquizing Obama, or, the Ethics of Archival Ventriloquism." In *Media Ventriloquism: How Audiovisual Technologies Transform the Voice-Body Relationship*, edited by Jaimie Baron, Jennifer Fleegeer, and Shannon Wong Lerner, 199–214. New York: Oxford University Press, 2021.
- Baron, Jaimie, Jennifer Fleegeer, and Shannon Wong Lerner, eds. *Media Ventriloquism: How Audiovisual Technologies Transform the Voice-Body Relationship*. New York: Oxford University Press, 2021.
- Barthes, Roland. "The Grain of the Voice." In *Image, Music, Text*, 179–89. Translated by Stephen Heath. London: Fontana, 1972. Reprint New York: Hill and Wang, 1977. Citations refer to the Fontana edition.
- Bates, Eliot, and Samantha Bennett. *Gear: Cultures of Audio and Music Technologies*. Cambridge, MA: MIT Press, 2025.
- Bayton, Mavis. *Frock Rock: Women Performing Popular Music*. Oxford: Oxford University Press, 1998.
- BBC. "1965: Delia Derbyshire and the BBC Radiophonic Workshop." Posted June 20, 2014. Clip from *Tomorrow's World*. Originally broadcast December 9, 1965. <https://www.bbc.com/videos/cz48zjrgnz50>.
- BBC Archive. "1970: Wendy Carlos and her Moog Synthesiser | Music Now | Retro Tech | BBC Archive." Posted June 17, 2022. YouTube, 6:44. Clip from *Music Now*. Originally broadcast February 8, 1970. BBC Two. <https://www.youtube.com/watch?v=UsW2EDGbDqg>.
- . "1982: Brian Eno does NOT like Electronic Sounds." Posted July 19, 2023. YouTube, 4:10. Brian Eno interview with Mike Andrews. Clips taken from *Riverside: The Synthesizer, People and Performance*. Originally broadcast November 1, 1982. BBC. <https://www.youtube.com/watch?v=eV92oZxV80o>.

- Bell, Arthur. "Playboy Interview: Wendy/Walter Carlos." *Playboy*, May 1979.
- Bell, Sarah A. "The dB in the.db: Vocaloid Software as Posthuman Instrument." *Popular Music and Society* 39, no. 2 (2016): 222–40.
- Benjamin, Ruha. *Race after Technology: Abolitionist Tools for the New Jim Code*. Cambridge, UK: Polity, 2019.
- Benjamin, Walter. "The Work of Art in the Age of Mechanical Reproduction." In *Illuminations*, edited by Hannah Arendt, translated by Harry Zohn, 1–26. New York: Schocken Books, 1969.
- Bennett, Samantha. *Modern Records, Maverick Methods: Technology and Process in Popular Music Record Production 1978–2000*. New York: Bloomsbury Publishing, 2019.
- Bergen, Hilary. "Let Me in Through Your Window: Dancing with Kate Bush and Hatsune Miku." In *Lo: Tech: Pop: Cult: Screendance Remixed*, edited by Alanna Thain and Priscilla Guy, 25–44. New York: Routledge, 2024.
- Beyoncé. *Cowboy Carter*. Parkwood Entertainment and Columbia Records, 2024.
- Bijsterveld, Karin, Eefje Cleophas, Stefan Krebs, and Gijs Mom. *Sound and Safe: A History of Listening Behind the Wheel*. New York: Oxford University Press, 2014.
- Billboard. "Rosalia Says Flamenco Connects Her to Latin Culture | Growing Up Latino." January 30, 2019. YouTube, 3:03. https://youtu.be/xRI6nOFRhx0?si=fpbiecUT1gBhF-Nd&utm_source=ZTQxO.
- Bimm, Morgan. "Time Is a Click Wheel: The iPod as Music Artifact." Forthcoming.
- Black, Daniel. "The Virtual Idol: Producing and Consuming Digital Femininity." In *Idols and Celebrity in Japanese Media Culture*, edited by Patrick W. Galbraith and Jason G. Karlin, 209–28. New York: Palgrave Macmillan, 2012.
- Blackburn, Manuella. "Responding to Misrepresentation: Sample Pack Creation, Branding and Distribution." *Sound Studies* 10, no. 2 (2024): 223–53. <https://doi.org/10.1080/20551940.2023.2301214>.
- Blackburn, Manuella, and Paul Harkins. "Following Women Users: Towards a Feminist Historiography of the Fairlight CMI and Other Music Technologies." In *The Routledge Handbook to Rethinking the History of Technology-Based Music*, edited by Jøran Rudi and Monty Adkins, 337–52. London: Routledge, 2025.
- Blake, Art M. *Radio, Race, and Audible Difference in Post-1945 America: The Citizens Band*. Cham, Switzerland: Palgrave Macmillan, 2019.
- Blanton Museum of Art in Austin, Texas. "Curated Conversations—Subverted, Sealed, Delivered: Mail Art in Latin America." April 30, 2020. YouTube, 48:13. <https://www.youtube.com/watch?v=4LRbmxE8MjY>.
- Blom, Ina. "How to (Not) Answer a Letter: Ray Johnson's Postal Performance," *PAJ: A Journal of Performance and Art* 29, no. 2 (2007): 1–19. <https://doi.org/10.1162/pajj.2007.29.2.1>.
- Bonk, Ecke. *Marcel Duchamp: The Box in a Valise*. New York: Rizzoli, 1989.
- Braverman, Harry. *Labor and Monopoly Capital: The Degradation of Work in the Twentieth Century*. New York: Monthly Review Press, 1974.
- Brennan, Matt. *Kick It: A Social History of the Drum Kit*. New York: Oxford University Press, 2020.
- Brett, Thomas. "Prince's Rhythm Programming: 1980s Music Production and the Esthetics of the LM-1 Drum Machine." *Popular Music and Society* 43, no. 3 (2020): 244–61. <https://doi.org/10.1080/03007766.2020.1757813>.
- Brodesser-Akner, Taffy. "Kesha, Interrupted." *New York Times*, October 26, 2016.

- Brooks, Daphne A. *Liner Notes for the Revolution: The Intellectual Life of Black Feminist Sound*. Cambridge, MA: Harvard University Press, 2021.
- Brøvig-Hanssen, Ragnhild, and Anne Danielsen. *Digital Signatures: The Impact of Digitization on Popular Music Sound*. Cambridge, MA: MIT Press, 2016.
- Brown, Simone. *Dark Matters: On the Surveillance of Blackness*. Durham, NC: Duke University Press, 2015.
- Buhler, James. "Blank Music: Marketing Virtual Instruments." In *The Oxford Handbook of Music and Advertising*, edited by James Deaville, Siu-Lan Tan, and Ron Rodman, 92–118. Oxford: Oxford University Press, 2021.
- Bull, Michael. "Soundscapes of the Car: A Critical Study of Automobile Habitation." In *Car Cultures*, edited by Daniel Miller, 185–202. London: Routledge, 2001.
- Burgess, Richard James. *The Art of Music Production: The Theory and Practice*. Oxford: Oxford University Press, 2013.
- Burton, Justin D., and Jason Lee Oakes, eds. *The Oxford Handbook of Hip Hop Music Studies*. New York: Oxford University Press, 2018.
- Buskin, Richard. "Afrika Bambaataa & The Soulsonic Force 'Planet Rock.'" *Sound on Sound*, November 2008. <https://www.soundonsound.com/techniques/classic-tracks-afrika-bambaataa-soulsonic-force-planet-rock>.
- BuzzFeed Video. "You Won't Believe What Obama Says In This Video! 🤖" April 17, 2018. YouTube, 1:12. <https://www.youtube.com/watch?v=cQ54GDm1eLo>.
- Byron, Tim, and Jadey O'Regan. *Hooks in Popular Music*. Cham, Switzerland: Palgrave Macmillan, 2022.
- Cachopo, João Pedro. "Callas and the Hologram: A Live Concert with a Dead Diva," *Sound Stage Screen* 2, no. 1 (Spring 2022): 5–29.
- Cage, John. *Silence: Lectures and Writings*. Middletown, CT: Wesleyan University Press, 1961.
- . "For More New Sounds." In *John Cage*, edited by Richard Kostelanetz, 64–66. New York: Praeger, 1970.
- Cairns, Dan. "The Regeneration Game." *Sunday Times* (UK), March 11, 2007.
- Capetola, Christine. *Sonic Femmeness: Black Culture Makers, Felt History, and Vibrational Identity*. Durham, NC: Duke University Press, forthcoming.
- cardenas, micha. "Blah, Blah, Blah: Kesha Feminism?" *Journal of Popular Music Studies* 24, no. 2 (2012): 176–95. <https://doi.org/10.1111/J.1533-1598.2012.01324.X>.
- Carlos, Wendy. "Official Wendy Carlos Online Information Source." Accessed February 22, 2025. <https://www.wendycarlos.com/>.
- Carman, Ashley. "Sabrina Carpenter's 'Espresso' Highlights the New Way Music is Made." Bloomberg. June 5, 2024. <https://www.bloomberg.com/graphics/pop-star-ranking/2024-june/sabrina-carpenter-s-espresso-highlights-the-new-way-music-is-made.html?embedded-checkout=true>.
- Caswell, Estelle. "The Sound That Connects Stravinsky to Bruno Mars." Posted May 15, 2018 by Vox. YouTube, 9:25. https://www.youtube.com/watch?v=8A1Ajl_EF9Y.
- Cawood, Ian. "'Don't Let Me Go! Hold Me Down!': Inspiration, Voice and Image in Kate Bush's 'Hounds of Love,'" *Popular Music* 35, no. 1 (2016): 41–63. <https://doi.org/10.1017/S0261143015000781>.
- Chapman, Jill. *Guide to the Qasar Tony Furse Archive*. Sydney: Powerhouse Museum, 2012.
- Charli XCX. "Charli XCX—claws [Official Video]." May 1, 2020. YouTube, 2:39. <https://www.youtube.com/watch?v=WAo8X-rIt8k>.

- Charnas, Dan, with Jeff Peretz. *Dilla Time: The Life and Afterlife of J Dilla, the Hip-Hop Producer Who Reinvented Rhythm*. New York: MCD/Farrar, Straus and Giroux, 2022.
- chiaki. "Hatsune Miku Joins the CC Community." Creative Commons. December 14, 2012. <https://creativecommons.org/2012/12/14/hatsune-miku-joins-the-cc-community/>.
- Chude-Sokei, Louis. *The Sound of Culture: Diaspora and Black Technopoetics*. Middletown, CT: Wesleyan University Press, 2016.
- Chun, Wendy Hui Kyong. *Programmed Visions: Software and Memory*. Cambridge, MA: MIT Press, 2013.
- Cimini, Amy. *Wild Sound: Maryanne Amacher and the Tenses of Audible Life*. New York: Oxford University Press, 2023.
- Coates, Norma. "Teenyboppers, Groupies, and Other Grotesques: Girls and Women and Rock Culture in the 1960s and Early 1970s." *Journal of Popular Music Studies* 15, no. 1 (June 2003): 65–94. <https://doi.org/10.1111/j.1533-1598.2003.tb00115.x>.
- Coddington, Amy. *How Hip Hop Became Hit Pop: Radio, Rap, and Race*. Oakland: University of California Press, 2023.
- Cook, Nicholas. *Analyzing Musical Multimedia*. Oxford: Oxford University Press, 1998.
- . "Music as Performance." In *The Cultural Study of Music: A Critical Introduction*, edited by Martin Clayton, Trevor Herbert, and Richard Middleton, 204–14. New York: Routledge, 2003.
- Corbitt, Fil. "808: The Drum Machine That Changed Music Forever." *Twenty Thousand Hertz* podcast. July 29, 2019. <https://www.20k.org/episodes/808>.
- "The Cosby Show S2e18 Stevie Wonder." Posted May 9, 2017 by BillCosby. YouTube, 2:37. Clip taken from *The Cosby Show*, season 2, episode 18, "A Touch of Wonder." Originally broadcast February 20, 1986. <https://www.youtube.com/watch?v=kwDz-vcNkEU>.
- "'Countdown' Kate Bush Interview (Australia, 1980)." Posted March 22, 2022 by @katebush_thecollection. YouTube, 4: 11. Clip taken from *Countdown*. Originally broadcast October 5, 1980. <https://www.youtube.com/watch?v=kFM65fzi154>.
- Crawford, Kate. *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence*. New Haven, CT: Yale University Press, 2021.
- Crockett, Zachary. "The Mathematical Genius of Auto-Tune." *Priceonomics*. September 26, 2016. <https://priceonomics.com/the-inventor-of-auto-tune/>.
- Cusick, Suzanne G. *Francesca Caccini at the Medici Court: Music and the Circulation of Power*. Chicago: University of Chicago Press, 2009.
- Dant, Tim. "The Driver-Car." *Theory, Culture & Society* 21, no. 4/5 (2004): 61–79. <https://doi.org/10.1177/0263276404046061>.
- Danz CM. "Oscillators." *Synth History* podcast, episode 3. March 29, 2023. <https://www.synthhistory.com/episode-03-oscillators>.
- "DAVID BOWIE on Synthesizers." Posted March 6, 2014 by Halloweenjack84. YouTube, 0:43. <https://www.youtube.com/watch?v=yadcdunOd7U>.
- Davis, Jenny L. *How Artifacts Afford: The Power and Politics of Everyday Things*. Cambridge, MA: MIT Press, 2020.
- Dawson, Giles. "Machines Alive with the Sound of Music." *New Scientist* 99, no. 1369 (August 4, 1983): 333–35.
- Deaville, James, Júlia Durand, Toby Huelin, and Melissa Morton. "Introduction: Library Music in Digital Media." *Music, Sound, and the Moving Image* 18, no. 2 (2024): 95–113. <https://muse.jhu.edu/article/946730>.

- de Duve, Thierry. "The Readymade and the Tube of Paint," *Artforum* 24, no. 9 (May 1986). <https://www.artforum.com/features/the-readymade-and-the-tube-of-paint-206976/>.
- Denyer, Ralph. "No Presets Allowed: Hans Zimmer." *Sound On Sound*, August 1986. <https://www.muzines.co.uk/articles/no-presets-allowed/1639>.
- D'Errico, Mike. *Push: Software Design and the Cultural Politics of Music Production*. New York: Oxford University Press, 2022.
- Dery, Mark. "Black to the Future: Interviews with Samuel R. Delany, Greg Tate, and Tricia Rose." In *Flame Wars: The Discourse of Cyberculture*, edited by Mark Dery, 179–222. Durham, NC: Duke University Press, 1994.
- Devine, Kyle. *Decomposed: The Political Ecology of Music*. Cambridge, MA: MIT Press, 2020.
- Dickinson, Kay. "Believe? Vocoder, Digitalised Female Identity, and Camp." *Popular Music* 20 (October 2001): 333–47. <https://doi.org/10.1017/S0261143001001532>.
- Dienstfrey, Eric. *Making Stereo Fit: The History of a Disquieting Film Technology*. Oakland: University of California Press, 2024.
- Diliberto, John. "Kate Bush: From Piano to Fairlight with Britain's Exotic Chanteuse." *Keyboard*, July 1985.
- Douglas, Susan J. *Listening In: Radio and the American Imagination*. Minneapolis: University of Minnesota Press, 1999.
- Dreamtonics. "Synthesizer V Studio 2." Accessed May 1, 2025. dreamtonics.com/synthesizerv/.
- Dreamtonics Co., Ltd. "This Is Not Your Average Singing Video." November 30, 2022. YouTube, 0:46. <https://www.youtube.com/watch?v=ktRRHVmEmi4>.
- . "Synthesizer V Studio 2 Pro: Walkthrough Video." March 20, 2025. Facebook, 4:59 <https://www.facebook.com/MusicMarketingInc/videos/dreamtonics-synthesizer-v-studio-2-pro-is-released-it-is-a-major-update-to-their/639268192231836/>.
- Dregni, Michael. "The Heil Talk Box." *Vintage Guitar* 27, no. 11 (September 2013). <https://www.vintageguitar.com/16339/heil-talk-box/>.
- Drott, Eric. *Streaming Music, Streaming Capital*. Durham, NC: Duke University Press, 2024.
- Dubowsky, Jack. *Intersecting Film, Music, and Queerness*. London: Palgrave Macmillan, 2016.
- Duerden, Nick. "Gorillaz in Our Midst." *Observer* (UK), March 11, 2001. <https://www.theguardian.com/theobserver/2001/mar/11/featuresreview.review2>.
- Duff, John D., and Louis E. Dietrich [P. Duff & Sons, Inc.] Dehydrated flour mix and process of making the same. US Patent 2016320, filed June 13, 1933, and issued October 8, 1935.
- Dyson, Frances. "The Ear That Would Hear Sounds in Themselves." In *Wireless Imagination: Sound, Radio, and the Avant-Garde*, edited by Douglas Kahn and Gregory Whitehead, 373–407. Cambridge, MA: MIT Press, 1992.
- Earnshaw, Jessica. "Jennifer Lopez, 49, Writhes Around in Sequin Stockings and Lingerie in JAW-DROPPING Scenes." *Express*, August 16, 2018. <https://www.express.co.uk/celebrity-news/1004211/Jennifer-Lopez-2018-stockings-Las-Vegas-show-age-pictures-latest-news>.
- Eckard, Greg. "How an Oil Engineer Created Auto-Tune and Changed Music Forever." *Vice*, February 25, 2016. <https://www.vice.com/en/article/bmaj4d/how-an-oil-engineer-created-auto-tune-and-changed-music-forever-interview-creator>.
- Eidsheim, Nina Sun. *Sensing Sound: Singing and Listening as Vibrational Practice*. Durham, NC: Duke University Press, 2015.
- . *The Race of Sound: Listening, Timbre, and Vocality in African American Music*. Durham, NC: Duke University Press, 2019.

- Elliott, Richard. *The Late Voice: Time, Age and Experience in Popular Music*. New York: Bloomsbury, 2015.
- Eno, Brian and Peter Schmidt. *Oblique Strategies*. 1975. <https://mattrickard.com/list-of-all-oblique-strategies>.
- Enzensberger, Hans Magnus. *The Consciousness Industry: On Literature, Politics and the Media*. Edited by Michael Roloff. New York: Seabury Press, 1974.
- Epand, Len. "A Phantom Orchestra at Your Fingertips." *Crawdaddy!*, April 1976.
- Eshun, Kodwo. *More Brilliant Than the Sun: Adventures in Sonic Fiction*. London: Quartet Books, 1998.
- Faber, Tom. "VTubers and the Women behind the Masks." *Financial Times* (London), April 21, 2021.
- Failes, Ian. "The Future of Entertainment." *Rolling Stone*, December 10, 2018. <https://www.rollingstone.com/culture/culture-lists/future-entertainment-technology-music-tv-movies-760659/virtual-reality-experience-void-760683/>.
- "Fairlight CMI—Original Brochure." The Fairlight CMI: Computer Musical Instrument. October 16, 2022. <https://www.synthforbreakfast.nl/fairlight-cmi-original-brochure/>.
- "Fairlight Collection." Nord. Accessed April 4, 2021. <https://www.nordkeyboards.com/sounds/sound-collections/fairlight/>.
- Fenley, Marissa. "Puppet Theory: The Mechanical Infrastructure of Personhood." PhD diss., University of Chicago, 2022.
- Fink, Robert. "The Story of ORCH5, or, the Classical Ghost in the Hip-Hop Machine." *Popular Music* 24, no. 3 (2005): 339–56. <https://doi.org/10.1017/S0261143005000553>.
- First We Feast. "Rosalía Can't Stop Laughing While Eating Spicy Wings | Hot Ones." June 8, 2023. YouTube, 22:46. <https://www.youtube.com/watch?v=eGuuRmOFAaY>.
- Frank, Thomas. *The Conquest of Cool: Business Culture, Counterculture, and the Rise of Hip Consumerism*. Chicago: University of Chicago Press, 1997.
- Frere-Jones, Sasha. "The Gerbil's Revenge." *New Yorker*, June 2, 2008. <http://www.newyorker.com/magazine/2008/06/09/the-gerbils-revenge>.
- Gardner, James. "Interview—Peter Vogel." Radio New Zealand. May 8, 2010.
- . "Interview—Suzanne Ciani." Radio New Zealand. July 13, 2013.
- Garvey, Meaghan. "Charli XCX: Stress-Cried a Lot while Recording Her Entire New Album in Quarantine." *New York Magazine*, May 11, 2020.
- Geffen, Sasha. *Glitter Up the Dark: How Pop Music Broke the Binary*. Austin: University of Texas Press, 2020.
- George, Zoë. "Synthesised Sounds, Gendered Narratives: Investigating Depictions of Girlhood in Vocaloid Music: A Critical Examination of Vocaloid Lyrics." BA honors diss., University of Liverpool, 2024.
- . "Towards Post-Vocal Synthesis: Exploring Synthetic Vocality through Adachi Rei and Additive Synthesis: A Creative-Practice Study of Machinic Girlhood, Hauntology, and Post-Vocal Aesthetics." MSt diss., University of Oxford, 2025.
- Giddens, Rhiannon. *Songs of Our Native Daughters*. Smithsonian Folkways Recordings, 2019.
- Gitelman, Lisa. *Always Already New: Media, History, and the Data of Culture*. Cambridge, MA: MIT Press, 2008.
- Glaser, Jennifer. *Borrowed Voices: Writing and Racial Ventriloquism in the Jewish American Imagination*. New Brunswick, NJ: Rutgers University Press, 2016.

- Godfrey, Jem. "Creative Sound Design for Music: Tips & Techniques." *Sound on Sound*, July 2011. <https://www.soundonsound.com/techniques/creative-sound-design-music>.
- Goffman, Erving. *Stigma: Notes on the Management of Spoiled Identity*. First Touchstone edition. New York: Simon & Schuster, [1963] 1986.
- Goldfine, Jael. "The Rise of the Vulnerable Heroine." *Paper*, April 3, 2019. <https://www.papermag.com/vulnerable-heroine-kesha-lady-gaga-beyonce#rebelltitem41>.
- Goldmann, Stefan. *Presets: Digital Shortcuts to Sound*. 3rd ed. London: The Bookworm, 2015.
- Goldmark, Daniel. "An Interview with Mark Mothersbaugh." In *The Cartoon Music Book*, edited by Daniel Goldmark and Yuval Taylor, 207–17. Chicago: A Cappella Press, 2002.
- Goldschmitt, K. E. "The Long History of the 2017 Spotify 'Fake Music' Scandal." *American Music* 38, no. 2 (2020): 131–52. <https://doi.org/10.5406/americanmusic.38.2.0131>.
- Goldstein, Dan. "Soil Festivities: Vangelis Speaks." *Electronics & Music Maker*, December 1984. <https://www.muzines.co.uk/articles/soil-festivities/8038#>.
- Goodwin, Andrew. "Sample and Hold: Pop Music in the Digital Age of Reproduction." *Critical Quarterly* 30, no. 3 (1988): 34–49. <https://doi.org/10.1111/j.1467-8705.1988.tb00315.x>.
- Gopinath, Sumanth, and Jason Stanyek. *The Oxford Handbook of Mobile Music Studies*. Vol. 1. New York: Oxford University Press, 2014.
- Gorbman, Claudia. *Unheard Melodies: Narrative Film Music*. London: BFI Publishing, 1987.
- Gordon, Theodore. *The Composer's Black Box: Making Music in Cybernetic America*. Oakland: University of California Press, 2025.
- Gosse, Johanna. "From Art to Experience." *Journal of Black Mountain College Studies* 2 (Spring 2012). <https://www.blackmountaincollege.org/volume2/johanna-gosse-2/>.
- Green, Venus. *Race on the Line: Gender, Labor, and Technology in the Bell System, 1880–1980*. Durham, NC: Duke University Press, 2001.
- Gudis, Catherine. *Buyways: Billboards, Automobiles, and the American Landscape*. New York: Routledge, 2004.
- Hagood, Mack. *Hush: Media and Sonic Self-Control*. Durham, NC: Duke University Press, 2019.
- Han, Lisa Yin. *Deepwater Alchemy: Extractive Mediation and the Taming of the Seafloor*. Minneapolis: University of Minnesota Press, 2024.
- Hansen, Kai Arne. "(Re)Reading Pop Personae: A Transmedial Approach to Studying the Multiple Construction of Artist Identities." *Twentieth-Century Music* 16, no. 3 (2019): 501–29. <https://doi.org/10.1017/S1478572219000276>.
- Haraway, Donna J. *Simians, Cyborgs, and Women: The Reinvention of Nature*. London: Free Association Books, 1991.
- Harkins, Paul. *Digital Sampling: The Design and Use of Music Technologies*. London: Routledge, 2019.
- Harper, Paula Clare. "Unmute This: Circulation, Sociality, and Sound in Viral Media." PhD diss., Columbia University, 2019.
- . *Viral Musicking and the Rise of Noisy Platforms*. Chicago: University of Chicago Press, forthcoming.
- Harris, Neil. *Humbug: The Art of P. T. Barnum*. Chicago: University of Chicago Press, [1973] 1981.
- "Hatsune Miku: Project DIVA." Sega. Accessed April 29, 2025. <https://asia.sega.com/mega39splus/en/>.
- Heath, Harold. "Gear Tribute: The Maestro Rhythm King MRK–2, Sly Stone's Favorite Drum Machine." *Reverb*. June 5, 2017. <https://reverb.com/news/gear-tribute-the-maestro-rhythm-king-mrk2-sly-stones-favorite-drum-machine>.

- "Herbie Hancock Yamaha DX7 Vintage Demo 8os." Posted January 28, 2018 by Analog-SynthMuseum. YouTube, 7:47. Originally aired 1986. <https://web.archive.org/web/20250813065022/https://www.youtube.com/watch?v=qBpu7cmm2gI>.
- Herndon, Holly. "2021 Statement on Artist's Website." Accessed January 17, 2022. <https://www.hollyherndon.com/holly>.
- . "Holly+." July 13, 2021. <https://holly.mirror.xyz/54ds2liOnvthjGFkokFCoal4EabytH9xjAYyirHy94>.
- . "What If You Could Sing in Your Favorite Musician's Voice?" TED. April 2022. www.ted.com/talks/holly_herndon_what_if_you_could_sing_in_your_favorite_musician_s_voice.
- Hilderbrand, Lucas. "Sex Out of Sync: *Christmas on Earth's* and *Couch's* Queer Sound Tracks." *Camera Obscura* 28, no. 2 (2013): 45–75. <https://doi.org/10.1215/02705346-2209916>.
- Hill, Rosemary Lucy, Bianca Fileborn, and Catherine Strong. *Unsilenced: Women Musicians, Gender-Based Violence, and the Popular Music Industry*. New York: Bloomsbury Academic, 2025.
- Hilmes, Michele. "The New Materiality of Radio: Sound on Screens." In *Radio's New Wave: Global Sound in the Digital Era*, edited by Jason Loviglio and Michele Hilmes, 43–61. New York: Routledge, 2013.
- Hiser, Kelly. "Electronic Musical Sounds and Material Culture: Early Reception Histories of the Telharmonium, the Theremin, and the Hammond Organ." PhD diss., University of Wisconsin-Madison, 2015.
- . "The Theremin's Voice: Amplifying the Inaudibility of Whiteness through an Early Interracial Electronic Music Collaboration." *SoundingOut!* (blog), November 5, 2018. <https://soundstudiesblog.com/2018/11/05/the-theremins-voice-amplifying-the-inaudibility-of-whiteness-through-an-early-interracial-electronic-music-collaboration/>.
- Hoekner, Berthold. *Film, Music, Memory*. Chicago: University of Chicago Press, 2019.
- Holmes, Jessica A., and Michael Kinney. "Céline Dion and Cher's Vegas Residencies: The Envoiced and Embodied Spectacle of Feminine Aging." In *The Possibility Machine: Music and Myth in Las Vegas*, edited by Brian F. Wright, 112–31. Champaign: University of Illinois Press, 2023.
- Holte, Lisa Karolyn. "Vocal Processing and the Creation/Expression of Gender in Hyperpop." Master's diss., University of Oslo, 2023.
- Hong, Cathy Park. *Minor Feelings: An Asian American Reckoning*. New York: One World, 2021.
- Hosokawa, Shuhei. "The Walkman Effect." *Popular Music* 4 (1984): 165–80.
- Hsu, Hua. "Machine Yearning." *New Yorker*, May 20, 2019.
- Hu, Jane C. "The Whitney Houston of the 3D Hologram Tour Will Be Neither 3D nor a Hologram." *Slate*, May 22, 2019. <https://slate.com/technology/2019/05/whitney-houston-3d-hologram-tour-technology.html>.
- Hubbs, Nadine. *The Queer Composition of America's Sound: Gay Modernists, American Music, and National Identity*. Berkeley: University of California Press, 2004.
- Hulser, Kathleen. "Visual Browsing: Auto-Flaneurs and Roadside Ads in the 1950s." In *Suburban Discipline*, edited by Peter Lang and Tam Miller, 9–29. New York: Princeton Architectural Press, 1997.
- Hutchinson, Kate. "Making Sounds with Suzanne Ciani, America's First Female Synth Hero." *Guardian*, May 20, 2017. <https://www.theguardian.com/music/2017/may/20>

- /suzanne-ciani-america-female-synth-hero#:~:text=Her%2olive%2otelevision%2o performance%2C%2oto,t%2ocompute%2C%E2%80%9D%2oshe%2osays.
- . “Rosalía: The Pop Star Bringing Flamenco to a New Generation.” *New York Times*, November 16, 2018.
- “The IBM Punched Card.” IBM. Accessed March 3, 2025. <https://www.ibm.com/history/punched-card>.
- Inglis, Sam. “Trevor Horn: The Art of Record Production.” *Sound on Sound*, May 1, 2019. <https://www.soundonsound.com/people/trevor-horn-art-record-production>.
- Jackson, Louise H., and Mike Dines. “Vocaloids and Japanese Virtual Vocal Performance: The Cultural Heritage and Technological Futures of Vocal Puppetry.” In *The Oxford Handbook of Music and Virtuality*, edited by Sheila Whiteley and Shara Rambarran, 101–10. Oxford: Oxford University Press, 2016.
- “Jam & Lewis.” Red Bull Music Academy. 2016. <https://www.redbullmusicacademy.com/lectures/jam-lewis-lecture>.
- James, Robin. “‘Robo-Diva R&B’: Aesthetics, Politics, and Black Female Robots in Contemporary Popular Music.” *Journal of Popular Music Studies* 20, no. 4 (December 2008): 402–23. <https://doi.org/10.1111/j.1533-1598.2008.00171.x>.
- . *The Sonic Episteme: Acoustic Resonance, Neoliberalism, and Biopolitics*. Durham, NC: Duke University Press, 2019.
- . “Antonified Pop Vs Brat & The Stakes of Elite Musical Taste in Pop’s Girlboss Era.” It’s Her Factory. August 18, 2024. <https://www.its-her-factory.com/2024/08/antonified-pop-vs-brat-the-stakes-of-elite-musical-taste-in-pops-girlboss-era/>.
- JandroYanch. “Teto Sings Bohemian Rhapsody [Synthesizer V Cover].” July 14, 2023. YouTube, 5:56. <https://www.youtube.com/watch?v=pwU6gWmb5yc>.
- Jenkins, Henry, Sam Ford, and Joshua Green, eds. *Spreadable Media: Creating Value and Meaning in a Networked Culture*. New York: New York University Press, 2013.
- Jenkins, Mark. *Analog Synthesizers: Understanding, Performing, Buying from the Legacy of Moog to Software Synthesis*. 2nd ed. New York: Routledge, 2020. Audiobook.
- Kalinak, Kathryn Marie. *Film Music: A Very Short Introduction*. New York: Oxford University Press, 2010.
- “Kate Bush Documentary, including rare interview footage. Part two.” Posted October 30, 2009 by zack11993. YouTube, 10:00. Including a clip from an interview with Christopher Ward for *Egos and Icons*. Originally broadcast November 1985. Much. <https://www.youtube.com/watch?v=IY7D2qgSxtM&t=1s>.
- “Kate Bush Profiles in Rock.” Kate Bush interview with Doug Pringle for *Profiles in Rock*. Posted November 10, 2015 by alfienoaks. YouTube, 13:51. Originally broadcast December 1980. CITY-TV, Toronto (Canada). <https://www.youtube.com/watch?v=OBiFL6tVRjY>.
- Katz, David. “Wayne Smith’s Under Mi Sleng Teng—The Song That Revolutionised Reggae.” *Guardian*, February 20, 2014. <https://www.theguardian.com/music/2014/feb/20/wayne-smith-sleng-teng-revolutionised-dancehall-reggae>.
- Katz, Mark. *Capturing Sound: How Technology Has Changed Music*. Berkeley: University of California Press, 2004.
- Kedves, Jan. “Pump Up the Jam.” Frieze. November 14, 2014. <https://www.frieze.com/article/maximal-hochgepumpt>.
- Keeling, Kara. *Queer Times, Black Futures*. New York: New York University Press, 2019.

- Kehrer, Lauron J. *Queer Voices in Hip Hop: Cultures, Communities, and Contemporary Performance*. Ann Arbor: University of Michigan Press, 2022.
- "Kesha—It Ain't Me, Babe [Billboard Music Awards 2016] HD 1080p." Posted June 1, 2016 by MJJHD Production. YouTube, 4:11. <https://www.youtube.com/watch?v=SnwbXbvur4g>.
- Kessler, Sarah. "Anachronism Effects: Ventriloquism and Popular Media." PhD diss., University of California, Irvine, 2016.
- . "Puppet Love: Documenting Ventriloquism in Nina Conti's *Her Master's Voice*." *Camera Obscura* 92 vol. 31, no. 2 (2016): 61–91. <https://doi.org/10.1215/02705346-3592576>.
- Kheshti, Roshanak. *Wendy Carlos's "Switched-On Bach"*. New York: Bloomsbury, 2019.
- Kienle, Miriam. *Queer Networks: Ray Johnson's Correspondence Art*. Minneapolis: University of Minnesota Press, 2023.
- Kietzmann, Jan, Linda W. Lee, Ian P. McCarthy, and Tim C. Kietzmann. "Deepfakes: Trick or Treat?" *Business Horizons* 63, no. 2 (January 1, 2020): 135–46. <https://doi.org/10.1016/j.bushor.2019.11.006>.
- Kim, Suk-Young. *K-Pop Live: Fans, Idols, and Multimedia Performance*. Stanford, CA: Stanford University Press, 2018.
- Kinder, Marsha. "Music Video and the Spectator: Television, Ideology and Dream." *Film Quarterly* 38, no. 1 (1984): 2–15. <https://doi.org/10.1525/fq.1984.38.1.04a00030>.
- Kinney, Michael Evans. "Hearing beyond Vocal Twilight: Aging Vocalities in Contemporary American Operatic and Classical Voice Performance." PhD diss., Stanford University, 2023.
- Knight, Will. "Fake America Great Again." *MIT Technology Review*, August 17, 2018.
- Koestenbaum, Wayne. *The Queen's Throat: Opera, Homosexuality, and the Mystery of Desire*. New York: Poseidon Press, 1993.
- Kogawa, Tetsuo. "A Radioart Manifesto." Accessed January 18, 2020. http://anarchy.k2.tku.ac.jp/non-japanese/20080710AcousticSpaceIssue_7.html.
- Kostelanetz, Richard. *Conversing with Cage*, 4th ed. New York: Routledge, 2003.
- Krishnaswami, Ravi. "Amplifying Value: Labor, Technology, and Creativity in the Jingle Industry." *The Palgrave Handbook of Critical Music Industry Studies*, edited by David Ardit and Ryan Nolan, 191–208. Cham, Switzerland: Palgrave Macmillan, 2024.
- Lacey, Kate, and Michele Hilmes. "Editors' Introduction: Women and Soundwork." *Feminist Media Histories* 1, no. 4 (October 2015): 1–4. <https://doi.org/10.1525/fmh.2015.1.4.1>.
- Lai, Chi Ming. "Robin Hatch T.O.N.T.O." *Electricity Club*, October 25, 2021. <https://www.electricityclub.co.uk/robin-hatch-tonto/>.
- Lamarre, Thomas. *The Anime Machine: A Media Theory of Animation*. Minneapolis: University of Minnesota Press, 2009.
- Lambie, Ryan. "Brad Fiedel Interview: Composing Terminator 2's Iconic Score." *Den of Geek*, December 5, 2017. <https://www.denofgeek.com/movies/brad-fiedel-interview-composing-terminator-2s-iconic-score/>.
- Langley, Carol. "Borrowed Voice: The Art of Lip-Synching in Sydney Drag." *Australasian Drama Studies* 48 (April 2006): 5–17.
- La Rosa, Jaime E. Oliver. "Theremin in the Press: Instrument Remediation and Code-Instrument Transduction." *Organised Sound* 23, no. 3 (December 2018): 256–69. <https://doi.org/10.1017%2FS135577181800016X>.

- Latham, Clara. "Instrument or Appliance? The RCA Theremin, Gender, Labor, and Domesticity." *The Journal of Musicology* 39, no. 1 (2022): 35–65. <https://doi.org/10.1525/jm.2022.39.1.35>.
- "Laurie Anderson—Home studio (late 80's)—02." Posted January 10, 2009 by Aouret-VolkenVisage. YouTube, 3:56. <https://www.youtube.com/watch?v=YajQNIAY78k>.
- Lavengood, Megan. "What Makes It Sound '80s? The Yamaha DX7 Electric Piano Sound." *Journal of Popular Music Studies* 31, no. 3 (2019): 73–94. <https://doi.org/10.1525/jpms.2019.313009>.
- . "The Yamaha DX7 in Synthesizer History." Megan L. Lavengood. May 12, 2022. <https://meganlavengood.com/the-yamaha-dx7-in-synthesizer-history/>.
- Laxton, Susan. *Surrealism at Play*. Durham, NC: Duke University Press, 2019.
- Leete, Norm. "Fairlight Computer Musical Instrument (Retro)." *Sound on Sound*, April 1999. <https://web.archive.org/web/20150403163110/http://www.soundonsound.com/sos/apr99/articles/fairlight.html>.
- Leppert, Richard. *The Sight of Sound: Music, Representation, and the History of the Body*. Berkeley: University of California Press, 1993.
- Levine, Steve, and J. William Mauchly. "The Fairlight Computer Music Instrument." In *Proceedings of the 1980 International Computer Music Conference*, 565–73. San Francisco: Computer Music Association, 1980.
- Lipsitz, George. *Time Passages: Collective Memory and American Popular Culture*. Minneapolis: University of Minnesota Press, 1990.
- Lo, Yun-Kiu. "Idols Living in the Virtual: The Authentication of VTuber's Persona through Sound and Music in Digital Realm." *Journal of Sound and Music in Games* 6, no. 2 (2025): 96–121. <https://doi.org/10.1525/jsmg.2025.6.2.96>.
- Lorde, Audre. *The Master's Tools Will Never Dismantle the Master's House*. London: Penguin Classics, 2018.
- Loughridge, Deirdre. *Sounding Human: Music and Machines, 1740/2020*. Chicago: University of Chicago Press, 2024.
- Love, Joanna K. *Soda Goes Pop: Pepsi-Cola Advertising and Popular Music*. Ann Arbor: University of Michigan Press, 2019.
- Loviglio, Jason. *Radio's Intimate Public: Network Broadcasting and Mass-Mediated Democracy*. Minneapolis: University of Minnesota Press, 2005.
- Loza, Susana. "Sampling (Hetero)Sexuality: Diva-ness and Discipline in Electronic Dance Music." *Popular Music* 20, no. 3 (2001): 349–57.
- Lynch, Joe. "Hyperpop Pops Off." *Billboard*, June 5, 2021.
- MacDonald, Cameron. "The Alien Resonances and Queer Obscurities of Hyperpop's 100 geecs." *Journal of Popular Music Studies* 36, no. 2 (2024): 76–98. <https://doi.org/10.1525/jpms.2024.36.2.76>.
- MacDonald, Scott. *A Critical Cinema 5: Interviews with Independent Filmmakers*. Berkeley: University of California Press, 2006.
- Maler, Anabel. *Seeing Voices: Analyzing Sign Language Music*. New York: Oxford University Press, 2024.
- Manning, Erin. *Always More Than One: Individuation's Dance*. Durham, NC: Duke University Press, 2013.
- Manuel, Peter. "The Rosalía Polemic: Defining Genre Boundaries and Legitimacy in Flamenco." *Ethnomusicology* 65, no. 1 (2021): 32–61. <https://doi.org/10.5406/ethnomusicology.65.1.0032>.

- March, Lucy. "‘Wrap You Up in My Blue Hair’: Vocaloid, Hyperpop, and Identity in ‘Ashnikko Feat. Hatsune Miku—Daisy 2.0.’" *Television & New Media* 24, no. 8 (2022): 894–910. <https://doi.org/10.1177/15274764221093599>.
- Marks, Laura U. *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses*. Durham, NC: Duke University Press, 2000.
- Marr, D. Organ, US Patent 1,762,274A, filed October 20, 1926 and issued June 10, 1930. <https://patents.google.com/patent/US1762274A/en?q=1%2C762%2C274+>.
- Marshall, Kingsley, and Rupert Loydell. "Control and Surrender: Eno Remixed—Collaboration and *Oblique Strategies*." In *Brian Eno: Oblique Music*, edited by Sean Albiez and David Pattie, 175–92. London: Bloomsbury Academic, 2016.
- Marshall, Owen. "Auto-Tune In Situ: Digital Vocal Correction and Conversational Repair." In *Critical Approaches to the Production of Music and Sound*, edited by Samantha Bennett and Eliot Bates, 175–92. New York: Bloomsbury Academic, 2018.
- Master Key to Auto Radio*, brochure. July 1, 1962. Radio Advertising Bureau, Broadcast Pamphlet #3018, HE 8689.4.A1. National Association of Broadcaster Archives, University of Maryland Libraries.
- Matsutoya, Mari. "Joining the Dots—Sketching the Outlines of a Floating Girl." In *Looking at Music*, edited by Lina Brion and Detlef Diederichsen, 39–53. Leipzig, Germany: Spector Books, 2021.
- Maurice, Alice. *The Cinema and Its Shadow: Race and Technology in Early Cinema*. Minneapolis: University of Minnesota Press, 2013.
- Mauss, Marcel. "Techniques of the Body." *Economy and Society* 2, no. 1 (1973): 70–88. <https://doi.org/10.1080/03085147300000003>.
- McClary, Susan. *Feminine Endings: Music, Gender, and Sexuality*. Minneapolis: University of Minnesota Press, 1991.
- McDermott, Emily. "In the Studio: Holly Herndon." *Art in America*, 2020.
- McGrath, John. "The Return to Craft: Taylor Swift, Nostalgia, and Covid-19." *Popular Music and Society* 46 no. 1 (2022): 70–84. <https://doi.org/10.1080/03007766.2022.2156761>.
- McKittrick, Katherine, and Alexander G. Weheliye. "808s and Heartbreak." *Propter Nos* 2, no. 1 (2017): 13–42. <https://doi.org/10.2307/jj.6695549.16>.
- McLean, Craig. "Lady Gaga on Tony Bennett: ‘I’ve Been Controlled for Years. He Liberates Me.’" *Telegraph* (UK), September 8, 2014.
- McLeod, Ken. "Living in the Immaterial World: Holograms and Spirituality in Recent Popular Music." *Popular Music and Society* 39, no. 5 (2016): 501–15. <https://doi.org/10.1080/03007766.2015.1065624>.
- . *Driving Identities: At the Intersection of Popular Music and Automotive Culture*. New York: Routledge, 2020.
- McPherson, Tara. "Reload: Liveness, Mobility, and the Web." In *New Media, Old Media: A History and Theory Reader*, edited by Wendy Hui Kyong Chun and Thomas Keenan, 199–208. New York: Routledge, 2006.
- Meizel, Katherine. *Multivocality: Singing on the Borders of Identity*. New York: Oxford University Press, 2020.
- Messbauer, Sarah. "As Time Goes By: Car Radio and the Travel Experience in Twentieth-Century America." *Current Musicology* 101 (Fall 2017): 7–23. <https://doi.org/10.7916/cm.voi101.5361>.
- Michaud, Alyssa. *Automatic Artistry: Negotiating Musical Creativity in a Technological Age*. Berkeley: University of California Press, 2026.

- Mills, Mara, and Jonathan Sterne. *Tuning Time: Sequences from the History of Time Stretching and Pitch Shifting*. Forthcoming.
- Monkman, Francis. "Sampling Synths." *Electronic Soundmaker & Computer Music* 1, no. 62 (October 1983). <https://www.muzines.co.uk/articles/sampling-synths/3159>.
- Moog, Bob. "Wendy Carlos: New Directions for a Synthesizer Pioneer." *Keyboard*, November 1982. https://www.wendycarlos.com/other/PDF-Files/KbdInterview-82*.pdf.
- . "Some of Bob Moog's Comments." The Switched-On Boxed Set. October 26, 1999. <https://www.wendycarlos.com/+sobox.html#moog%20new>.
- Moore, Thurston. *Mix Tape: The Art of Cassette Culture*. New York: Universe, 2005.
- Morris, David Z. "Cars with the Boom: Identity and Territory in American Postwar Automobile Sound." *Technology and Culture* 55, no. 2 (2014): 326–53. <https://doi.org/10.1353/tech.2014.0044>.
- Morris, Mitchell. *The Persistence of Sentiment: Display and Feeling in Popular Music of the 1970s*. Berkeley: University of California Press, 2013.
- Morrison, Matthew D. *Blacksound: Making Race and Popular Music in the United States*. Berkeley: University of California Press, 2024.
- Morse, Margaret. "Postsynchronizing Rock Music and TV." *Journal of Communication Inquiry* 10, no. 1 (January 1986): 15–28. <https://doi.org/10.1177/019685998601000102>.
- . "An Ontology of Everyday Distraction: The Freeway, the Mall, and Television." In *Logics of Television: Essays in Cultural Criticism*, edited by Patricia Mellencamp, 193–221. Bloomington: Indiana University Press, 1990.
- Mowitt, John. "The Sound of Music in the Era of its Electronic Reproducibility." In *The Sound Studies Reader*, edited by Jonathan Sterne, 213–24. New York: Routledge, 2012.
- Mulvey, Laura. "Visual Pleasure and Narrative Cinema." *Screen* (London) 16, no. 3 (1975): 6–18. <https://doi.org/10.1093/screen/16.3.6>.
- Muñoz, José Esteban. "'The White to Be Angry': Vaginal Davis's Terrorist Drag." *Social Text* 52/53, nos. 3 and 4 (1997): 80–103. <https://doi.org/10.2307/466735>.
- . *Disidentifications: Queers of Color and the Performance of Politics*. Minneapolis: University of Minnesota Press, 1999.
- . *Cruising Utopia: The Then and There of Queer Futurity*. New York: New York University Press, 2009.
- "The Music and SFX of Forbidden Planet." Posted April 22, 2012 by Rod Abernethy—Composer. YouTube, 3:22. Clips taken from *Amazing! Exploring the Far Reaches of Forbidden Planet*. <https://www.youtube.com/watch?v=YSFoILcyqAU>.
- Nakamura, Lisa. *Digitizing Race: Visual Cultures of the Internet*. Minneapolis: University of Minnesota Press, 2008.
- . "Indigenous Circuits: Navajo Women and the Racialization of Early Electronic Manufacture." *American Quarterly* 66, no. 4 (2014): 919–41. <http://www.jstor.org/stable/43823177>.
- National Association of Broadcasters. *Radio: Always in Tune with You*. May 5, 1959. Box 18, pamphlet 1244. National Association of Broadcaster Archives, University of Maryland Libraries.
- Neal, Jocelyn R. "'That's Why You Have to Stream the Re-Records': Copyright, Messaging, and Fan Engagement in Taylor Swift's Re-Recording Project." In *Taylor Swift: The Star, the Songs, the Fans*, edited by Christa Anne Bentley, Kate Galloway, and Paula Clare Harper, 82–94. New York: Routledge, 2025.

- Ngai, Sianne. *Ugly Feelings*. Cambridge, MA: Harvard University Press, 2004.
- Ng Man Chuen, Caitlyn. "Girl-Instrument: Posthumanism, Producers, and Virtual Performers in Japanese Music." *International Journal of Cultural Studies* 28, no. 2 (2025): 481–96. <https://doi.org/10.1177/13678779241273459>.
- . *Theory of the Gimmick: Aesthetic Judgment and Capitalist Form*. Cambridge, MA: Harvard University Press, 2020.
- Niebur, Louis. "Delia Derbyshire: An Examination of Selected Film and Television Scores." In *Women's Music for the Screen: Diverse Narratives in Sound*, edited by Felicity Wilcox, 35–46. New York: Routledge, 2021.
- Noble, Safiya U. *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: New York University Press, 2018.
- "Orchestra for Sale?" advertisement. *Keyboard*, February 1982, 15. <http://retrosynthads.blogspot.com/2011/10/fairlight-cmi-orchestra-for-sale-ad.html>.
- "Oskar Sala—Mixtur-Trautonium—Klang und Verwendung." Posted December 9, 2010 by Trautonist. YouTube, 5:13. Clip taken from *Musikinstrumente und ihre Geschichte*. Originally broadcast 1986. NDR. <https://www.youtube.com/watch?v=uaWrdbvhg1Q>.
- Osterweil, Ara. *Flesh Cinema: The Corporeal Turn in American Avant-Garde Film*. Manchester, UK: Manchester University Press, 2014.
- . "Radio Daze: Why Ken Jacobs' Blonde Cobra Still Matters." *C Magazine*, Summer 2016.
- Oteri, Frank. "Wendy's World," *New Music Box*, April 2007.
- Ovalle, Priscilla Peña. *Dance and the Hollywood Latina: Race, Sex, and Stardom*. New Brunswick, NJ: Rutgers University Press, 2011.
- Packer, Jeremy. *Mobility without Mayhem: Safety, Cars, and Citizenship*. Durham, NC: Duke University Press, 2007.
- Packer, Jeremy, and Kathleen F. Oswald. "From Windscreen to Widescreen: Screening Technologies and Mobile Communication." *Communication Review* 13, no. 4 (2010): 309–39. <https://doi.org/10.1080/10714421.2010.525478>.
- Palmer, Landon. "Do the Loud Thing: The Boombox and Urban Space in 1980s American Cinema," *Journal of Cinema and Media Studies* 61, no. 5 (2021–22): 59–85. <https://doi.org/10.1353/cj.2021.0083>.
- Parisi, David Harlan. *Archaeologies of Touch Interfacing with Haptics from Electricity to Computing*. Minneapolis: University of Minnesota Press, 2018.
- Parkinson, Claire, and Isabelle Labrouillère, eds. *A Critical Companion to Christopher Nolan*. Lanham, MD: Lexington Books, 2024.
- Parks, Lisa. *Cultures in Orbit: Satellites and the Televisual*. Durham, NC: Duke University Press, 2005.
- Paterson, Mark. *The Senses of Touch Haptics, Affects and Technologies*. Oxford: Berg, 2007.
- Patteson, Thomas. "Player Piano." In *Oxford Handbook Online*. Oxford: Oxford University Press, 2014. <https://doi.org/10.1093/oxfordhb/9780199935321.013.16>.
- . *Instruments for New Music: Sound, Technology, and Modernism*. Oakland: University of California Press, 2016.
- PBS Nova Science NOW. "Auto-Tune." June 30, 2009. PBS, 6:51. <http://www.pbs.org/wgbh/nova/tech/auto-tune.html>.
- Pelly, Liz. *Mood Machine: The Rise of Spotify and the Costs of the Perfect Playlist*. New York: One Signal Publishers/Atria, 2025.

- Peraino, Judith A. "Synthesizing Difference: The Queer Circuits of Early Synthpop." In *Rethinking Difference in Music Scholarship*, edited by Olivia Bloechl, Melanie Lowe, and Jeffrey Kallberg, 287–314. Cambridge: Cambridge University Press, 2014.
- "Perfected Automobile Radio Demanded by Traveling Public of America." *Radio-Electrical Record*, February 1932.
- "Peter Gabriel and Fairlight CMI—Les Enfants du Rock—French TV." Posted October 22, 2024 by Discothèques Souterraines 77–86 (80s Alternative). YouTube, 7:18. <https://www.youtube.com/watch?v=zWovNue7ZxQ>.
- "Peter Vogel and Thomas Dolby on the Impact of the Fairlight CMI." Posted February 29, 2012 by MatrixSynth. YouTube, 57:19. From *Big Ideas*. Australian Broadcasting Company. <https://www.youtube.com/watch?v=afzw6B5apxk>.
- Philips, Chuck. "Milli Vanilli's Grammy Rescinded by Academy." *LA Times*, November 20, 1990.
- Pinch, Trevor. "Why You Go to a Music Store to Buy a Synthesizer: Path Dependence and the Social Construction of Technology." In *Path Dependence and Creation*, edited by Peter Karnøe and Raghu Garud, 381–99. New York: Psychology Press, 2001.
- Pinch, Trevor, and Karin Bijsterveld. "Sound Studies: New Technologies and Music." *Social Studies of Science* 34, no. 5 (2004): 635–48. <https://doi.org/10.1177/0306312704047615>.
- Pinch, Trevor, and Frank Trocco. *Analog Days: The Invention and Impact of the Moog Synthesizer*. Cambridge, MA: Harvard University Press, 2002.
- Plant, Sadie. *Zeros + Ones: Digital Women + the New Technoculture*. New York: Doubleday, 1997.
- Plotnick, Rachel. "Force, Flatness and Touch without Feeling: Thinking Historically about Haptics and Buttons." *New Media & Society* 19, no. 10 (2017): 1632–52. <https://doi.org/10.1177/1461444817717510>.
- . *Power Button: A History of Pleasure, Panic, and the Politics of Pushing*. Cambridge, MA: MIT Press, 2018.
- . "Time's Up for Screens in Cars. All Hail the Button." *Toronto Star*, January 17, 2025. https://www.thestar.com/opinion/contributors/times-up-for-screens-in-cars-all-hail-the-button/article_30ca9778-d286-11ef-bee7-8b2a59fc49ca.html.
- Powers, Ann. "If There's One Star to 'Believe' in, It's Cher." *Morning Star* (UK), July 9, 1999.
- Preve, Francis. "Sound Design: Airy Pads." *Electronic Musician* 36, no. 8 (August 2020): 58–60.
- Prince, Stephen. *Digital Visual Effects in Cinema: The Seduction of Reality*. New Brunswick, NJ: Rutgers University Press, 2012.
- Print description for *Christmas on Earth*, dir. Barbara Rubin, 1963. Anthology Film Archives, New York, NY.
- "Programming Patterns: The Story of the Jacquard Loom." Science and Industry Museum. June 25, 2019. <https://www.scienceandindustrymuseum.org.uk/objects-and-stories/jacquard-loom>.
- Provenzano, Catherine. "Emotional Signals: Digital Tuning Software and the Meanings of Pop Voices." PhD diss., New York University, 2018.
- . "Auto-Tune, Labor, and the Pop-Music Voice." In *The Relentless Pursuit of Tone: Timbre in Popular Music*, edited by Robert Fink, Melinda Latour, and Zachary Wallmark, 159–82. New York: Oxford University Press, 2018.

- . *Emotional Signals: Auto-Tune, Melodyne, and the Cultural Politics of Pitch Correction*. Ann Arbor: University of Michigan Press, forthcoming.
- Puricelli, Rob. "David Vorhaus—That Fairlight Sound!" *Electronic Music* podcast, episode 2. June 16, 2020. *Sound on Sound*. <https://www.soundonsound.com/people/david-vorhaus-podcast>.
- Puskar, Jason Robert. *The Switch: An Off and On History of Digital Humans*. Minneapolis: University of Minnesota Press, 2023.
- "Q + A with Suzanne Ciani: Coca Cola Pop & Pour." Gearspace. November 2016. <https://gearspace.com/board/q-a-with-suzanne-ciani/1125031-coca-cola-pop-amp-pour.html>.
- "Q&A: Settings." Kasane Teto Official Site. Accessed March 19, 2025. https://web.archive.org/web/20230325062252/https://kasaneteto.jp/about_qa3.html.
- "Race after Technology: Ruha Benjamin." Meeting minutes, Old Guard of Princeton, NJ. November 14, 2018. <https://www.theoldguardofprinceton.org/11-14-2018.html>.
- Rangan, Pooja. "In Defense of Voicelessness: The Matter of the Voice and the Films of Leslie Thornton." *Feminist Media Histories* 1, no. 3 (2015): 95–126. <https://doi.org/10.1525/fmh.2015.1.3.95>.
- Rapée, Ernő. *Erno Rapee's Encyclopaedia of Music for Pictures*. New York: Belwin, 1925.
- Reed, S. Alexander. *Assimilate: A Critical History of Industrial Music*. New York: Oxford University Press, 2013.
- . *Laurie Anderson's "Big Science"*. New York: Oxford University Press, 2022.
- Regelson, Rosalyn. "Where Are 'the Chelsea Girls' Taking Us?" *New York Times*, September 24, 1967.
- Reynaldo, Shawn. "Suzanne Ciani: Diva of the Diode." *Resident Advisor*, April 8, 2016. <https://ra.co/features/2594>.
- Reynolds, Ann. "A History of Failure." *Criticism* 56, no. 2 (2014): 187–209. <https://doi.org/10.13110/criticism.56.2.018>.
- Reynolds, Simon, Charlie Harding, and Nate Sloan. "Do You Believe in Life After Auto-Tune?" *Switched on Pop* podcast, episode 102. January 22, 2019. <https://switchedonpop.com/episodes/102-do-you-believe-in-life-after-autotune?rq=autotune>.
- Richardson, John. "The Digital Won't Let Me Go: Constructions of the Virtual and the Real in Gorillaz' 'Clint Eastwood.'" *Journal of Popular Music Studies* 17, no. 1 (2005): 1–29. <https://doi.org/10.1111/j.1524-2226.2005.00031.x>.
- Riddle, Diallo, and LUXXURY. "Sly and the Family Stone's 'Thank You' with Novena Carmel." *One Song* podcast. March 19, 2025.
- "Rock School—Series 2—Episode 2 (part 3 of 3)." Posted July 19, 2008 by n. YouTube, 9:02. Clip taken from *Rockschool*. Originally broadcast November 11, 1987. BBC. <https://www.youtube.com/watch?v=HMUOcteHQCQ>.
- Rodgers, Tara. *Pink Noises: Women on Electronic Music and Sound*. Durham, NC: Duke University Press, 2010.
- Romo, Vanessa. "Grimes Invites Fans to Make Songs with an AI-Generated Version of Her Voice." NPR. April 24, 2023. <https://www.npr.org/2023/04/24/1171738670/grimes-ai-songs-voice>.
- Rose, Tricia. *Black Noise: Rap Music and Black Culture in Contemporary America*. Hanover, NH: Wesleyan University Press, 1994.

- Rosental, Claude. *The Demonstration Society*. Translated by Catherine Porter. Cambridge, MA: MIT Press, 2021.
- Rossi, Umberto. "Acousmatic Presences: From DJs to Talk-Radio Hosts in American Fiction, Cinema, and Drama." *Mosaic: A Journal for the Interdisciplinary Study of Literature* 42, no. 1 (2009): 83–98. <http://www.jstor.org/stable/44030653>.
- Royster, Francesca. *Black Country Music: Listening for Revolutions*. Austin: University of Texas Press, 2022.
- Rubin, Barbara. *Christmas on Earth* projection instructions, ca. 1965, in *Film Culture 80: The Legend of Barbara Rubin*. From *The Film-Maker's Cooperative Catalogue*, no. 3. Leipzig: Spector Books, 2018.
- Russo, Alexander. *Points on the Dial: Golden Age Radio beyond the Networks*. Durham, NC: Duke University Press, 2010.
- Sam, Jordan Hugh, and Craig L. Robertson. "Navigating Identity, Timbre, and Tradition: A Conversation about the HBCU Choral Experience." In *Routledge Companion to Voice and Identity*, edited by Amy Skjerseeth, Freya Jarman, and Naomi André. New York: Routledge, 2026.
- Sandoval, Denise M. "Lowriders." In *The Oxford Encyclopedia of Latinos and Latinas in the United States*, edited by Suzanne Oboler and Deena J. González, 20–23. New York: Oxford University Press, 2005.
- Satz, Aura. "She Recalibrates: A Series of Lenticular Drawings." 2018. <https://www.iamanagram.com/SheRecalibrates.php>.
- Schiller, Patricia. "Effects of Mass Media on the Sexual Behavior of Adolescent Females." In *Technical Report of the Commission on Obscenity and Pornography*. Vol. 1. Washington, DC: Government Printing Office, 1971.
- Schloss, Joseph G. *Making Beats: The Art of Sample-Based Hip-Hop*. Middletown, CT: Wesleyan University Press, 2004.
- Searcy, Maureen. "A Pattern of Progress: How an Automated Loom Inspired the Earliest Computer Inventors." *Inquiry*, Fall 2016, *UChicago Magazine*. <https://mag.uchicago.edu/science-medicine/pattern-progress>.
- Shaviro, Steven. "Supa Dupa Fly: Black Women as Cyborgs in Hip-hop Videos." *Quarterly Review of Film and Video* 22, no. 2 (2005): 169–79. <https://doi.org/10.1080/10509200590921962>.
- "'She Can't Sing': Rosalía Poses as a Reporter." *CE Noticias Financieras English*, March 20, 2022.
- Shepherd, Julianne Escobedo. "Work Hard, Play Hard: How Rosalía Makes Her Music." *Pitchfork*, May 18, 2022. <https://pitchfork.com/features/interview/rosalia-on-motomami-songwriting-fame/>.
- Shewey, Don. "The Performing Artistry of Laurie Anderson," *New York Times*, February 6, 1983. <https://www.nytimes.com/1983/02/06/magazine/the-performing-artistry-of-laurie-anderson.html>.
- Shi Xinran, and Masashi Shirabe. "The Acceptance of the Fairlight CMI in Japan and its Influence on the Japanese Music Scene." *Commons* 2024, no. 3 (2024): 135–61. https://doi.org/10.57298/commons.2024.3_135.
- SiriusXM, "Keshia Feels 'Cosmically Connected' to T-Pain." April 23, 2025. YouTube, 1:37. <https://www.youtube.com/watch?v=gjoGiY5Drk>.
- Sitney, P. Adams. *Visionary Film: The American Avant-Garde, 1943–2000*. Oxford: Oxford University Press, [1974] 2002.

- Skjerseth, Amy. "Electric Ladies in Playback: The Android Antecedents of Janelle Monáe's *Dirty Computer*." *Music, Sound and the Moving Image* 16, no. 1 (2022): 1–27. <https://doi.org/10.3828/msmi.2022.1>.
- . "Podcast Reenactments and the Sonics of Fictionalization from Cher to Swift." *Journal of Popular Music Studies* 35, no. 4 (December 2023): 34–53.
- . "The Voice Modification Menagerie: From Ducks to Chipmunks, Automata to Auto-Tune." In *The Oxford Handbook of Media Vocality*, edited by Lisa Coulthard, Colleen Montgomery, and Katherine Spring. Forthcoming.
- Spiegel, Laurie. "Thoughts on Composing with Algorithms." In *The Oxford Handbook of Algorithmic Music*, edited by Roger T. Dean and Alex McLean, 105–12. New York: Oxford University Press, 2018. <https://doi.org/10.1093/oxfordhb/9780190226992.013.26>.
- Stanyek, Jason, and Benjamin Piekut. "Deadness: Technologies of the Intermundane." *TDR: The Drama Review* 54, no. 1 (2010): 14–38. <https://doi.org/10.1162/dram.2010.54.1.14>.
- Stargate Studios. "Stargate Studios Virtual Backlot Reel 2009." December 17, 2009. YouTube, 3:58. <https://www.youtube.com/watch?v=clnozSXyF4k>.
- Steinberg, Marc. "Converging Contents and Platforms: Niconico Video and Japan's Media Mix Ecology." In *Asian Video Cultures: In the Penumbra of the Global*, edited by Joshua Neves and Bhaskar Sarkar, 91–113. Durham, NC: Duke University Press, 2017.
- Steinbock, Eliza. "The Wavering Line of Foreground and Background: A Proposal for the Schematic Analysis of Trans Visual Culture." *Journal for Visual Culture* 19, no. 2 (2020): 171–83. <https://doi.org/10.1177/1470412920944480>.
- Sterne, Jonathan. *The Audible Past: Cultural Origins of Sound Reproduction*. Durham, NC: Duke University Press, 2003.
- . *MP3: The Meaning of a Format*. Durham, NC: Duke University Press, 2012.
- . "Spectral Objects: On the Fetish Character of Music Technologies." In *Sound Objects*, edited by James A. Steintrager and Rey Chow, 94–109. Durham, NC: Duke University Press, 2018.
- . *Diminished Faculties: A Political Phenomenology of Impairment*. Durham, NC: Duke University Press, 2021.
- Stewart, Tom. "The Story of SARARR." Failed Muso. February 12, 2012. <https://www.failedmuso.com/the-story-of-sararr/>.
- Stoever, Jennifer Lynn. *The Sonic Color Line: Race and the Cultural Politics of Listening*. New York: New York University Press, 2016.
- Stoever-Ackerman, Jennifer. "Reproducing U.S. Citizenship in 'Blackboard Jungle': Race, Cold War Liberalism, and the Tape Recorder." *American Quarterly* 63, no. 3 (2011): 781–806. <https://doi.org/10.1353/aq.2011.0044>.
- Strachan, Robert. *Sonic Technologies: Popular Music, Digital Culture and the Creative Process*. New York: Bloomsbury Academic, 2017.
- Strauss, Neil. "Cher Resurrected, Again, by a Hit: The Long, Hard but Serendipitous Road to 'Believe.'" *New York Times*, March 11, 1999.
- Suárez, Juan A. "Pop, Queer, or Fascist? The Ambiguity of Mass Culture in Kenneth Anger's *Scorpio Rising*." In *Experimental Cinema: The Film Reader*, edited by Wheeler Winston Dixon and Audrey Foster, 115–38. London: Routledge, 2002.
- "Suzanne Ciani." Red Bull Music Academy. 2016. <https://www.redbullmusicacademy.com/lectures/suzanne-ciani-lecture>.

- "Suzanne Ciani on the David Letterman Show." Posted July 9, 2009 by Suzanne Ciani. YouTube, 8:45. Clip taken from *The David Letterman Show*, season 1, episode 9. Aired August 14, 1980. NBC. <https://www.youtube.com/watch?v=fZscRHkLMto>.
- "Suzanne Ciani on Modular Synthesis & The Buchla 200e." *Composer Magazine*, January 10, 2020. <https://composer.spitfireaudio.com/en/articles/suzanne-ciani-on-modular-synthesis-the-buchla-200e>.
- Szabo, Victor. *Turn On, Tune In, Drift Off: Ambient Music's Psychedelic Past*. Oxford: Oxford University Press, 2022.
- Tamm, Eric. *Brian Eno: His Music and the Vertical Color of Sound*. New York: Da Capo, 1995.
- Tape Notes Podcast. "Charli XCX on Auto-Tune: When and When Not To Use | ft. George Daniel & A.G. Cook, 'BRAT.'" June 23, 2024. YouTube, 7:43. <https://www.youtube.com/watch?v=GJ1o84s9cM>.
- Tasker, Yvonne. *Working Girls: Gender and Sexuality in Popular Cinema*. London: Routledge, 1998.
- Taylor, Mark, and Brian Rawling. "Recording Cher's 'Believe.'" *Sound on Sound*, February 1999. <https://www.soundonsound.com/techniques/recording-cher-believe>.
- Taylor, Timothy Dean. *Music and Capitalism: A History of the Present*. Chicago: University of Chicago Press, 2016.
- Th  berge, Paul. *Any Sound You Can Imagine: Making Music/Consuming Technology*. Middletown, CT: Wesleyan University Press, 1997.
- Thompson, Ahmir "Questlove," and Ben Greenman. *Mo' Meta Blues: The World According to Questlove*. Reprint ed. New York: Grand Central Publishing/Hachette Book Group, 2015.
- Tilden, Imogen. "How We Made Art of Noise's Close (to the Edit)." *Guardian*, July 3, 2018. <https://www.theguardian.com/music/2018/jul/03/how-we-made-art-of-noise-close-to-the-edit-anne-dudley-paul-morley>.
- Tillet, Salamishah. "Strange Sampling: Nina Simone and Her Hip-Hop Children." *American Quarterly* 66, no. 1 (2014): 119–37. <http://www.jstor.org/stable/43823399>.
- Tingen, Paul. "Fairlight: The Whole Story," *Audio Media*, January 1996. <http://www.enerd.com/fairlight/fairlightstory.htm>.
- . "Inside Track: The Weeknd, Secrets of the Mix Engineers: Carlo 'Illangelo' Montagnese." *Sound on Sound*, December 2015. <https://www.soundonsound.com/techniques/inside-track-weeknd>.
- Tompkins, Dave. *How to Wreck a Nice Beach: The Vocoder from World War II to Hip-Hop: The Machine Speaks*. Brooklyn: Melville House, 2010.
- . "The Vocoder: From Speech-Scrambling to Robot Rock." NPR. May 13, 2010. <https://www.npr.org/templates/story/story.php?storyId=126781688>.
- Tongson, Karen. *Normporn: Queer Viewers and the TV That Soothes Us*. New York: New York University Press, 2023.
- Toop, David. *The Rap Attack: African Jive to New York Hip Hop*. London: Pluto Press, 1984.
- Torres, Eric. "11 Song Moments We Just Can't Shake." *Pitchfork*, August 18, 2021. <https://pitchfork.com/features/lists-and-guides/song-moments-we-just-cant-shake/>.
- Truffaut, Fran  ois. *Hitchcock*. London: Faber & Faber, 2017.
- Tudahl, Duane. *Prince and the Purple Rain Era Studio Sessions: 1983 and 1984*. Lanham, MD: Rowman & Littlefield, 2018.

- Turner, Madeline Murphy. "What Women Write: Artist's Books, Postal Objects, and Independent Theater in Mexico City (1979–92)." PhD diss., New York University, 2023.
- . "Confronting the Monster: The Antipatriarchal Mail Art of Polvo de Gallina Negra and Magali Lara in 1980s Mexico." *Latin American and Latinx Visual Culture* 6, no. 4 (October 2024): 45–64. <https://doi.org/10.1525/lavc.2024.6.4.45>.
- Urry, John. "The 'System' of Automobility." *Theory, Culture & Society* 21, nos. 4–5 (2004): 25–39.
- Valdés, Adriana. "Eugenio Dittborn: From the 1970s to the Present." *post*. May 27, 2015. <https://post.moma.org/eugenio-dittborn-from-the-1970s-to-the-present/>.
- Valéry, Paul. "De la Diction des Vers." In *Oeuvres II*, edited by Jean Hytier, 1253–59. Bibliothèque de la Pléiade. Paris: Gallimard, 1960.
- Veal, Michael. *Dub: Soundscapes and Shattered Songs in Jamaican Reggae*. Middletown, CT: Wesleyan University Press, 2007.
- Verma, Neil. *Theater of the Mind: Imagination, Aesthetics, and American Radio Drama*. Chicago: University of Chicago Press, 2012.
- Vernallis, Carol. *Experiencing Music Video: Aesthetics and Cultural Context*. New York: Columbia University Press, 2004.
- Vesey, Alyx. "Playing in the Closet: Female Rock Musicians, Fashion, and Citational Feminism." In *Emergent Feminisms: Complicating a Postfeminist Media Culture*, edited by Jessalynn Keller and Maureen E. Ryan, 73–89. New York: Routledge, 2018.
- Vigo, Edgardo Antonio, and Horacio Zabala. "Arte-Correo: Una nueva forma de expresión." *post* (blog). Museum of Modern Art, April 29, 2014 [written January 1976]. <https://post.moma.org/distance-communication-edgardo-antonio-vigos-writings-on-mail-art-1975-1981/>.
- Vincent, James. "Tom Cruise Deepfake Creator Says Public Shouldn't Be Worried about 'One-Click Fakes.'" *The Verge*. March 5, 2021. <https://www.theverge.com/2021/3/5/22314980/tom-cruise-deepfake-tiktok-videos-ai-impersonator-chris-ume-miles-fisher>.
- Waksman, Steve. *Instruments of Desire: The Electric Guitar and the Shaping of Musical Experience*. Cambridge, MA: Harvard University Press, 1999.
- Wall, Tim, and Nick Webber. "Changing Cultural Coordinates: The Transistor Radio and Space, Time, and Identity." In *The Oxford Handbook of Mobile Music Studies*, edited by Sumanth Gopinath and Jason Stanyek, 118–31. Vol. 1. Oxford: Oxford University Press, 2014.
- Wang, Oliver. "Sly Stone, the Original Rhythm King." *Medium*. January 11, 2015. <https://medium.com/cuepoint/sly-stone-the-original-rhythm-king-da29241897b5>.
- Wang, Steffanee. "Kendrick Lamar's 'The Heart Part 5' Deepfakes Are Connected to Its Lyrics." *Nylon*, May 9, 2022. <https://www.nylon.com/entertainment/kendrick-lamar-kanye-deep-fakes-heart-part-5-meanings>.
- Warhurst, Myf. "Which Aussie Invention Changed the Sound of Pop Music?" Australian Broadcasting Corporation. October 25, 2018. <https://www.abc.net.au/radio/programs/myf-warhurst/peter-vogel/10429544>.
- Watkins, Mel. *On the Real Side: A History of African American Comedy*. Chicago: Lawrence Hill Books, 1999.
- Weheliye, Alexander G. "'Feenin': Posthuman Voices in Contemporary Black Popular Music." *Social Text* 20, no. 2 (2002): 21–47. https://doi.org/10.1215/01642472-20-2_71-21.
- . *Phonographies: Grooves in Sonic Afro-Modernity*. Durham, NC: Duke University Press, 2005.

- Weisbard, Eric. *Top 40 Democracy: The Rival Mainstreams of American Music*. Chicago: University of Chicago Press, 2014.
- . “Amy Skjerseth with Catherine Provenzano, Instrumental Presets: The Visible Past of Music Technology.” April 23, 2025. YouTube, 1:16:41. Popular Music Books in Process series. <https://www.youtube.com/watch?v=vGdvYClpVLQ>.
- “Wendy Carlos Interview 1989 BBC Two.” Posted September 3, 2019 by Automatic_Bazooti. YouTube, 4:09. From *Horizon*. Originally broadcast 1989. BBC Two. <https://www.youtube.com/watch?v=Z3cab5IcCy8&t=111s>.
- Werde, Bill. “Could I Get That Song in Elvis, Please.” *New York Times*, November 23, 2003. <http://www.nytimes.com/2003/11/23/arts/music/23WERD.html>.
- Westhoff, Ben. *Dirty South: Outkast, Lil Wayne, Soulja Boy, and the Southern Rappers Who Reinvented Hip-Hop*. Chicago: Chicago Review Press, 2011.
- Wielk, Peter. “Fairlight CMI IIX Sound Library, Revision 1.3.” Fairlight Instruments Australia. 1982. https://archive.org/details/fairlight_cmi_iix_factory_sounds/page/n1/mode/2up.
- Wiener, Norbert. *The Human Use of Human Beings: Cybernetics and Society*. Boston: Houghton Mifflin, 1950.
- Williams, Justin A. “‘Cars with the Boom’: Music, Automobility, and Hip-Hop ‘Sub’ Cultures.” In *The Oxford Handbook of Mobile Music Studies*, edited by Sumanth Gopinath and Jason Stanyek, 109–45. Vol. 2. Oxford: Oxford University Press, 2014.
- Wilson, William S. “Ray Johnson and Dick Higgins: Reciprocities.” *Journal of Black Mountain College Studies* 8 (July 2015). <https://www.blackmountaincollege.org/volume8/ray-johnson-and-dick-higgins-reciprocities-by-bill-wilson/>.
- Wolfer, Bill. “Stevie—That Girl: That Song, and That Sound.” May 6, 2025. YouTube, 9:43. <https://www.youtube.com/watch?v=PRYoNUZtDU>.
- Womack, Ytasha. *Afrofuturism: The World of Black Sci-Fi and Fantasy Culture*. Chicago: Independent Publishers Group, 2013.
- Wong, Deborah Anne. *Louder and Faster: Pain, Joy, and the Body Politic in Asian American Taiko*. Oakland: University of California Press, 2019.
- Worby, Robert. “Turn On, Tune In: John Cage’s Symphony for 12 Radios.” *Guardian*, August 6, 2009. <https://www.theguardian.com/music/2009/aug/06/john-cage-symphony-for-radios>.
- Wright, Carol. “Only Human: Touching the Significance.” Wendy Carlos [website]. March 2001. <https://www.wendycarlos.com/onlyhuman.html>.
- Yamaha. *DX7 Operating Manual*. Hamamatsu, Japan: Nippon Gakki, 1983. https://usa.yamaha.com/files/download/other_assets/9/333979/DX7E1.pdf.
- . *Authorized Product Manual: DX7: Digital Programmable Algorithm Synthesizer*. Buena Park, CA: Yamaha Corporation of America, 1999. <https://archive.org/details/synthmanual-yamaha-dx-7-owners-manual/page/n71/mode/2up>.
- Young, Kevin. “Classic Keyboards: Canadian Musician’s 2017 Focus on the Keys.” *Canadian Musician* 39, no. 4 (July/August 2017): 49–57.
- Young, Miriama. *Singing the Body Electric: The Human Voice and Sound Technology*. Farnham, UK: Ashgate, 2015.
- Zaborowski, Rafal. “Hatsune Miku and Japanese Virtual Idols.” *The Oxford Handbook of Music and Virtuality*, edited by Sheila Whiteley and Shara Rambarran, 111–28. Oxford: Oxford University Press, 2016.

- . “Fans Negotiating Performer Personas: ‘Melt’ by Ryo feat. Hatsune Miku.” *Suomen Antropologi* 43, no. 2 (Summer 2018): 104–8. <https://doi.org/10.30676/jfas.v43i2.77708>.
- . “Virtual (Idol) Audiences: Canon, Fanon, and Multivocality in Vocaloid Cultures.” In *The Routledge Companion to Media Audiences*, edited by Peter Lunt and Annette Hill, 222–33. New York: Routledge, 2025.
- Zamecnik, J. S. *Sam Fox Moving Picture Music*. Cleveland, OH: Sam Fox, [1913] 1923. <https://www.loc.gov/item/2020563955/>.
- Zeitlin-Wu, Lida. “Mama Don’t Take My Chromophobia Away.” *Los Angeles Review of Books*. February 4, 2026.
- Zien, Katherine. “On Performance, Liminality, and Normativity.” *Journal of Dramatic Theory and Criticism* 39, no. 1 (2024): 45–72. <https://doi.org/10.1353/dtc.2024.a951644>.
- Zuboff, Shoshana. “‘We Make Them Dance’: Surveillance Capitalism, the Rise of Instrumentarian Power, and the Threat to Human Rights.” In *Human Rights in the Age of Platforms*, edited by Rikke Frank Jørgensen, 3–51. Cambridge, MA: MIT Press, 2019.
- . “The Coup We Are Not Talking About.” *New York Times*, 2021. <https://www.nytimes.com/2021/01/29/opinion/sunday/facebook-surveillance-society-technology.html>.

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