

::: Material Listening Manifesto ::: by Lincoln Hancock ::: May 31, 2010 :::

Graphic design was once integral to the culture of recorded music. From Reid Miles' work at Blue Note in the 1950s, through Aubrey Powell and Storm Thorgerson's surreal escapades at Hipgnosis, to Peter Saville's groundbreaking reappropriations for Factory, the images and text that decorated a record's sleeve framed the entry to an encounter. In the best instances, album covers served as visual inductions into the specific logic of the sounds the packages contained.

But the oft-romanticized vinyl LP and its cover were never strictly visual phenomena. The flutter of cellophane, the smell of paperboard and ink, the sticky gloss varnish, the static crackle emanating from the imperfection of the analog playback process — these are the grace notes of the undeniable physicality, particularity, and material richness of an encounter with a slab of vinyl.

Material, here, has a specific connotation. An artifact's materiality supports the creation, sustenance, and transfer of meaning in and through human encounters with it. As described by literary theorist N. Katherine Hayles,¹ *materiality* implies an awareness of an artifact's substantial physical qualities, as well as all its incumbent, human-touched intentions, motivations, and associations. An artifact's materiality, then, becomes a sort of substrate onto which we make the emotional-historical imprints that characterize value.

Here, a more complex picture begins to emerge. A vinyl LP, as a material cultural artifact, indicates and refers not only to itself (as manufactured physical product) but also to the specific time and place it was acquired, the older brother who passed it down, the carefully constructed mix tape of which it was part, the lingering kiss for which it provided a soundtrack. This loose association of physical attributes and connotative expressions refers to what we shall call "material listening." From the perspective of material listening, significant aspects of past music culture are not coextensive with or reducible to the album cover. There is more to the story.

Today's computer-based digital music collections make few nods toward material listening. The prevailing mode of experience in contemporary digital culture, in fact, is purposefully distanced from the particular, personal contexts that support connotative associations and emotional-historical resonance. Interfaces for digital music listening prioritize database-driven models of efficiency and quick sorting. The aesthetics of these interfaces are derived almost entirely from tried-and-true HCI paradigms — menu-based selection, filtering, and sorting — already stretched uncomfortably to accommodate emergent screen-based practices.

¹ In *Writing Machines* (London: The MIT Press, 2002), among other works.

::: Material Listening Manifesto

Traditional GUI schema dictate organizational principles perhaps appropriate for simple text and numerical data, but which fail to support an end-listener's experience with a rich, multivalent cultural presence like music.

In today's digital music-listening interfaces, particular artifacts ideally are pristine, ideal copies — endlessly replaceable and duplicable. These systems regard the abstracted audio file as the essence of the listening experience. But while the sonic quality of a digitally remastered recording encoded with a high-quality compression algorithm might rival or exceed vinyl, the artifact is not ontologically equivalent.² A digital audio file lacks a certain coherence as an artifact. Like chimera, songs and albums appear in today's interfaces, absolutely impenetrable and interchangeable. But where, and what, are they? Digital files in themselves have no material quality; they provide no shelter or support for the emotional projection in which we must engage when we commit to an evaluation of a thing. Yet contemporary interfaces do seem to assume that an audio file and a lo-res JPEG of an album cover can substitute for the material experience of a record. When designed databases and interfaces fail to support material listening, music is disembodied and ruptured from the seat of meaning. Remanded to an abstract prison like some scorned General Zod³, it has no real way to make contact with the world.

It's not news that music is struggling to adapt to life in the digital era. The industry as a whole has been on the ropes for a decade.⁴ But the real loss threatens to be much broader — the value proposition of one of our greatest cultural productions is being compromised by design decisions that have traded visual and material richness for quickness, quantity and convenience. As Brian Eno observes in a recent BBC4 Documentary, "music doesn't play an ideological role" in the lives of today's youth — "the currency is devalued." What young people today enjoy about music, he suggests, is not so much the music, but the communal experience of it, the pleasure of exchange.⁵ In some ways, such a shift is the inevitable outcome of the way music is represented by current digital interfaces. Stripped of its natural physical anchor, its

² I employ an ontological perspective here to emphasize that the question is of the comprehensive status and presence of the artifact in the world, rather than a selective inquiry regarding a particular attribute of its existence. I do not take on essentialist arguments about the nature of music, but suggest that culturally and experientially our relationships with it are conditioned by the embodied ways in which we encounter it.

³ Dru-Zod was a Kryptonian enemy of Superman who was sent the Phantom Zone — an alternate prison dimension discovered by Jor-El. See <http://www.zod2008.com>.

⁴ See Johnston, Maura. "Music Sales Are In Free Fall Right Now, and That Fact Still Matters." *Sound of the City: The Village Voice Blogs*. 15 Apr. 2010. Web. 30 Apr. 2010. <http://blogs.villagevoice.com/music/archives/2010/04/music_sales_are.php>.

⁵ *Brian Eno: Another Green World*. Dir. Nicola Roberts. Perf. Brian Eno, Richard Dawkins, Malcolm Gladwell, Steve Lilywhite, David Whittaker. BBC Four, 2010. Film.

::: Material Listening Manifesto

ontological status is reduced to rough equivalence with all the other free, disposable, and replaceable data on our machines.

The cultural shift Eno describes is not altogether lamentable, to be sure. We can celebrate the growth in socially-oriented exchange enabled by our digital devices and networked environments. But this exchange need not preclude the possibility of material resonance in artifacts swapped, shared, published. Recent critical and speculative essays on cultures of exchange centering around archaic formats like cassettes and CD-Rs point to a reemergent interest in music's physical dimension, and nostalgic fetishism not only of album art but of the imperfect media of eras past.⁶ Taken in context of the general decline in music's presumed value, these writings reinforce the notion that contemporary digital culture lacks some crucial ability to support certain kinds of personal connections with its artifacts. Without the emotional-historical anchor of a material listening experience, the character of our relationships with our music artifacts and collections is fundamentally compromised.⁷ Materiality is supportive of meaning, memory, and expressive associative connotations; digital files, in and of themselves, are impersonal, impregnable, interchangeable, and unable to carry specific significance.

How might design reintroduce materiality into digital music culture? The answer lies somewhere beyond the present array of interface options, generally limited to simple displays of album cover images and psychedelic visualizers. Desktop and mobile devices are exponentially more powerful than they were even a few years ago, yet interface designs yield to paradigms established in the early days of the computer. Technological barriers to graphically-intensive representations and simulations no longer should thwart the ambitions of designers. But what logic should we follow? What frameworks can provide guidance as designers begin to rethink experiences with cultural interfaces?⁸

⁶ See Tom Ewing, "Poptimist #26," <http://pitchfork.com/features/poptimist/7772-poptimist-26/>; Hegarty, Paul, "The Hallucinatory Life of Tape," *Culture Machine*, <http://www.culturemachine.net/index.php/cm/article/viewArticle/82/67>; Hogan, Marc, "This Is Not a Mixtape," <http://pitchfork.com/features/articles/7764-this-is-not-a-mixtape/>; Straw, Will, "The Music CD and Its Ends." *Design and Culture* 1.1 (2009): 79-91.

⁷ A parallel might seem to reside in e-books. But even the most basic e-reader or word processing program works to reintroduce material affordances into the user's encounter with that file — formatting, simple text-based graphical representations, and page-turning animations anchor the appearance of digitally remediated text data to the materiality of the screen or device. Music, on the other hand, per its primary status as audio, does not seem to demand any particular representational strategy. The use of a text-based GUI [such as iTunes] to support a musical encounter does not manifest materiality. It is an incidental strategy that seeks to hide the interface rather than incorporate the music into its being. Materiality implies a productive ontological relationship between an interface and its content — text is an empty indicator in the cultural context of music.

⁸ As described by Lev Manovich in *The Language of New Media*, a cultural interface is an interface designed specifically for interaction with cultural data, e.g., music, art, film, books. "In short, we are no longer interfacing to a computer but to culture encoded in digital form" (69-70).

::: Material Listening Manifesto

A Haylesian take on materiality begins to stake the conceptual terrain within which we might re-envision the cultural interface. Materiality, Hayles proposes, “offers a robust conceptual framework in which to talk about both representation and simulation as well as the constraints and enablings they entail” (6). In an interview with Lisa Gitelman for the *Iowa Journal of Cultural Studies* in 2002, she argues, further, that “meaning emerges from material engagements with the rich resources of a physically vibrant world as it is crafted through artistic practices and instantiated in artifactual objects and processes.” In Haylesian terms, to propose that a digital album or song should appear as a *material* artifact points at the kinds of connotative associations we might want to accommodate in an onscreen encounter. Instead of an abstract entity represented by a standard text-based GUI, designers working with materiality in mind might imagine an interface in which digital artifacts become hypertexts — manifold centers of gravity around which all sorts of related subjects, voices, and associations swirl. Indeed, the behaviors afforded by such an interface might indicate heretofore unseen aspects of materiality in the artifacts of music culture.

But what does it mean to talk about materiality within the confines of a medium that is, essentially, a simulation? (Baudrillard grappled with this issue in terms of the *hyperreal*). Søren Pold, a Danish researcher and writer on digital interface aesthetics, explains how aesthetic realism in an interface culture⁹ elevates the ontological status of the digital encounter. Pold argues that the interface is “an aesthetic form in itself,” ontologically and epistemologically significant and worthy of consideration as an “aesthetic, cultural, and ideological object” (2005, 6). He contrasts this perspective with the prevailing mindset of HCI, which regards the interface as strictly functional and ideally transparent.

In *Remediation*, Jay David Bolter and Richard Grusin insist on the reality of the mediations that increasingly comprise our experience in the modern world. New media employ layer upon layer of increasingly advanced technology in order (paradoxically) to bring users closer to immediate, authentic experience. Remediation is an ongoing process of refashioning and reinterpreting cultural productions and prior media. It is marked by what Bolter and Grusin call a “double logic”: “Our culture wants both to multiply its media and erase all traces of mediation: ideally, it wants to erase its media in the very act of multiplying them” (5). What this means is that new digital media “oscillate between immediacy and hypermediacy, between transparency and opacity,” in order to draw one closer to the “real,” and simultaneously to suspend one in rapt attention of the technology that makes this particular genre of experience possible. But as technology proceeds, and we move farther from unadulterated encounters with the real, we cannot accept the possibility of full, resonant encounters eternally fading from

⁹ Pold takes the term “interface culture” from Steven Johnson, and uses it to refer to the fact that, in the digital age, the interface is not only the primary cultural form, but also the essential point of intersection between humanity and technology (2010).

view or eluding our grasp. Bolter and Grusin observe, in the realms of modern art (58-59) and rock music (42), for instance, how notions of authenticity and immediacy (as cognitive characteristics of encounters with the real) have come to refer to and celebrate hypermediated constructions like finely crafted studio and stage productions and nonrepresentational painting. Contemporary examples from the art world reinforce their point, as video and digital work frequently takes hypermediation as its calling card and subject of exploration. But at base, establishing the ontological status of mediated experiences within simulations supports the proposition of locating materiality in a digital encounter. Material aspects of a screen-based interface are not, then, reducible to the haptic and physical qualities of a device. The resonance of a human-digital encounter is informed and conditioned by the representational and behavioral strategies that comprise the design of the interface that supports the experience.

How might oscillating representational strategies of transparent immediacy and dense hypermediacy play out and balance productively in a digital interface designed to afford a material encounter with a cultural artifact like a music recording? Bolter and Grusin situate this question within a historical discourse that acknowledges the relationship between new media and its predecessors. The challenge for design, then, is to refashion resonant aspects of material encounters with physical music artifacts and collections into a digital interface that supports authentic experience. *Authentic* experience can be read in terms of the notion of *embodiment* articulated by HCI researcher Paul Dourish and others: since we are, in fact, embodied consciousnesses, we perceive, encounter, create, and sustain meaning in our engaged interactions with the world. The process of refashioning the resonant aspects of physical culture into screen-based digital experiences is not simply a matter of image-based representational strategy — it must take into account the embodied nature of our understanding and relationships with meaning.

Dourish's notion of embodiment locates meaning in the mutual relationship between our activities and the world. It does not establish particular guidelines for design, but rather elucidates general principles in terms of a conceptual framework within which design might take into account an embodied perspective on interaction. "The core idea of an embodied interface is the ability to turn action into meaning," he says (183) — a new system through which we encounter cultural artifacts like music, then, should take into account that meaning is not passively transmitted from the system to us. It should reflect and locate the user in a spatiotemporal relationship to the world it represents, and establish the user as an active agent in that world. It is precisely through our interaction with such a system that we understand how it works, and what it is, dynamically and in context. Dourish's perspective complements Bolter and Grusin in that it demands we consider not only remedial strategies

::: Material Listening Manifesto

of representation as we design interfaces, but also the kinds of affordances that best leverage our “familiarity and facility with the everyday world” (17). Emerging multitouch technologies in tablet computers (like the iPad) provide opportunities for designers to enhance both the material aspects of encounters with digital representations of cultural artifacts and our embodied interactions with them.

Hypothetically, a new genre of interface might become an immaterial-material substrate, supporting meaningful exchange through embodied interaction, placing a user in potent, agency-filled relationships with digital representations of music. Current models of interaction do not afford this kind of reciprocal relationship. iTunes, for instance, relies primarily on adaptive, customizable reconfigurations of hierarchically structured data, and is not designed to prompt or support a rich interaction with any particular artifact. It prioritizes database functionality at the expense of embodied interaction. The text-based iTunes GUI assumes that the system's meaning is contained within the database, and that the interaction patterns best suited for encounters with music are related to traditional filtering and selection. In other words, iTunes does not encourage or afford a reflective, spatiotemporal understanding wherein relationships, associations, and outcomes are unveiled in the midst of an encounter. It privileges the all-at-once, endlessly permutable and reconfigurable dataspace of the computer over the particular, subjective experience of the user. And, as I argued earlier, it is precisely that particular material experience that supports resonant encounters with music artifacts and is thus at the root of music's value proposition in our culture.

To be fair, Apple developers seem to be aware that a richer visual approach might improve the quality of the user experience in iTunes. They have introduced new aesthetic approaches with each revision of the software, including the recent iTunes LP (which attempts to reinstate the digital album's presence as a package containing photos, liner notes, lyrics, and videos). These alternative view options have added some color to what was initially an aesthetically drab experience, but none have fundamentally altered the logic of the interface. The Cover Flow GUI, for instance, though neatly and efficiently animated, provides only momentary cover for traditional database interaction patterns. Collections remain at arm's length, ordered in a list (which can be sorted according to various criteria). From this list one selects the file to be read (which stands in for the act of “playing a song”). Cover Flow has little to contribute to the micro-level encounter with any particular artifact in a user's library; one can look, admire from a distance, and perhaps briefly pretend that the artifacts presented are “true signifiers,”¹⁰ but within the GUI they cannot be independently accessed, examined, moved, manually sorted or

¹⁰ Andrew Coulter Enright, Cover Flow's designer, suggested in a 2004 blog post that within this system “the cover image isn't a feature of the album/song, the image is the album/song and consequently the cover is the music. It becomes a true signifier as opposed to a decoration.”

grouped. The user's agency, when compared to a material interaction with a physical artifact, is severely diminished.

iTunes LP, though focused on a particular album experience and packed with content, remains entrenched in retrogressive GUI aesthetics. The visual cues and presentation of material in the LP environment actually resemble boilerplate DVD menu design. Against album-specific background wallpaper, menus appear which govern page-based navigation. Classic albums in iTunes LP come across almost as if they've been rebranded for a theme park ride. Splashy logos and identity systems prevail. No longer do you own a copy of *The Doors* — you enter *Doorsworld*, where every aspect of your experience is governed by some perverse Morrisonian logic. Yet behind the gloss, iTunes LP relies heavily on the same linear, hierarchical file structure that weighs down the standard iTunes interface. To reintroduce a resonant model of materiality and support for embodied interaction will require more than a fresh coat of paint.

What might it mean for an interface actively to address and engage its materiality? What kinds of interactions might be described as embodied? Cover Flow offers an integrated spatial arena for interaction, but its limited conception of agency keeps a user at bay. When an interface design inadvertently precludes a user from cognitively entering its simulation, a spell is broken. The subtle magic and suspension of disbelief that enables an interface to oscillate between representation and reality is the precondition for digital materiality. Without an impression of materiality, there is a rupture in our technocultural world. We are alienated from our devices, which suddenly appear intangible and tenuous. Our ability to experience things in and through their interfaces is compromised. In terms of cultural interfaces, this proposition is frightening — if we let technology hamper our ability to embrace the products of our culture, we risk losing hold on that which makes us human. Embodied interaction offers a way to navigate this terrain. It cues us to devise ways to seduce a user into the reality of a representation by designing interfaces that shift playfully between showing and being. Aylish Wood observes that embodiment “involves taking on a spatio-temporal orientation in the world... experienced as an ability to act directly and meaningfully on that world” (116). Our interfaces need, at crucial moments, to reflect our embodied presences in order to ground us in our centers of consciousness and human agency (the loci of valuation and meaning-making).¹¹

New multitouch application designs for mobile devices such as the iPhone and iPad are leading the way in terms of forging constructive play between representation and reality. Some of the most popular applications for the iPhone evince concern and appreciation for materiality and

¹¹ Jay David Bolter and Diane Gromala argue this point in *Windows and Mirrors: Interaction Design, Digital Art, and the Myth of Transparency* (2005): “the most compelling interfaces will make the user aware of her contexts and, in the process, redefine (them)” (27).

embodied interaction that goes beyond what we've yet seen on our desktop machines.¹² Emblematic of these is Hipstamatic. In contrast with the integrated iPhone camera, which is a transparent interface marked by a single button,¹³ Hipstamatic hypermediates the act of taking pictures with the device. Upon launching the app, a user's iPhone effectively *becomes* a camera. The representation onscreen recreates an original Hipstamatic 100 (which was an eight-dollar plastic camera from the early 1980s). The behavioral logic of the interface is specific to the customs and affordances of the iPhone — through simple directional swipes in particular contexts, a user unveils the operation of the device. Superficially accurate representations of various lenses, film canisters, and flashes are selectable options. The way the parts of the simulated camera rotate and selectively reveal and hide specific information orients and grounds the user as she participates in the encounter. Patterns and combinations explored over time yield qualitatively different outcomes and provide context-specific feedback.

Certainly some credit for the success of the Hipstamatic app must go to the design and material character of the iPhone platform — Apple's device effectively acts as a cipher for each application it hosts. Yet software and hardware work in concert to produce an experience. Hipstamatic exploits this dualism by integrating its material representations and interface behaviors with the physical constraints and affordances of the device on which it lives. The app intentionally evokes a play of reality and representation. It oscillates between these modalities to gently lead a user into a mindspace where she is fully aware of the device qua device, yet simultaneously and immediately able to engage her imagination and interact with the app's simulation in an emotionally gratifying way.

Looking closer, we can see how the visual design of the Hipstamatic interface maintains a sort of *productive ambiguity* in the impression it imparts.¹⁴ First, the app effectively represents a simulated dimensional object — the camera appears actually to have a front and back, and both sides are interactive. Importantly, this representational strategy allows the interface to oscillate between representation as such, and actually *becoming* the thing represented. The Hipstamatic app exploits the intangibility and ambiguity of the screen to shift the user productively between reflective and transparent modes of engagement. Looking *through* the interface to submenus of text-based information, the user coincides with considered, higher-

¹² Perhaps this is appropriate, given that the proximity and scale of interaction on a handheld device might lend itself to more intimacy.

¹³ The iPhone's integrated camera does feature an animation of a shutter closing when the photo button is depressed. This moment is clearly a nod to materiality, but Hipstamatic goes farther and is more effective at creating an embodied interaction, I argue.

¹⁴ I borrow the phrase "productive ambiguity" from Jon Caramanica of *The New York Times*, who used it to describe a play between reality and representation in a recent video by rapper Rick Ross (2009).

::: Material Listening Manifesto

order goals; looking *at* the interface, believing its representation and cognitively engaging with the simulation, the user is immediately present and prereflectively involved. The interface's ontological status is established in this dialectical play. It is supported by the fact that what is represented is not purely decorative or inconsequential to the encounter that occurs in its presence. The functionality of the representation lures a user to engage with the simulation, granting a suspension of disbelief that opens the door to emotional immediacy. Merely *showing* the front and back sides of a camera, to be sure, would not yield the same effect — it is the integration of representation, functionality, and reflective, contextual orientation into the image that makes the simulation sustainable.

The materiality of the interface emerges from this integration of representation, function, and reflective orientation. At any moment in the interface encounter, a user's embodied presence is reinforced by the hidden side of the camera, which asserts its reality from the darkness precisely through its integrated necessity in terms of the experience as a whole. The spatiotemporal character of the encounter is psychically grounding and cognitively reassuring. This type of playful oscillation, as an interactive principle, stands in stark contrast to the standard GUI, which seeks to remain transparent and ideally to make every functionality accessible to the user from every vantage.

Finally, the Hipstamatic app leverages the host device's physical constraints to reinforce the simulation's material impression: processing delays are masked behind meters indicating elapsed time "warming up," "developing" and "printing." The peculiarities of the images produced by iPhone's low fidelity VGA camera further the Hipstamatic's surprising and evocative photographic outcomes. Yet the affordances of the digital medium mean the Hipstamatic does not burden a user with the mechanical, chemical incumbencies of past photographic process — all the permutations of lenses, flashes, films, and shooting conditions that might challenge an amateur confronting a physical camera are neutralized by a digital experience that makes learning playful and efficient. All these representational and behavioral strategies foreground the physical construction, content, and intent of the interface — its *materiality*. But it is the interface's careful articulation of a play between showing and being that makes for a compelling simulation into which we want to enter, and within which we are rewarded on our own embodied terms.

From the foregoing it should be abundantly clear that a mere audio file in a database, accompanied by a lonely JPEG of an album cover, is insufficient on its own to support a resonant encounter with digital music. For material listening implies that we don't just listen to music — we encounter it within the greater contexts of our lives, as a cultural phenomenon

rich with connotative and emotional-historical resonance.¹⁵ The current shape of the digital music encounter, however, lacks basic structural support for the creation, sustenance, and transference of value. Conceptual frameworks like Hayles' materiality and Dourish's embodied interaction point to behavioral and representational strategies that can lead designers towards systems that will reinstate the value proposition of music in the digital environment.

It should be clear that these frameworks do not foreground the particular content of the system behind the interface. In a hyper-networked world, we no longer want for content — whatever we need is always already accessible. Additionally, contemporary interfaces collect information about our habits of use, about particular occurrences, about relationships intentionally and unknowingly forged through pattern and chance.¹⁶ Networked music interfaces can serve as portals into other kinds of data about particular recordings, groups, equipment, cultural milieus, and particular music scenes from which sounds originate. And new information environments provide real-time exchange with other listeners and fans. Increasingly powerful and mobile devices offer an endlessly permutable space for visual representation of data that can be tracked, tagged, and associated with digital audio files. Imminent file types such as MusicDNA — a dynamically-updating XML wrapper for a standard audio file — will soon ensure access to more of this kind of information than we can yet fathom.

It will be up to designers to decide whether this data will be leveraged into value, or will further obscure the possibility of resonant encounters with digital music. More is not necessarily better. The focus on behavioral and representational strategies implied by Hayles' and Dourish's notions is a factor of a broader recognition that the *kind* of content we need is *meaningful* content — and meaning is not contained within a system so much as created and revealed through its use. Moving forward, the question for designers of cultural interfaces is not so much “what should we put in the system?” but rather, “how and when should the system show us what we need and want to know and experience?”

Interfaces designed to manage and facilitate encounters with digital music artifacts and collections must acknowledge the roles materiality and embodiment play in our personal understandings, appraisals and valuations. Even when cultural artifacts are digital files, the

¹⁵ Vivian Sobchack evokes a similar argument concerning embodiment and film: “We do not experience any movie only with our eyes. We see and comprehend and feel films with our entire bodily beings, informed by the full history and knowledge of our sensorium. Vision is not isolated from our other senses. Whatever its particular capacities and discriminations, vision is only one modality of my lived body's access to the world and only one means of making the world of objects and others sensible – that is, meaningful – to me. Vision may be the sense most privileged in cinema, with hearing a close second; nonetheless, I do not leave my capacity to touch or to smell or to taste at the door, nor, once in the theater, do I devote these senses only to my popcorn” (64-65).

¹⁶ Music-listening environments like iTunes, Pandora, and Last.fm channel this information into predictive algorithms that suggest playlists, purchases and mixes.

::: Material Listening Manifesto

systems through which we encounter them should function to reflect our uniquely human attachments and ways of knowing, providing spaces within which our specific experiences can accrue and accrete into meaning.¹⁷ Part of this project involves exploration of the ways in which a music listening experience might create and maintain the kind of careful play between showing and being that entices a user cognitively to engage with a simulation. I suggest that representations should never be *just* representations — they populate the manipulable world the interface creates, and provide the functional hypertextual connectivity that supports a personalized experience, rich with connotative associations and expressions. Enhanced by such play, the interface is always simultaneously something to be looked at and looked through. A screen-based encounter with a cultural artifact in some ways may never rival a physical interaction — it is impossible for a screen to reproduce the myriad sensations and physical cues of an experience in the analog world. But as cultural artifacts are increasingly remediated into digital lives, we must believe that there is an emergent materiality and possibility for embodied interaction with the screen. Design can provide the structure for a digital experience with recorded music supported by the embodied presence of the listener and the materiality of the artifact. This is the essence of material listening.

¹⁷ To use an expression taken from Peter Lunenfeld in his manuscript for the forthcoming *The Secret War Between Downloading and Uploading: Among Other Tales of the Computer as Our Culture Machine*.

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::: Material Listening Manifesto

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