Museum Making:  
Creating with New Technologies in Art Museums  

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Submitted to the Program in Comparative Media Studies/Writing in partial fulfillment of the requirements for the degree of Master of Science in Comparative Media Studies at the Massachusetts Institute of Technology.  

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ABSTRACT

Hackathons, maker spaces, R&D labs: these terms are common to the world of technology, but have only recently seeped into museums. The last few years have witnessed a wave of art museum initiatives that invite audiences—from casual visitors to professional artists and technologists—to take the reins of creative production using emerging technologies.

The goals of this thesis are threefold. First, I situate this trend, which I call “museum making,” within two historical narratives: the legacy of museums as sites for art making and the birth of hacker and maker cultures. These two lineages—histories of art-based and technology-based creative production—are part of a larger participatory ethos prevalent today. A second goal of this thesis is to document museum making initiatives as they emerge, with an eye to how staff members at museums are able to develop such programs despite limited financial, technological, or institutional support or knowledge. Finally, I critically examine how museum making may or may not challenge traditional structures of power in museums. Museum making embodies a tension between the desire to make the museum a more open and equitable space—both by inviting creators into the museum, and by welcoming newer forms of creative production that might not align with today’s art world—and the need to maintain institutions’ authority as arbiters of culture.

My analysis draws on a wide range of fields, including sociology, educational theory, media studies, museum studies, and art theory. This thesis is informed by extensive fieldwork conducted at three sites: the Los Angeles County Museum of Art’s Art + Technology Lab, a program that awards artist grants and mentorship from individuals and technology companies such as Google and SpaceX; the Metropolitan Museum of Art’s Media Lab, an innovation lab
that invites members of New York’s creative technology community to develop prototypes for and based on the museum experience; and the Peabody Essex Museum’s Maker Lounge, an ingallery space in which visitors are invited to tinker with high and low technologies.

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Acknowledgments

“Art worlds, rather than artists, make works of art.” With these words, Howard Becker argued that creative production is not the result of lone genius but is rather predicated on coordinated networks of people, ideas, and resources. Like art, this thesis would not have been possible without a network of individuals who have provided me feedback, inspiration, and moral support during the agonizing two years we call “grad school.”

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Introduction

On October 28, 2013, a small but fiery debate raged on Twitter. At the epicenter of the discussions was an image of Jonathan Monaghan’s *Leda and the Marsyas*, an object the artist created by 3D scanning two works in the Metropolitan Museum of Art’s collection, combining them in modeling software, and then 3D printing the resultant model. He created this work during the 2012 Met 3D Hackathon, an event in which participants were invited to learn from curators about certain works in the collection and then experiment with digital technologies. Art critic Lee Rosenbaum (@culturegrrrl)—frequent writer for publications such as the *New York Times* and the *Wall Street Journal*—wrote on Twitter that these “hokey digital mashups...seem contrary to the Met’s authenticity-centered mission,” “run counter to promoting deeper understanding of the works in @MetMuseum’s collection,” and are “sacilege.” Others came to the defense of such projects. For example, museum consultant Koven J. Smith described Monaghan’s piece as “winking irreverence” and said Rosenbaum’s tweet implied that “there is but one legitimate way of promoting ‘deep understanding.’”

Monaghan’s *Leda and the Marsyas* is just one outcome of an emerging trend in which art museums are sites for creative production with new technologies. Since 2012, the Walters Art Museum—known more for its elaborately illuminated manuscripts from the Middle Ages than
high-tech happenings—has held a yearly hackathon that invites Baltimore-area folks to build software projects using the museum’s collection data. In October 2013, the Art Institute of Chicago launched its Museum3D project, a yearlong series of programming that explored how 3D technologies might be able used to engage visitors with the art on view. And 2014 witnessed the birth of NEW INC, a startup incubator run by the New Museum of Contemporary Art in New York City.

These undertakings are part of what I call “museum making.” Over the last few years, art museums have begun to invite audiences to experiment and create with emerging technologies. For some, like Koven Smith, museum making represents an opening up of museums from the authority they have traditionally imposed on what constitutes as high culture; for critic Lee Rosenbaum, it threatens the very core of what makes museums important. Museum making challenges what we might think of an art museum’s modus operandi: the museum becomes not only a site of art display, but also a site of creative production; additionally, the museum is not a steward of the past but also engages with forward-thinking technologies.

Non-art museums, such as science centers and children’s museums, have long experimented with new technologies, and often at a faster pace than their art counterparts. However, this project looks specifically at art museums because museum making brings up interesting questions about what is aesthetically and culturally valuable. Museums serve as cultural gatekeepers, deciding what is worthy of being displayed and preserved. What does it mean to invite audiences to create, especially when they are making things that don’t look like what is on the gallery walls? Serving as cultural gatekeepers is one of the many—and at times competing—roles of a museum. These roles include the selection and display of exemplary objects, the preservation of our artistic past, the promotion of research and scholarship, and the
education of public audiences. (The educative function of museums is itself a complex notion related to power and cultural authority—exactly what are they teaching? Should art museums instill a particular sense of taste and aesthetic values? Are they meant to “uplift” the masses by teaching them which cultural objects are worthy of appreciation, as museums in the Progressive Era endeavored? Or should they allow for a multiplicity of viewpoints in line with postmodern beliefs?) George Hein identifies three different framings to which museums have historically aligned themselves: sites for public education, as championed by the Smithsonian Institution's George Brown Goode (1851-96); temples for the contemplation of aesthetic beauty, as supported by the Boston Museum of Fine Arts' Benjamin Ives Gilman (1852-1933); or, as pioneered by the Newark Museum's John Cotton Dana (1856-1929), organizations that have a social responsibility to its audiences. ¹ The goals of museums have also shifted over time. Stephen Weil argues that, starting in the second half of the twentieth century, American museums continued to display and preserve objects, but much of their efforts now focused on the experience of the visitor.² Lisa Roberts identifies a parallel and closely related shift in museums from merely showing objects to interpreting them.³ Similarly, Hilde Hein has written about how museums have shifted from an “object-centered” perspective to a “story-centered” one.⁴

The current wave of art and technology projects is a recent one, having emerged only in the past few years. I find it particularly appropriate to examine this phenomenon as a student working at MIT, a major force in (and arguably the birthplace of) hacker and maker “cultures,”

and more specifically in the Media Lab, which often bills itself as situated at the intersection of cutting-edge technology and art. As museum making initiatives have only been adopted in art museums recently, it strikes me an excellent opportunity to trace the historical precedents of these initiatives, while also documenting how museum making develops and imagining its implications for the future of these institutions. Although this is a specific movement happening right now, the debates around it address broader questions: Who gets to make cultural and art objects? Who gets to bestow aesthetic value on these new forms of art? How do change and innovation happen in cultural institutions?

Two sociologists of art form the twin theoretical pillars of this thesis, which also align with my goals. In his 1982 book *Art Worlds*, Howard Becker argues that art is formed through coordinated networks that he calls an “art world.” These (often multiple and overlapping) worlds function through a series of cooperative links based on conventions that the art world agrees upon. “Art worlds, rather than artists, make works of art,” Becker asserts, contesting the notion that art is made by a single, genius artist, and instead suggesting that it is produced by an entire system. Take, for example, Pablo Picasso’s *Demoiselles d’Avignon* (1907). While Picasso is attributed as the famed painting’s creator, the artist sourced oil paints and canvas from various sellers and manufacturers, relied on the technology of oil paint to have been developed in the past, required models to pose for the painting, likely employed a studio assistant, and may have received feedback from trusted colleagues, friends, or critics. Today, the work is housed in the Museum of Modern Art in New York, where curators continue to research the work and build a narrative around it, conservators monitor its condition and restore it when necessary, and

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audiences relish in the works' layers of paint and meaning. These various cooperative links are necessary to maintain *Les Demoiselles*’ status as the modern masterpiece we believe it to be today.

When museums work with creative technologies, there are many overlapping worlds at play: low- and mid-level museum professionals might also moonlight as creative coders; professional contemporary artists who venture into the world of technology; computer programmers who rarely visit museums but now find these institutions as resources for software projects. Like Becker, I am less interested in the particular objects that are being produced through museum making programs and whether or not they are art; instead, I am interested in examining the systems of production, distribution, and reception surrounding museum making practices through sociological terms. A major goal of this thesis is to document the emergence of the museum making trend as it is happening and, in doing so, tracing the coordinated links—particularly the many people and communities behind these programs—that allow them to happen.

Sociologist Pierre Bourdieu’s writings on cultural capital and taste form the second theoretical framing for this project. (Bourdieu provides a logical foil to Becker’s art worlds: writing for the *New Yorker*, Adam Gopnik notes that, “in talking about Becker, one invariably also talks about” his French counterpart.)⁶ In *Distinction: A Social Critique of the Judgement of Taste*, first published in French in 1979, Bourdieu asserts that aesthetic taste is a mechanism for perpetuating social class. According to Bourdieu, an individual’s class influences what he or she likes and dislikes, whether food, art, or music; correspondingly, one’s cultural tastes determine—and perhaps define—which social class one belongs to. In his study, Bourdieu identifies three

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zones of taste that correspond roughly to social class: the legitimate taste of intellectuals, the ruling class, and those who have attained highest educational capital; “middle-brow” taste; and the “popular” taste of the working class. In Bourdieu’s theory, it is the dominant class that dictates aesthetic quality. The ability to recognize what is good taste is “the supreme manifestation of the discernment which defines the accomplished individual”; what is deemed as legitimate taste becomes a way to separate “those who understand and those who do not.”

When the dominant class deems something—whether a preference for a certain artist or a good wine—as legitimate, its qualities are passed off as inherent and correct; but cultural objects are, in fact, a socially constructed mechanism to maintain the power of the dominant class.

Bourdieu later builds on these ideas in *The Love of Art*, co-authored with Alain Darbel, in which he argues that museums, while ostensibly serving the public, perpetuate class distinctions based on cultural taste. He suggests that common museum features, from sumptuous neo-classical halls to the antiseptic white cube aesthetic of modern art, are meant to alienate those who do not pertain to the cultured class. Through “the tiniest details of their morphology and their organization,” these institutions “betray their true function, which is to reinforce for some the feeling of belonging and for others the feeling of exclusion.” Many studies have shown that museum visitors do fall along socio-economic and education lines, and that audiences often report finding museums intimidating or irrelevant to their everyday lives. I contend that Bourdieu’s argument is perhaps too scathing. Over the past half-century, museum thinkers and professionals have attempted to address the exclusiveness and hegemony of museums through a

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8 Ibid., 23.
wide variety of tactics, from developing programming for underserved and minority populations to acknowledging that the way they display knowledge is only one of many possible readings of knowledge. But the paradox remains: museums are institutions that rely on their position of power even when aiming to break down their own hegemony. In this thesis, I’m interested in the tension between certain museum professionals who want to make the museum a more open and equitable space—both by inviting creators into the museum, and by welcoming newer forms of creative production that might not align with the contemporary art world—while needing to maintain their own authority as arbiters of culture.

I place the start of museum making around 2012, the year that desktop 3D printing captured the imagination of the media, with magazines proclaiming that they will “change the world.” For some museum professionals attuned to the world of tech, an affordable, easy-to-use printer symbolized a wealth of possibilities: the power to replicate touchable objects from the collection; a solution to conservation problems; a window into the world of coders and makers who used technologies in creative ways. Around this time, museums began hosting hackathons that invited coders to tap into their application programming interfaces, running maker spaces in which participants could tinker with electronics, and 3D workshops in which audiences scanned collection objects and then printed them out. This is not the first time that art making programs have focused on media technologies; for example, the Hirshhorn’s Art Lab+, an after-school program, welcomes teens work in their digital lab, complete with a sound studio, green screen, and animation software. However, the particular wave of museum initiatives I’m examining takes on a different flavor: first, the technologies and communities they engage with are closely tied to

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the DIY maker movement and start-up culture; and second, these initiatives go beyond a mere a youth or educational focus and instead engage general adult amateurs and professional creators alike.

The first chapter defines key terms that guide this thesis and further explores the kinds of initiatives that fall within what I call “museum making.” To begin, I outline a typology of museum making initiatives, many of which are models that have been borrowed from the world of technology and adapted to fit the particular needs of the museum. I also consider concepts such as “art museum,” “creator,” “audiences,” and “new and emerging technologies.” In trying to define these terms, however, I demonstrate that the boundaries of these concepts are fluid.

Chapter two provides a historical perspective that traces the roots of museum making in order to understand why these initiatives have emerged now and what ideological impulses underlie them. While Bourdieu argues that institutions like educational systems and museums instill taste values and therefore perpetuate class differences, Lawrence Levine contends that the distinction between low-brow and high-brow have not always been as rigid as we currently understand them. Since their founding, museums in the United States have served as sites for art making for audiences of all skill levels. In the twentieth century, museums ceased to provide art making opportunities for adults, a move that paralleled a general shift away from amateur art practices. Today, however, museums are now again being reinvigorated as sites for creative production. I also delineate the rise of computers hackers in the 1950s and 1960s as well as their more contemporary counterparts, makers. Museum making programs superficially associate themselves with the countercultural leanings of hackers, but their ethos may, in actuality, be more in line with the mainstream makers. Finally, I discuss how both art-based and technology-based creative production are part of a larger participatory ethos prevalent today.
Chapters three, four, and five are informed by months of fieldwork at three museum sites: the Los Angeles County Museum of Art’s Art + Technology Lab, the Metropolitan Museum of Art’s Media Lab, and the Peabody Essex Museum’s Maker Lounge. These case studies represent a wide spectrum of audience engagement (from professional artists to visitors) as well as a range of institutional involvement (from programs developed by senior management to initiatives spearheaded through a more grassroots efforts). Each chapter takes on one of the three museums to frame a key issue in museum making. The goals here are twofold: in the case study section of each chapter, I’m hoping to provide an in-depth descriptive account of the particular program, while the analysis expands the discussion to larger themes within a theoretical framework.

The Los Angeles County Museum of Art’s Art + Technology Lab serves as the basis for chapter three, which examines how museums look to their missions and institutional histories to rationalize and gain support for their own technology initiatives. Launched in December 2013, the A+T Lab invites artists to apply for competitive grants of up $50,000 to work on technology-oriented projects. They also receive in-kind support and mentorship from major technology corporations such as Google, SpaceX, or augmented reality company DAQRI. The program revives the spirit of the museum’s original Art & Technology program, which from 1967 to 1971 paired renowned artists such as Claes Oldenburg and Andy Warhol with corporate partners to develop large-scale art projects. While the two other case studies may not have direct historical forebears, staff members behind museum the making programs at all three institutions strategically tap into their museum’s pasts to push their agendas forward. These examples demonstrate how museums are constantly evolving, changing their goals to fit the prevailing ideologies that underlie the contemporary social, economic, and cultural contexts.
The fourth chapter examines how technology initiatives happen in museums despite limited financial, technological, or institutional support or knowledge—in other words, how museum professionals build their own Beckerian networks of cooperative links. Since 2012, Metropolitan Museum of Art’s Media Lab has invited both visitors and artists to experiment with technologies through a variety of events, such as the 3D hackathon described above. For the Met Media Lab, a research and development-inspired wing of the museum’s digital media department—if an R&D lab can consist of only two staff members and subsist on a tight budget—inviting audiences to experiment with new technologies became a way to build capacity within constraints of time, technological knowledge, and funding. All three of the case studies in this thesis developed strategies that allow their programs to flourish despite the technological and cultural conservatism of their respective institutions.

Of course, building a system of cooperative links from the ground up does have its challenges: We witness how the Media Lab does not currently have the workflow or capacity to allow many of the technological solutions prototyped by interns and volunteers to be implemented at scale within the Metropolitan. Museum making programs are ostensibly about creating with new technologies, but often, the products of these efforts aren’t all that high-tech. In chapter five, the Maker Lounge at the Peabody Essex Museum in Salem, Massachusetts, exemplifies this idea. The Maker Lounge is an in-gallery space in which visitors are invited to tinker with high and low technologies. As opposed to a maker space, in which members usually commit to participating for long periods of time, often with the goal of creating a finished product, this lounge is tailored to fit the drop-in mentality of the casual museum visit. Even though the Lounge is encoded with the language of design and technology, often, the products that visitors create involve little to no new technologies. Museums are not able to compete with
technology production in the for-profit sector. Why, then, do museums invite people to create with technology, and what do they get out of it? In the analysis portion of this chapter, I discuss how these programs bring a technology ethos of playfulness, experimentation, and flexibility into the museum, all efforts that start to chip away at the Bourdieuan notion of the stratified, monolithic institution.

In the conclusion, I return to my theoretical frameworks—those of Becker and Bourdieu—to address two key questions. The first I mentioned earlier—how do change and innovation happen in institutions so steeped in issues of hierarchy and cultural legitimacy? And if these institutions are indeed evolving, are they becoming more open and accessible spaces? I suggest that museums should cast a critical eye toward whether their technologies initiatives are expanding what a museum can be or simply replicating existing structures of power.
CHAPTER 1
What is Museum Making?

In the bowels of the Metropolitan Museum of Art, a robotic arm drags a black felt-tip marker across a white sheet of paper, plotting out the intricate staccato lines of a seventeenth-century etching. Further north at the Peabody Essex Museum in Salem, Massachusetts, a 3D printer whirs in the background while a group of friends prototypes original designs for wearable technologies. And on the other side of the country, on a street outside of the Los Angeles County Museum of Art, an iPad reveals augmented-reality versions of LA denizens, rendered via photogrammetry, who will pause to tell you what they have lost.

These are just some of the projects under what I have identified as museum making. The kinds of works produced and experimentations being done in museum technology initiatives are diverse: tapping into many different types of technologies, produced by audiences as wide-ranging as one-time visitors to professional artists, and created in programs or events that take many forms. However, they are all emerging from a particular cultural moment in which art museums are calling upon the ethos of hackers and makers. This chapter aims to define key terms and establish what I mean by museum making. First, I explain why I chose the phrase “museum making” to describe this wave of art museum initiatives that invite audiences to create with new technologies. The term encapsulates two major goals of this thesis: to focus on the process and community behind these initiatives, rather than the technologies themselves, while
also suggesting that museums are dynamic institutions that are perpetually redefining themselves. I then outline various models that museum making programs take on, often borrowed from the world of technology but adapted to fit the constraints and needs of the museum. In the subsequent sections, I address concepts—“art museum,” “creators,” “audiences,” and “new and emerging technologies”—that are key to my definition of museum making. I ultimately complicate these concepts and demonstrate how they are fluid, socially- and contextually-constructed categorizations.

1.1 A note on language

Early in my research project, I described my topic as “creative technologies and making in art museums.” I wasn’t a fan of this phrasing. For one, it is long and unwieldy, and takes a while to decode its meaning. The museum initiatives that I was noticing are about connecting technologists, artists, and visitors interested in experimenting with technologies. I wanted a shorthand that would properly express this ethos of participation, creative production, and community.

I soon adopted “museum making,” borrowing a term from the so-called “maker” movement. The maker movement is a contemporary subculture interested in using technology for do-it-yourself projects, using strategies and technologies such as electronics, computer programming, robotics, and 3D printing, among others. While this movement has adopted the words “making” and “makers,” I think it is important to probe this word choice. Where do we draw the line between digital making and other forms of production? How are they related? Artists make things too, after all. While traditionally aligned with a certain sets of conventions
thought to be specific to the fine arts, many artists produce objects with the same processes and materials as so-called makers. In an article for Make magazine’s website, Don Undeen of the Metropolitan Museum of Art cites seventeenth-century portraitists who used a camera obscura to capture the likeness of their subjects, explaining that these individuals “availed themselves of the latest technology and tools to push their crafts to greater heights of expression.” With his mantra “all art is made by makers,” Undeen advocates to rethink making as artistic production and vice versa. In this way, my adoption of the term “museum making” serves as a nod to the more technologically-focused making movement as well as creative production more broadly defined.

The term “making” moves away from specific technologies and instead focuses more on process and people. Individuals spearheading museum initiatives often fetishize particular technologies, such as 3D printing, Google Glass, and the Oculus Rift virtual reality headset. I’m less interested in developing a technodeterminist vision of how technologies may or may not “disrupt” the museum experience and instead focusing on the people who are doing the creating. In their research on hackathons—extended events in which programmers, designers, and other individuals come together to build new technologies, sometimes around a particular theme or a problem—Willow Brugh and J. Nathan Matias suggest that the value of these events lies not in the final products but instead in the emphasis on process and community building. While the technologies that museum makers use and the products that result from their actions are important, I’m interested first and foremost in the connections between the people involved in

these initiatives, or what Howard Becker calls the coordinated network of cooperative links that forms an art world.\textsuperscript{13}

I would also like to thinking of “museum making” in a more ambiguous and metaphorical way. Not only are individuals coming to museums to make objects, but museums are being made—or remade—themselves. Writing in 1989, anthropologist Renato Rosaldo uses two metaphors, art museums and garage sales, to describe recent shifts in ethnography. Classic ethnographies, which claim to express a higher, objective truth, are like art museums, which attempt to uphold cultures as “sacred images” that “stands alone as an aesthetic object of contemplation.”\textsuperscript{14} He sees this kind of ethnography as “a relic from the colonial past” and prefers to view anthropological work as a garage sale “where cultural artifacts flow between unlikely places, and nothing is sacred, permanent, or sealed off.”\textsuperscript{15} I agree with Rosaldo in championing the shift toward recognizing ethnography as interpretation, rather than reporting hard data; however, I’d like to object to his use of metaphor. As I’ll discuss later, art museums are not static institutions, even though people often think of them that way (and even though they may be slow to change). The functions of art museums continue to be a topic of debate today, with different stakeholders believing these institutions should serve different roles. I am interested in looking at how museum making may (or may not) fit within these discussions of the functions of a museum, and how the museum making movement might shape how we see cultural institutions in the future.

\textsuperscript{13} Howard Saul Becker, \textit{Art Worlds} (Berkeley, CA: Univ of California Press, 1984).
\textsuperscript{15} Ibid., 44.
1.2 A typology of museum making

Museums are launching initiatives that outwardly look very different from their usual roster of lectures and workshops. But a lot of these seemingly new models are actually borrowed from the tech and startup world and adapted to fit the museum. In this section, I outline the kinds of structures and models that museums are adopting for their technology programming and examine how these models might be different from or similar to strategies that exist beyond the walls of the museum.

Perhaps the most common museum making initiatives are workshops and classes. Most, if not all, of the technology-based classes and workshops I’ve encountered in art museums are casual sessions that introduce participants to new technologies and somehow connect these strategies or processes to objects on view. These tend to not be rigorous professional development sessions—perhaps because other organizations have more expertise and resources to provide that kind of technology training—and instead are introductory and exploratory, with a focus on individual expression. Workshops and courses are generally incorporated into the museum’s broader suite of educational offerings. For example, each season, MoMA Teens offers one Click@MoMA session—that is, one of the four class options for teens involves an emerging technology. These programs can be one-off events or continue for an extended period of time, such as the Brooklyn Museum’s once-a-week-for-eight-weeks “Forward Thinking: 3-D Printing” course in the summer of 2014.

Hackathons are longer events, often spanning multiple days or a weekend, in which participants come together to tinker with and build new software and hardware. Attendees generally have previous knowledge, or at least a vested interest, in technology. Hackathons often
attract individuals who are already knowledgeable about or invested in software or hardware
development. Unlike classes, they are not necessarily about introducing novices to technology,
although they are sometimes based around a particular type of technology. The 3D Hackathon
(June 2012) at the Metropolitan Museum, for instance, invited digital artists to 3D scan, remix,
and print art objects. These events might also revolve around a certain data set or theme. The
Walters Art Museum’s Art Bytes hackathons (July 2012, January 2014, and January 2015) did
both: they made their collection application programming interface (API) available and asked
participants to build software that enhances the museum visitor experience. Additionally,
hackathons are often sites for people to exchange their knowledge of technologies in informal
ways, reminiscent of Wenger and Lave’s communities of practice framework, in which
individuals organize around a craft or a profession to achieve intangible goals such as the
communication of knowledge, a shared identity, and a sense of community.16 While not quite a
hackathon, nor hosted by a museum, the Volumetric Society’s Hardware Hacklab is a recurring
event in which people come together to work on art-related technology projects; I attended a
session in which I witnessed participants sharing strategies, trying out the new Kinect 2 motion
controller, and providing feedback on each other’s projects.

Maker spaces—also variably known as hacker spaces, hacklabs, fabrication labs (or
fablabs)—are permanent community workspaces where people can tinker and develop tech-
related projects. Think of a studio, but instead of paint and charcoal, the space is equipped with
laser cutters, 3D printers, and microcontrollers. Maker spaces aren’t all technology all the time:
these sites often combine old and new technologies (for example, the Makerspace Playbook

recommends tools from hot glue guns to pinking shears), and art museum versions of such spaces often incorporate traditional visual art materials. Some museums' maker spaces are open to the general public. The Peabody Essex Museum in Salem, Massachusetts, for example, opened its Maker Lounge in spring 2014, reimagining the maker space to fit the behaviors and needs of casual visitors. Others are built with specific audiences in mind: the Hirshhorn’s ARTLAB+ is a “no adults allowed” space for teens to drop in, hang out, and create. Either way, these spaces allow for open-ended creation in which participants can work on whatever projects they choose for however long they would like.

Like maker spaces, incubators and residencies encourage sustained creation but are geared toward professional artists, designers, and technologists who have undergone a rigorous selection process. These models provide the opportunity to develop a particular project over a set period of time, tapping into financial support, resources, and/or feedback from the home institution. Residencies have long been a part of the art world (although usually less the domain of the museum and more of smaller contemporary art organizations), while the incubator model stems from the startup scene. Interestingly, NEW INC, the New Museum’s incubator launched in early 2014, takes on an entrepreneurial bent, an as-yet-unheard-of endeavor in museums. Both of the residency and incubator benefit from having a physical space that (in theory) allows for the formation of a tight-knit community and the exchange of ideas.

Grants like LACMA’s Art + Technology Lab are similar to residencies in that they support the development of creative projects over a long period of time, but these projects do not necessarily have to be produced on site. In April 2014, the museum selected five artist projects from a competitive pool of applicants. Participants are awarded funding of up to $50,000 per

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project as well as partnerships with high-profile Lab advisors such as NVIDIA, SpaceX, and Google.

**Prizes and competitions**, by definition, entail a rigorous selection process, but unlike residencies, incubators, and grants, might not necessarily provide the infrastructure to support the development of the project. While museums have long administered artist awards such as the Tate’s Turner Prize and the Guggenheim’s Hugo Boss Prize, they generally are not specific to creators working with new technologies. I have only identified one competition that I would consider a museum making endeavor: last fall, the Tate IK Prize solicited applications for innovative digital projects to be implemented in conjunction with the Tate Britain’s permanent collection installation.¹⁸

**Innovation labs** are the final museum making category I have identified. These are more permanent institutional structures that allow for digital experimentation to occur, taking on a research-and-development or skunkworks ethos of radical and rapid innovation. For example, the Metropolitan Museum of Art’s Media Lab (founded in 2011) runs programs that take on many of the above models—including classes and hackathons—but these are all initiatives within the auspices of the Lab. The Media Lab structure allows the promotion of technology and innovation in a broader and more sustained way than these one-off events could. Many of the initiatives mentioned above might also fit into the description of innovation labs—for example, NEW INC hosts a range of events, from workshops to lectures.

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¹⁸ In July 2014, Rhizome and the New Museum announced the no-strings-attached Prix Net Art, an award that acknowledges “the future promise of an artist making outstanding work on the internet.” Although I believe this prize is a great step forward in legitimizing digital art, I’m not considering it under the purview of museum making, as the prize doesn’t necessarily entail the creation of new work.
Museum making programs take on many forms and tap into a wide variety of audiences. On the diagram above, I have plotted the various models onto a matrix. The x-axis is a continuum representing the kind of audience served by each initiative, from amateurs to professional artists, designers, or technologists. The y-axis plots the temporality of engagement, from one-off events to long-term commitments. Of course, like the typology itself, these diagrams must be viewed with a grain of salt. For example, I labeled maker spaces somewhere in
the top left quadrant—geared more towards tinkerers instead of professionals (who might own
tech equipment in their personal workshops or studios) and meant for people who will
continually return to work on their projects. But the Peabody Essex Museum’s Maker Lounge,
while based on the maker space model, might be better placed in the lower left quadrant: its
primary audience is casual visitors who need a place to unwind and be creative during a museum
visit.

My three field work sites—PEM’s Maker Lounge, LACMA’s Art + Technology Lab, and
the Met’s Media Lab—represent a broad range of museum making types: maker spaces,
grants/residencies, and innovation labs, respectively. In chapters three, four, and five, we see how
each institution borrows certain aspects of from the start-up or technology world while rejecting
others, allowing for flexibility as the initiatives continue to grow and solidify.

1.3 What does it mean to be an art museum?
Just as museum making models should be taken with a grain of salt, so must typologies
governing the distinction between art and other disciplines. In the introduction to this thesis, I
explained that my research focuses on technology programs in art museums precisely because of
the questions of authority and cultural legitimacy that arise in these kinds of institutions. But the
boundary between art museums and other kinds of museums is, itself, a fuzzy one. Philosopher
Hilde Hein examines museums through a thematic typology—art, science, history, and children’s
museums—but recognizes that these categorizations are socially constructed, “brittle,” and
ultimately restraining. The art museums represented in this thesis exhibit a wide variety of
objects, from objects typically considered fine art, such as painting and sculpture, to “less exalted
expressions and even such ambiguously utilitarian items” such as furniture, arms and armor, architecture and architectural ephemera, and clothing.\textsuperscript{19} Some art museums exhibit art along with design objects, but might organize their collections by curatorial departments that establish a kind of hierarchy between art and non-art. The Museum of Modern Art in New York, for example, separates Painting and Sculpture—the department that houses modern masterpieces and which has the most prominent and most trafficked permanent exhibition space within the museum—from its Architecture and Design or the Film departments, which count utilitarian objects and popular movies, respectively, among their holdings. Often, what is considered “art” versus “design” is based on time period or geography; the Metropolitan Museum of Art’s Asian Art department features Chinese ceramics from as early as the eleventh century B.C. to as recent as the nineteenth century, but traditional ceramics are no where to be found in the contemporary art department. The institutional theory of art, as most famously articulated by Arthur Danto and later George Dickie, holds that objects are defined as art by a social institution—the art world, which consists of a complex network of artists, critics, curators, philosophers, gallerists, and art dealers.\textsuperscript{20} Because art is socially defined, art museums can house musical instruments from fifteenth century Europe in one wing while eschewing its contemporary counterpart in another wing.

Part of what I am looking at in this thesis is what happens when art museums that uphold traditional creative forms must confront forms of creative production that do not necessarily fit into its image of art. In chapter two, I suggest that, while institutions like museums display a particular kind of art—aligned with a particular art market—in its contemporary galleries,

general audiences increasingly have very fluid definitions of what constitutes creative production, agnostic of traditional labels of fine art. Hein warns museums against adhering to their thematic categorizations too rigidly, as these distinctions "are dissolving in a world that affirms the global while denying the universal. Any typology is good only as long as its utility endures, and utility is measured by approximation to perceived ends.” She suggests that, “as museum objectives change, so must the characteristics by which we classify the institutions.\(^{21}\)

1.4 What does it mean to be a creator?

Museum making challenges preconceptions of what it means to be an artist and what it means to produce art. Museums have certainly witnessed shifts in these ideals in the past: In the 1960s, the visual arts scene saw an explosion of new artistic genres such as performance and video that have now been accepted and codified into art history. Today, someone could be an artist without ever working in a studio, or by primarily using his or her computer. Still, just as before, museums today continue to be slow to accept new types of art. Much of the kind of work produced through museum making initiatives have yet to recognized by the gatekeepers, such as gallerists and curators, within the world of contemporary visual arts.

Moreover, many people involved in creative technologies in general and museum making initiatives in specific may not even consider themselves “artists.” Instead, these programs incorporate self-described designers, creative coders, makers, and hackers, suggesting a new, expanded sense of an emerging creative class. Similarly, the works being produced in museum making programs aren’t all necessarily “art.” The Peabody Essex Museum invited industrial

\(^{21}\) Hein, The Museum in Transition, xi.
designer Ryan White for a six-week residence in the Maker Lounge; there, he worked with
visitors to imagine new possibilities for wearable technologies. Like many artists, he works in a
studio or workshop, he produces objects, and his work involves his levels of creativity and craft;
yet the fact that he creates commercial products meant to be mass-produced separates his work
from the objects generally thought of as “art.” The Maker Lounge residency is just one example
in which museum making initiatives are opening their doors to an expanded notion of creative
production.

I’m not interested in fixing the idea of artist versus designer versus technologist, although
I will use all of these terms throughout this thesis, recognizing they are fluid categories. I am
more interested in what these terms mean to different people and how these different ways of
understanding such terms shape how institutions run and where power rests.

1.5 What do I mean by “audience”?

Museums often use the term “visitors” to describe their audiences. This is a term I try to avoid;
“visitors” implies people paying admission and viewing exhibitions for a limited period of time.
Many of the participants involved in museum making engage with the institution over a long
period of time, whether as an intern for the Metropolitan Media Lab or through the year-long
residency at LACMA’s Art + Technology grant program. (PEM is a notable exception; as an in-
gallery space, many of the people who create at the Maker Lounge come during their museum
visit, stopping by for short periods of time.) And as we saw before, museum making targets a
wide range of expertise, from amateur to professional creators. While often thought of as
educational institutions for general public, art museum also support professional creators;
sociologist Vera Zolberg has written about how museums—as the gatekeepers who decide which artists are collected and exhibited by the institution—have historically had an uneasy relationship with artists.\textsuperscript{22}

Theopisti Stylianou-Lambert draws a parallel between Abercrombie and Longhurst's audience paradigms in media and the ways museums have historically viewed audiences. Under the behavioral paradigm, “the individual receives a single media message and reacts to it directly.”\textsuperscript{23} “For a long time,” Stylianou asserts, “museum professionals placed themselves in the position of the mass-communicator involved in a one-way communication process of a preferred message.”\textsuperscript{24} In the 1970s, Stuart Hall’s encoding/decoding model of communication upended the behavioral paradigm. In this model, media audiences are presented with media messages that are decoded, or interpreted, in various ways depending on an individual’s cultural background, economic standing, and personal experiences. While media makers try to express one dominant reading, audiences can bring their own resistant or subversive readings into their decoding of the message.\textsuperscript{25} Museum professionals correspondingly shifted their thinking about museum audiences, recognizing that museums, like mass communicators, hold a position of power, but that objects are interpreted in light of individuals' identities and experiences. Abercrombie and Longhurst believe that the encoding/decoding paradigm did not go far enough; while it acknowledges the unequal distribution of power between who does the communicating and who does the receiving, it does not explain how the same individuals can read messages differently in


\textsuperscript{24} Ibid.

\textsuperscript{25} Stuart Hall, “Encoding/decoding,” \textit{Media and Cultural Studies: Keywords}, 2001, 166–76.
various situations and contexts. They propose the spectacle/performance paradigm, in which individuals constantly perform different roles: “People simultaneously feel members of an audience and that they are performers; they are simultaneously watchers and being watched...Since people are simultaneously performers and audience members, cultural consumer become cultural producers and vice versa.”26 In the context of a museum, Abercrombie and Longhurst’s paradigm posits an active visitor, one makes “imaginative choices about what to accept, reject, distort, alter, or modify in a way that would fit their sense of identity.”27 Museum making initiatives—ones that invite participants to create based on the museum’s collection or space—similarly blur the boundaries between the audience and museum professionals, allowing participants to craft their own narratives of the museum. I suggest that these initiative not only permit audiences become communicators, but that museum staff are as much of an audience for these technology programs as their participants.

1.6 What do I mean by “new” or “emerging” technologies?

In this thesis project, I examine museums that work with new and emerging technologies, but what does that actually mean, especially within an art museum? What we consider as technology, like art, is a product of its particular historical and social contexts. Oil paint and photography, for example, were once new technologies. In fact, Don Undeen of the Metropolitan Museum of Art’s Media Lab uses this argument in rationalizing his own efforts. In an article for Make magazine’s website, he wrote about learning how artists represented at the museum “availed themselves of the latest technology and tools to push their craft to greater heights of expression. I learned about

the possibility that Dutch master painter Johannes Vermeer may have used a camera obscura to aid his genius.\textsuperscript{28} It makes sense for museums to encourage creative exploration with technology, he contends, because artists have always taken advantage of new technologies.

Some of the technologies that museums are adopting—such as 3D printing—have been around for decades; however, they might be new to museums and to popular discourse at large, and are finally easy-to-use and available to the public at a reasonable pricetag. Defining new technology this way has its drawbacks: all too often, “technology” seems to mean new commercial products, rather than processes or concepts. Many of the technologies that Undeen suggests Media Lab interns or volunteers work with are specific products, such as Google Glass, iBeacon indoor positioning devices, or the Oculus Rift virtual reality headset.\textsuperscript{29}

LACMA defines technology differently: for Amy Heibel and Joel Ferree, the staff members behind the A+T Lab, technology is more about processes, concepts, and areas of research. Their 2014 request for proposals included topics as broad as “visualization and computational graphics,” “machine design,” “sensors,” “data structures,” and “space exploration.”\textsuperscript{30} In an article in The Verge, Heibel is quoted saying that the A+T Lab aims to tap into “impractical and creative applications of technology”—in other words, “we are not looking for the next great mobile guide app.”\textsuperscript{31}

My final case study—the Peabody Essex Museum’s Maker Lounge—seems to define technology in yet a third way. The Lounge is modeled off of the concept of a maker space, a

\textsuperscript{28} Undeen, “All Art Is Made by Makers.”
\textsuperscript{29} For museum making initiatives, conceiving of technology as commercial products becomes doubly problematic when the hype around a certain product dissipates—how can staff maintain internal support for their efforts when these hot commodities have lost their luster?
\textsuperscript{30} http://www.lacma.org/sites/default/files/LACMALabRFP.pdf
community workshop in which individuals can work on technology projects; however, there have been times when I've been observing in the space and there was little to no “new” technology being used at all, an idea further explored in chapter five. The Lounge places an emphasis on the iteration-focused design process that has made the development of new technologies possible. For PEM, the technology seems to be more of a mindset than an object; it is more about the enthusiasm, awe, and conversations around design and technology that the Maker Lounge hopes to invoke.

The museum making initiatives I discuss in this thesis are but one small part of larger flourishing digital strategies being implemented within their respective institutions. Contemporary museums are increasingly focusing their efforts on the digitization of their collections, using social media to connect to faraway audiences, and implementing interactive installations and multimedia guides to frame the museum visit. Robust communities of collections specialists, conservators, information technology and audio visual specialists, educators, and other sundry museum staff engage in debate and scholarship on the uses and best practices of technologies in museums. Professional organizations such as Museums and the Web and Museums Computer Network in the United States and the Museums Computer Group in the United Kingdom run conferences on innovation and digital practices for cultural institutions. The kinds of initiatives that fall under the rubric of museum making fit within this landscape of broader digital engagement, but they also serve as a next step: not just providing technology as a service or as an enhancement to the so-called visitor experience, but for the production of new cultural objects. The next chapter situates museum making within two histories of cultural production, considering the museum as a long-lived site for art making as well as the rise of hackers and makers in popular discourse.
Like many of my peers, I am registered for a lot of email lists. And as the oversubscribed are wont to do, I delete about 90% of the emails that land in my inbox before ever opening them.

On an ordinary day in September, though, I paused as my cursor hovered over the trash icon. FWD: MAKING MAKER SPACE PROGRAMMING FOR MUSEUMS, the subject line read. This message came through the Museum-Ed listserv, a community of hundreds—if not thousands—of museum educators who post conference and job opportunities, share best practices, and, sometimes, debate issues within the field.

Upon opening the email, I was bombarded with a sales pitch: You too can join an online course that explains what maker spaces are and how you can implement them in your cultural institution! At $79 for four three-hour sessions, the price was a bit steep for a graduate student like me; my mouse again drifted towards the delete button.

But then I did a double take. There was something about this email that was different from most messages passed around on the listserv. Sure, this wasn’t the first time educators had used the online venue to discuss technology initiatives. But what I found interesting was that now, such programs were gaining so much traction in museums (and in education more
generally) that someone seized the opportunity to profit off of the propagation of the maker ethos. The language used in the workshop ad is fascinating:

There is a kind of revolution going on in programming and museums are one of the leaders of the movement. Whether you call them Maker, Community, or Hacker Spaces, these DIY working areas in libraries and museums have become a popular meeting and creative program space for patrons of all ages.32

In other words: Hop on the maker bandwagon or risk missing out.

A few days later, I awoke to find another message from the Museum-Ed listserv. The subject: MAKER’S FAIRES [sic]. Inside, the sender questioned the sudden trend in all things maker:

I have a question that has actually been nagging at me for a while about the “Maker Space” movement. I have been in museum education for almost 30 years now and have been doing this type of integrated workshop for most of my career and have participated at these types of events at other museums and zoos as well. Why are they suddenly a new thing (beside the name)? Is there something that I am not understanding?33

A few others who chimed in asked the same thing: What’s so special about maker spaces (or hacker spaces, or hacklabs, or whatever you want to call them), anyway? The online course touts maker spaces as revolutionizing the way we approach learning. But for many museum educators, hands-on learning is nothing new. Another member of the listserv pointed out the parallels to Montessori and Reggio Emilia, decades-old approaches to learning that advocate for self-directed exploration and discovery within a supportive community.

Most museum professionals are quick to tell you that introducing technology initiatives can produce internal tension. What’s interesting about this case is that the conflict is

33 Email correspondence, September 12, 2014. Available online at http://www.museum-ed.org/cgi-bin/dada/mail.cgi/archive/talk/20140912102501.
intradepartmental, among peers, instead of interdepartmental. Here, in fact, we see a generational divide, with younger staff presenting seemingly new ideas and butting heads with older colleagues. “I guess I really got to thinking about this,” the original poster noted, “when a new staff member came in with this ‘hot’ new idea, and we had been doing it at our museum for the past 19 years!”

Maker spaces, hackathons, startup incubators: These initiatives are touted as breaking new grounds in museums, but in fact, this kind of museum programming has deep historical roots. In this chapter, I’ll trace the precedents that have led to the development of museum making programs. The first section examines arts participation, particularly through amateur art practice, in the history of the United States. Borrowing from the arguments of Lawrence Levine, Lynne Conner, Bill Ivey, and Steven Tepper, I will discuss how amateur art practice was common in the nineteenth century, waned in the twentieth century, and is currently on the rise again. Within this context of cultural engagement, I will delineate how art museums have historically served as cites of creative production. The second section of this chapter traces the precedents that have led to the landscape of creative technology we know today. The earliest computer hackers eschewed authority, championed a hands-on ethic, and saw their hacking as a form of art. The more recent development of the so-called “maker movement” exemplifies a mainstreaming of creative technology: as it becomes easier to access digital and fabrication tools, more people can become amateur technologists. Art museums today are tapping into both the countercultural impulses of hackers—which resonate with that of artists—as well as the mainstream appeals of the maker movement. In the final section, I discuss how the two threads—art-based and tech-based production—are now merging at a time when, at least to many public

34 Email correspondence, September 12, 2014.
audiences, the distinctions between art, media, and technology are no longer important; instead, a general sense of creative production, whether aligning itself with the art world or the tech world is king.

2.1 On art: Amateur art practice in the United States and art museums as sites of creative production

Unlike their European counterparts, which began as princely collections that were opened to the public, the earliest museums in the United States were eclectic. Philadelphia’s Peale’s Museum, founded by painter and naturalist Charles Willson Peale in 1786, displayed mastodon bones, insect, and fossils alongside portraits patriots and scientists. In Boston, the Columbian Museum (1795-1825) housed objects as diverse as artworks, wax figures, and natural specimens. These early museums were not structured around the generic distinctions—art, natural history, history, and so on—that now have come to dominate museums, but rather were constructed according to the idiosyncratic tastes of collectors.

More to the point, historian Lawrence Levine argues that in the United States before the late nineteenth century, the boundaries between high and low culture didn’t exist as they are conceived of today. Audiences across all classes enjoyed cultural figures and forms such as Shakespeare and opera, sharing “a public culture less hierarchically organized, less fragmented into relatively rigid adjectival boxes than their descendants were to experience a century later.”

Historian, playwright, and director Lynne Conner argues that audience members played a different role in arts experiences, as well. As opposed to the contemporary ideal of an audience that “by definition and by current standards of appropriate behavior...looks, listens, and feels at

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a distance," audiences in the nineteenth century came from "all economic classes and from a wide variety of places" and "were expected to participate actively before, during, and after the event." The audiences, in a sense, were essential to the production, rather than separate from the art event. Museums, like their theater counterparts, had equally diverse audiences. For example, Barnum's American Museum, founded in New York City, exhibited everything from fine art and scientific instruments to medical oddities. Economically diverse audiences came in droves not only to view the spectacle of the museum's collection but also attend lectures and watch performances. While some of the museum's practices are questionable (they famously exhibited conjoined twins Chang and Eng, among other alleged "curiosities"), Conner argues that the "[p]atrons at these museums lived the art space fully; they saw their presence in it as a large affair that was not confined simply to quiet, reverent spectating." Other museums drew in audiences through programming such as scientific demonstrations and music and theater performances.

Diverse publics were not limited to arts participation as audiences, but also as creators: amateur art practice was a part of everyday life. In the nineteenth century, pianos were a common sight in households, serving as "the nation's archetypal cultural hearth"; families would often gather around the piano for a sing or a post-dinner performance. As Bill Ivey explains, "the abilit[ies] to sing or play music...were considered everyday skills, integrated into family life as thoroughly as sewing or the canning of autumn garden produce." Domestic piano-playing was

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37 Ibid., 107.
38 Levine, Highbrow/Lowbrow: The Emergence of Cultural Hierarchy in America, 149.
how music was circulated and enjoyed. Conner corroborates: “Arts patrons also participated in a practical manner by joining amateur production companies, by taking studio classes, and by creating public works of art, such as historical pageants, as a form of celebration and as a way to solidify and document community identity.”

Since their founding, art museums in the United States have been sites for art making. The primary way in which nineteenth century museums supported creative production was by offering formal training, often in the form of museum academies. Melanie Buffington identifies three ways in which these schools developed: schools that complement an existing museum collection, such as the Buffalo Fine Arts Academy; museums formed after schools in order to provide a teaching collection from which students could learn, such as the Art Institute of Chicago; and academies and museums that were founded concurrently. As universities and colleges increasingly began to establish art and art history departments at the onset of the twentieth century, many of these schools began to disappear or distance themselves from their respective museums.

The Metropolitan Museum of Art is one example of an institution with a rich history as a site for art making. Sound after its founding, the Met granted permission to artists to copy works in their collection on Tuesdays through Saturdays from 9:00am to 12:00pm.40 In 1880, the museum established the School of Industrial Arts, providing free41 classes to artisans in skills such as woodworking and metal working, and later ornamental painting and carving, architecture, drawing, and clay modeling.

40 Roslyn Esperon, Metropolitan Museum of Art Museum Education—Studio Programs History Project, April 2012. 41 The School of Industrial Arts would have to start charging tuition in 1886 in order to sustain itself, but the school’s funding continued to be supplemented by the Metropolitan.
Toward the turn of the century, the Metropolitan witnessed the decline of art making in the museum. The 1883 Annual Report of the Trustees of the Metropolitan Museum of Art indicates that many of the school’s classes were discontinued by that year. (One notable exception to the decline of art making in the museum is the Museum’s copyist program, which increased in popularity into the early decades of the twentieth century.) Still, the museum promoted art making in other ways: in 1916, the Met published a resource on the educational offerings available to artisans living and working in New York City; from 1917 through at least 1928, the museum inaugurated a series of industrial arts exhibitions that displayed works by designers who have studied from the Met’s collection. While the Met continued to encourage creative production, however, the physical museum became less of a site for art making itself. In 1926, studio programs geared toward artists and artisans were limited to lectures and study hours; the museum saw its role as fostering a sense of high taste in its audiences <cite Elliot>. Into the middle of the twentieth century, the Met’s programming shifted its focus: educational offerings for adults were primarily in the form of lectures, while art-making courses were geared toward children.

The decline of art making at the Metropolitan was echoed at museums throughout the United States in the early twentieth century. This decline aligned itself with what Levine has dubbed the “sacralization of culture,” in which popular and high arts were increasingly differentiated. Shakespeare became exclusively highbrow; the opera was the domain of the wealthy, rather than all audiences. Sacralization also went hand-in-hand with the decrease of amateur art practice:

The blurring of that distinction [between amateur and professional] had been one of the characteristics of music in America for much of the nineteenth century. But by the end of
the century the gap had widened. More and more it was asserted that it was only the highly trained professional who had the knowledge, the skill, and the will to understand and carry out the intentions of the creators of the divine art. The urge toward high art precipitated a marked decline of parlor music in the late nineteenth century.42

Pianos no longer served as the home’s cultural hearth; according to Ivey, the radio, and later television, would come to replace it.43 Arts and culture participation was now an act of consumption, the receiving of music rather than the creation of it. Both shifting cultural attitudes and technological changes (such as the introduction of recorded music and broadcast media) were part and parcel to this new definition of arts participation.44

Conner suggests that the sacralization of culture was a Gilded Age (1870s to 1900) project, “an effort to reshape cultural interaction at a time when class lines were being drawn to fit late nineteenth-century economic interests.”45 As the United States entered the Progressive Era at the dawn of the twentieth century—a time known for its philanthropic, if not paternalistic, support for the arts—theaters, museums, symphonies, and other artistic productions were reconstituted as nonprofit, charitable organizations. This reconstitution effectively increased the professionalization of the arts, distancing further professional art practice from that of amateurs and widening the gap between the highbrow nonprofit arts and the populist noncommercial arts.

American museums went through a similar pattern of sacralization. As Levine notes, museums transitioned from “the general and eclectic to the exclusive and specific,” solidifying the generic distinctions between art, natural history, history, and science institutions that we

42 Levine, Highbrow/Lowbrow: The Emergence of Cultural Hierarchy in America, 139.
43 Ivey, “Introduction: The Question of Participation.”
44 Ibid.
45 Conner, “In and Out of the Dark: A Theory about Audience Behavior from Sophocles to Spoken Word,” 112.
know today. In building collections, art museums opted for exemplars of the finest taste, eschewing the mix of popular and high cultural objects of yore. The Museum of Fine Arts in Boston represents this trend: when it opened its doors to the public in 1876, the MFA’s collection consisted of both original artworks and reproductions. Over the next years, the museum “began to relegate the photographs, casts, and a variety of ‘curiosities’ to storage and dedicate its galleries to what its director in 1912 called ‘higher things.’”

Since their establishment, museums have been seen as educational institutions, but it was around this time that the field of museum education emerged and professionalized. In line with the ideals of the Progressive Era, education departments formed to provide programming and outreach as a service to “uplift” the masses of workers who had increasingly more leisure time. Elliot Kai-Kee cites the 1930s as a time when “creativity,” rather than training in particular skills, “became the chief goal of art instruction.” However, docent-led art historical lectures and tours with the aim of instilling a sense of aesthetic appreciation became de rigueur for adults, with art making was primarily left for children.

As the field of museum education became professionalized, museum workers looked for a body of scholarship to inform their practices. Paradoxically, the attitudes behind the educational theories adopted by museums professionals advocated learning through hands-on activities (a core tenet of many children’s art-making programs) at a time when museums were phasing out art-making programming for adults. Still, the writings of thinkers such as German educator and inventor of kindergarten Friedrich Froebel (1782-1852) provided a theoretical basis for art

46 Levine, Highbrow/Lowbrow: The Emergence of Cultural Hierarchy in America, 146.  
47 Ibid., 152.  
instruction. Central to Froebel’s kindergarten was the idea that individuals learn by interacting with the natural world. He devised a series of “gifts” of simple objects and materials, such as balls, sticks, paper, pencils, and clay; students would receive them in order and engage with them in self-directed play. Other educational pioneers would soon embrace Froebel’s approaches. Italian physician Maria Montessori (1870-1952) developed the eponymous educational approach that emphasized free activity and experiences tailored to individual children’s interests and needs. In *Experience and Education*, John Dewey (1859-1952) argued that traditional education’s rigidity ignored the capacities and interests of the learner. Individuals are undergoing development at all moments, and not just during formal instruction; Dewey advocated for an educational approach that emphasized learning from every day experiences. Founded by Loris Malaguzzi, the Reggio Emilia approach developed in the 1960s in the northern Italian city of the same name. Reacting to the destruction after World War II, Malaguzzi and the residents of Reggio Emilia believed that children—from the youngest of ages—needed a new way of learning about the world. The approach prioritized a sensitivity to local culture, hands-on use of materials, and self-directed learning.

In the 1970s, Swiss developmental psychologist and philosopher Jean Piaget built on and codified the ideas of Froebel, Montessori, and Dewey in what is now known as constructivism. This epistemology posits that knowledge does not exist separately from individuals, but is instead constructed based on experience. In museums, constructivism—in the form of “visitor-centered

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52 Martinez and Stager, *Invent To Learn*. 
learning” and the “visitors experience”—became a dominant discourse in the 1990s.\footnote{Kai-Kee, “A Brief History of Teaching in the Art Museum,” 45.} Education scholar George E. Hein is a key proponent of implementing open-ended, constructivist approaches within the museum. A constructivist museum, he suggests, should build its exhibitions around two ideas: that “the viewer constructs personal knowledge from the exhibit” and that “the process of gaining knowledge is itself a constructive act.” Such cultural institutions lack a predetermined sequence that visitors must follow, call upon multiple learning modalities, and provide “opportunity for the visitor to make connections with familiar concepts and objects” while also allowing for “comparisons between the unfamiliar and the new.”\footnote{George E. Hein, “The Constructivist Museum,” in \textit{Reinventing the Museum: The Evolving Conversation on the Paradigm Shift}, ed. Gail Anderson (New York: AltaMira Press, 2012), 128.} Interactive exhibitions, hands-on discovery through creation, movement, and improvisational theater were some of the approaches being introduced into the gallery at this time.

I’d like to take a moment to examine the relationship between living artists and museums. Above, I’ve discussed nineteenth century museums’ role in training artists and artisans in particular crafts and aesthetic sensibilities, efforts to fulfill their missions as educational institutions. These efforts, however, do not mean that museums’ relationships to artists have always been painless, nor should they imply that museums’ goals have always aligned with those of artists. Sociologist Vera Zolberg has written extensively about the tense relationship between artists and museums. She argues that, “although museums of modern art have many occasions to deal with artists, they have rarely viewed living artists as forming a community toward which they have particular obligations.”\footnote{Vera L. Zolberg, “Art Museums and Living Artists: Contentious Communities,” \textit{Museums and Communities}, 1992, 105–36. P. 106} Many museums see their primary goal as collecting artworks of high caliber, thereby conferring status on them; most artists will never enter a museum’s
collection. Many major museums, such as the National Gallery of Art in Washington, D.C., and the Museum of Fine Arts in Boston, originally did not collect works by living artists. The NGA adhered to a policy that disallowed acquiring objects by artists dead less than 25 years; they changed this policy in the mid-1960s to accept a gift of works by Pablo Picasso. The MFA only began to collect objects by living artists with the founding of its contemporary art department in 1972. In her dissertation on the Art Institute of Chicago, Zolberg identifies a contrasting example: Since its founding in the mid-1800s, AIC has exhibited objects by living artists. But the tension between living artists and museums has always been present. In the 1930s and 1940s, AIC shifted from collecting American regional painters to modernist artists, many of them European; as Zolberg notes, the “growing cosmopolitanism of outlook meant decline in relative opportunity for local artists.” In both types of institutions—those that that were slow to collect works by living artists and those that have incorporated contemporary artists from the start—there is a disconnect between what is displayed on the walls of a museum and the needs of local artists.

Despite these tensions, a few museums in the twentieth century have served as sites for art making (or at least support for the development of artistic practice) by professional artists. And unlike programs in the 19th century, which aimed to train artisans in skills or to proselytize the museum’s concept of good taste to the masses, these programs were (or are still) often directed toward artists who are either represented by the museum’s collection, are on par with the perceived caliber of what the museum exhibits, or have the potential to make their name within the realm of contemporary art. For example, in 1970 the Whitney Museum of American Art founded the Independent Study Program, a program that accepts promising artists, curators, and

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scholars for an academic semester\textsuperscript{57} to study critical theory and further develop their individual practices.\textsuperscript{58} This program has helped to launch the careers of many distinguished artists, including as Félix González-Torres, Renée Green, and Julian Schnabel.\textsuperscript{59} Since 1968, the Studio Museum in Harlem has offered year-long on-site residencies to emerging artists of African and Latino descent. Writing in 2001, Ernesto Pujol identifies a "growing national trend to invite visual artists to participate in what I call open-process museum-based residencies."\textsuperscript{60} These recent residencies not only serve to advance the careers of the selected artists, but also to connect their artistic practices to those of (often-underrepresented) community groups. The museum thus serves as a site for art making for both the professional artist-in-residence and an amateur audience.

Thus far, I have discussed the prevalence of amateur art practice in the United States in the nineteenth century and its subsequent decline into the twentieth century. Within this context, museums have served as sites for art making in many ways: at first as sites for instilling artisans with skills, subsequently limiting art making programming efforts to younger audiences, and, more recently, occasionally inviting professional contemporary artists through prestigious residencies and study programs. Today, arts participation through amateur art practice is again on the rise in the United States, and subsequently museums are being reinvigorated as sites for art making for all ages and levels of professionalization. Over the last few decades, museums have

\textsuperscript{57} The Whitney ISP is now a year-long program.

\textsuperscript{58} It was also around this time that the Los Angeles County Museum of Art began its historical Art and Technology Program, from which today’s Art + Technology Lab takes its inspiration. In the original program, which ran from 1967 to 1971, curator Maurice Tuchman placed an impressive roster of artists such as Claes Oldenburg, Robert Irwin, and James Turrell in technology corporations in order to conduct research and develop new, experimental projects.


hosted hands-on classes and workshops for adults, geared both toward training students in skills and encouraging creative exploration. Some programs even take a page out of their institution’s historical roots: In December 2014, the Metropolitan announced that it will relaunch its copyist program, inviting anyone who applies to set up an easel to paint and draw directly from the works in the museum’s collection.61

I will return to the rise of arts participation—or as I will argue, creative production more generally—in the final section of this chapter. For now, I’d like to conclude that the forms of programming emerging in museums now, in which participants are invited to create with new technologies, fit within this larger history of art making in museums. In this sense, such efforts are not all that new. But these technology-oriented programs are also stemming from another historical lineage, one that brings with it particular attitudes: that of hackers and makers, which I will discuss in the following section.

2.2 On technology: Hackers, makers, and the rhetoric of innovation

Hacker: it’s a troubled term. The White House, NASA, National Science Foundation, Department of Homeland Security, and other federal agencies were all sponsors of this past year’s National Day of Civic Hacking. Yet, commenting on National Security agency leaker Edward Snowden’s extradition to Russia in June 2013, President Obama disparagingly remarked, “I’m not going to be scrambling jets to get a 29-year-old hacker.”62 “Hacking” strikes the imagination precisely because of these two, contradictory perceptions: a hacker is creative,

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inventive, and industrious, but also unruly and dedicated to first and foremost to his or her beliefs.

The earliest computer hackers emerged at the Massachusetts Institute of Technology in the 1950s and 1960s, when student members of the Tech Model Railroad Club would break into off-limits offices to use giant mainframe computers in the evenings, spending all night coding and debugging their irreverent and playful programs. For these hackers, programming computers became a way of life. In *Hackers: Heroes of the Computer Revolution*, Steven Levy outlines the doctrines underlying their community:

1. Access to computers—and anything which might teach you something about the way the world works—should be unlimited and total. Always yield to the Hands-On Imperative!
2. All information should be free.
4. Hackers should be judged by their hacking, not bogus criteria such as degrees, age, race, or position.
5. You can create art and beauty on a computer.
6. Computers can change your life for the better.63

This “hacker ethic,” as Levy calls it, reveals a countercultural, anti-authoritarian leaning that is still central to our image of computer hackers today. Hackers held a steadfast belief that information should be accessible to all, a tenet that would become further solidified in Richard Stallman’s Free Software Foundation and the free and open-source movement. They also shared the belief that coding was ultimately a creative endeavor.

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63 Ibid.
The so-called maker movement—a name that was coined in 2005 to identify a growing subculture interested in using technology for do-it-yourself projects—builds on the attitudes of early hackers. But unlike hackers, "makers," as participants in this trend are called, are not just interested in software, the stuff of computers; they apply their knowledge and enthusiasm of the digital and electronics to creating objects for the physical world. In his book Makers, technology and business writer Chris Anderson identifies three phrases of his personal DIY journey: working with his hands in his grandfather’s workshop in 1970s L.A., the punk scene in Washington, D.C., and the spirit of community of the nascent world wide web in the 1990s. The maker movement, he explains, borrows from these and other precedents a willingness to experiment, an emphasis on interdisciplinarity, and access to tools and knowledge. If open software was a defining tenet of the early hackers, then open hardware is a key a component of “maker culture.”

Despite its DIY ethos, maker culture lacks the kind of subversive agenda that fueled early hackers. From its beginning—at least as a branded entity— the maker movement was not a grassroots movement, as the hackers had developed, but rather an initiative led by a for-profit company. Anderson places the official birth of maker culture in 2005 with the launch of Make magazine. Dale Dougherty, a co-founder of the prolific technology publishing group O’Reilly Media, spearheaded these efforts along with Sherry Huss and Dan Woods. (The magazine would spin off into its own publishing company, Maker Media, Inc., in 2013). Modeled after older periodicals such as Popular Science and Popular Mechanics, the magazine focuses on DIY projects involving, among other topics, electronics, computers, robotics, and fabrication. In addition to issuing the bimonthly magazine, Maker Media now also publishes digital and print

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books, produces Maker Faires—large “show and tell” convenings in which makers show off their projects—around the world, and operates Maker Shed, an e-commerce site that sells DIY electronics, kits, and publications.

What has proven to be compelling about the maker movement is how it encompasses virtually all disciplines within its rhetoric of innovation. Case in point: Dougherty’s essay on the maker movement in MIT Press’s *innovations* journal, which veers toward the promotional:

> When I talk about the maker movement, I make an effort to stay away from the word “inventor”—most people just don’t identify themselves that way. “Maker,” on the other hand, describes each one of us, no matter how we live our lives or what our goals might be. We all are makers: as cooks preparing food for our families, as gardeners, as knitters. Although this view may not be part of mainstream thought, there once was a time when most Americans commonly thought of themselves as tinkerers. Tinkering used to be a basic skill, and you could get a little bit more out of life than the average person if you had good tinkering skills—if you could fix your own car, for example, or improve your home or make your own clothes.65

With this kind of all-encompassing language, Dougherty invites everyone to his utopian vision of a maker-fueled future.

Community-building is central to the maker movement, and this often happens through maker spaces. Also called “maker spaces,” “makerspaces,” “hackerspaces,” and “fablabs,” these are shared workshop spaces in which people can tinker with high and low technologies. Some, like the TechShop network, are membership based, allowing individuals who belong to work on projects during repeated visits. Community centers, libraries, and schools have started implementing maker spaces for their patrons and students. In an educational context, they have

been heralded as spaces for open-ended exploration, allowing learners to tap into their own interests through the development of personal projects. Fabrication labs, or fab labs, are similar to maker spaces, but in fact they precede them. Fab labs are small-scale workshops for prototyping products for what Neil Gershenfeld has called “a market of one.”66 As the director of MIT’s Center for Bits and Atoms, he established a network of international fab labs in 2001, each of which contains a set of minimal tools: a vinyl cutter, laser cutter, computer numerical control (CNC) mill, basic electronics supplies, and in some cases, a 3D printer.

While maker spaces may be a communal gathering point for the movement, making can also happen in the home. The technological equipment found in maker spaces is increasingly becoming cheap enough to own; for instance, 3D printers have dipped below the $1,000 price barrier. New startups, companies, and products targeted towards makers have emerged in the last five years: Adafruit and Sparkfun are well-known online purveyors of DIY electronics and kits, and the open-source microcontroller Arduino allows users to create interactive objects and environments. Additionally, online communities have formed around knowledge and file-sharing: how-to guides are crowd-sourced on websites like Instructables, Howtoons, Fritzing, while on Thingiverse users share 3D objects files that anyone can download and fabricate on their personal printers.

“Maker spaces,” “makers,” and “maker movement” have increasingly become commonplace terms in popular discourse as the so-called movement increases in attention. Dale Dougherty has discussed the movement’s implications on business, government, and education, and he’s not the only one who is touting the maker movement as a supposed disruptive force. In

*The Tinkerers: The Amateur, DIYers, and Inventors Who Maker America Great*, Alex Foege argues that tinkering has been a bedrock of innovation and industry in the United States, from Ben Franklin to Thomas Edison; he applauds the country’s return to tinkering, now manifested in makers. The subtitle of Chris Anderson’s book *Makers* says it all: the maker movement is ushering in a “new industrial revolution,” one in which manufacturing is no longer bound to large-scale corporations. With a DIY ethic and access to cheap equipment and open source software, individuals now have the power to fabricate the products they want. He proposes that the maker movement will foster a new and formidable class of small businesses. And makers have made it all the way to the top: On June 18, 2014, President Barack Obama hosted the inaugural White House Maker Faire, which brought together over a hundred people, projects, and companies creating with new tools and technologies. The event’s press release was couched in language of innovation, entrepreneurship, job creation, and education in science and technology fields:

> Today, President Obama will host the first ever White House Maker Faire and will meet with students, entrepreneurs and everyday citizens who are using new tools and techniques to launch businesses, learn vital skills in science, technology, engineering, and math (STEM), and lead a grassroots renaissance in American manufacturing. 67

Coopting the creativity of the maker movement, the Barack Obama administration strategically depicts itself as in-the-know, while putting forth an economic agenda in which the United States maintains its status as the world’s superpower.

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Whether or not the maker impulse will revolutionize manufacturing is yet to be seen, it is increasingly seeping into education. Attracted to the maker movement’s emphasis on creativity, learning-by-making, and self-directedness, educators view maker projects as a way to excite their students about science and mathematics. Thus the same educational theories valued by museum educators (as discussed in the previous section) align with many of the goals of a maker-infused curriculum. Like their art museum counterparts, proponents of hands-on educational technology look to the theories of Montessori, Dewey, and Piaget, and have added a newcomer to the list: Seymour Papert. In the late 1950s, Piaget tapped the mathematician Seymour Papert to collaborate on his research investigating how children construct knowledge. Papert took Piaget’s theory of constructivism one step further in what is now called constructionism, which posits that learning is most effective when individuals create tangible objects. Papert went on to teach at MIT with Marvin Minsky, a pioneer in the field of artificial intelligence. At MIT, he began to experiment with computers. In 1968, with Cynthia Solomon, Wally Feurzig, and others, Papert developed Logo, a computer language designed to teach programming concepts to children. He has since advocated for the use of computers in new, imaginative ways that align with the ideals of learning-by-making, whether the activities entail composing original music, controlling puppets, or doing mathematical modeling.

More generally, recent years have seen increased advocacy for science, technology, engineering, and mathematics (STEM) in primary, secondary, and higher education. The STEM movement is inextricably aligned with the rhetoric around innovation that dominates in this country. Supporters claim that without a workforce trained in these fields, the United States will

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not be able to maintain its dominance in innovation. Backing for STEM has professionalized and solidified through a bevy of national and regional nonprofit advocacy organizations such as the STEM Education Coalition. The Boy Scouts of America, the Department of Defense, and the National Science Foundation alike have announced programs dedicated to improving STEM literacy. 

In the past few years, certain stakeholders have proposed adding a new letter to the acronym: A for Art, transforming STEM into STEAM. Designer and computer scientist John Maeda, a pioneer in the STEAM initiative, wrote:

I would argue that STEM alone will not get us there. Innovation happens when convergent thinkers, those who march straight ahead toward their goal, combine forces with divergent thinkers—those who professionally wander, who are comfortable being uncomfortable, and who look for what is real.69

Without the critical thinking and design skills nurtured through artistic practices, Maeda and others argue, we will not be able to achieve our economic goals in a holistic and ethically-minded way. (I have also seen critics advocate for the inclusion of H for humanities, Frankensteining the term “SHTEAM” that excludes no academic subject and effectively renders the original acronym useless.)

The countercultural impulses of the hackers begat the more mainstream DIY attitudes of the maker movement, which is inextricably tied to today’s dominant discourse of technology’s economic promise. It is within this context that art museums have begun to invite creators to experiment with new technologies, which I will discuss further in the following section.

2.3 Participatory culture at the intersection of art and technology

Hackers and makers are but a part of what some might call a participatory attitude that has become widespread in the United States (and throughout the world) in the last fifteen years. In a participatory culture—as opposed to consumer culture—amateurs take the reins of the production of media and cultural artifacts. Henry Jenkins and Vanessa Bertozzi describe a participatory culture as

one where there are relatively low barriers to artistic expression and civic engagement, where there is strong support for creating and sharing what one creates with others, and where there is some kind of informal mentorship whereby what is known by the most experienced is passed to novices.70

As the internet increasingly provides easy access to tools and networks with which to contribute and distribute culture, everyone becomes a media maker. Wikipedia, video-sharing site YouTube, and fan fiction websites are just a few examples of platforms that allow and in fact rely on the participation of grassroots creators.

Many museum thinkers have adopted this participatory fervor over the last decade. “Participatory” is a term equally beloved and abhorred within the art world, both employed as a rallying cry for engaging new and often underserved audiences and denounced for “dumbing down” the art-viewing experience. Nina Simon published The Participatory Museum in 2010, a widely-read guide to designing museum experiences in which visitors contribute, collaborate, and create. Notably, the book was released online for free under a Creative Commons license, consistent with the attitudes of the free and open source movement. In an essay titled “The

Exploded Museum," Peter Samis of the San Francisco Museum of Modern Art speaks of the turn to social media in museums. He argues that a collection’s meanings can be enriched through user-generated content; the interpretation of works of art has now shifted to creation. Like museums of the nineteenth century that offered art-making opportunities in keeping with the broader culture of amateur arts practice, museums today recognize the greater participatory zeitgeist and incorporate such strategies into their own offerings.

The previous two sections have thus far distinguished art making from computer- and electronics-based forms of production. But throughout my narrative, there have been moments of intersection, if subtle ones. Museums have been sites of information sharing and skill building, offering (often free) classes since their beginnings; early computer enthusiasts advocated for open access to information. Similarly, educational programming in museums and maker-inspired initiatives today have in common the same theoretical underpinnings, rooting their practices and goals in an ethic of hands-on and personalized learning.

I propose that while art museums exhibit a very particular kind of visual art that follows the conventions of the contemporary art world, increasingly, more generalist audiences do not differentiate between various forms of creation production. Richard Peterson and Gabriel Rossman have suggested that audiences are interested in both highbrow and lowbrow (or popular) culture:

Whereas highbrow exclusion was an effective marker of status in a relatively homogeneous and circumscribed white, Anglo-Saxon, Protestant (WASP) world...omnivorous inclusion seems better adapted to an increasingly global world managed by those who make their way, in part, by showing respect for the cultural

expressions of others. As highbrow snobbishness fit the needs of the turn-of-the-twentieth-century entrepreneurial upper-middle class, there also seems to be an elective affinity between today's cosmopolitan business-administrative class and omnivorousness. 

I would further suggest that audiences are not only interested in both the high and low, but they are also comfortable with the blurring of boundaries between art, media, and technology. The maker movement encompasses all kinds of creators, from robotics builder to knitters; STEM has made room for art in STEAM. Platforms like Etsy (an e-commerce website for handmade or vintage items) and Kickstarter (a site that allows individuals, fledgling companies, and established organizations to raise funds for creative projects) have emerged as new marketplaces for creative production, agnostic of labels such as “art” and “technology.” The New York University founded the Interactive Telecommunications Program in 1979 to foster the interdisciplinary study of new and computational media; in 1985, MIT established its Media Lab, a research center that situates itself at the intersection of engineering, technology, design, and art. (These programs themselves are outgrowths of initiatives such as Experiments in Art and Technology and MIT's Center for Advanced Visual Studies, both founded in the late 1960s and both of which paired engineers and artists to work on creative projects.) ITP, the Media Lab, and other similar programs have spawned alumni who go on to lead careers as artists and establish start-up companies alike.

Technology, hacking, makers: these words are increasingly common in popular discourse today. Art museums are adopting the tools and strategies of the technology scene today for many

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reasons. One the one hand, it is easy to see a parallel between artists and hackers, both groups dedicating themselves to the enactment of counterculture through creative production. Like hackers, artists are known for eschewing authority, forming a community of creators around this subversive practice. The image of a hacker resonates with the image of the irreverent artist who uses his craft to convey an anti-authoritarian, if not full-on political, message. But at the same time, tapping into the contemporary technology ethos isn’t all that radical, serving as a safe choice for museums as the maker movement rushes into the mainstream. The maker movement has now been normalized, keeping the elements of creativity while stripping itself from more subversive leanings. In fact, maker culture coopts tinkering with technology to align itself with the mainstream interests of growing the economy and boosting innovation. Art museums are attracted to technology, the maker movement, and hacker culture because these attitudes align with the creative practices art museums have always championed while embuing these (often considered staid) institutions with the cache of progress and futurity.

In Status Update, Alice Marwick critiques the coexisting, but contradictory, ethos within the world of tech and more specifically within social media. If early hackers championed open source, collectivism, and anti-institutionalism, Silicon Valley soon borrowed some of these cyber-utopian beliefs to form what Richard Barbrook and Andy Cameron call the Californian Ideology: the paradoxical combination of technological determination and libertarianism. “Silicon Valley libertarian beliefs,” Marwick explains, “are rooted in a strong that intelligence and drive and indicators of success, an almost mythological trust in entrepreneurialism, the ‘do-it-yourself’ ethic, and an idealized view of the internet as a utopian space.”73 The current state of Northern California’s tech industry is more governed by individualism and deregulated free-

73 Marwick, Status Update: Celebrity, Publicity, and Branding in the Social Media Age, 50.
market economic policies and less by the collectivism of yore. In the end, this paradoxical framing benefits Silicon Valley more than anyone else: it gives off an anti-establishment veneer while maintaining—and perhaps even to mask or to justify—its capitalistic privileges.

Taking Marwick’s analysis into account, it is unsurprising that art museums are aligning themselves with the attitudes and rhetoric of the contemporary technology world. Museums have always embodied this same paradox: As institutions whose dual mission is to educate and to collect and preserve art, they are caught between supporting creators and deciding which of these creators are worthy of being displayed on their walls.
CHAPTER 3
Looking to the Past, Making the Future

From May 23, 2013 through April 6, 2014, the Los Angeles County Museum of Art held a retrospective of the work of James Turrell, an artist who rose to prominence in the 1960s and 1970s for his installations that deal with time, space, and perception. LACMA was a fitting host for this exhibition, a return to Turrell’s roots: in 1968 he collaborated with Robert Irwin as a part of the museum’s original Art & Technology program. Helmed by curator Maurice Tuchman, the program—launched in 1967 and running through 1971—would pair artists with corporations to develop large-scale technology-related projects. Many of the selected artists, from Claes Oldenburg to Andy Warhol, were already titans within the world of contemporary art. Turrell was decidedly not, or at least not yet. At the young age of 23 he had only recently dropped out of his first graduate program. \(^7^4 \) LACMA brought Turrell in to work alongside Robert Irwin, an artist a few decades older who had made a name for himself as a painter; the two were paired with perceptual psychologist Ed Wortz of the aerospace company Garrett Corporation.

Irwin and Turrell’s participation in A&T is generally considered a failure. In the Art & Technology report, Tuchman documented Irwin’s many doubts about the program, not least of which included the undue pressure he felt to have to produce an art object during the course of

the residency.\footnote{Maurice Tuchman, \textit{A Report on the Art and Technology Program of the Los Angeles County Museum of Art, 1967-1971} (Los Angeles: Los Angeles County Museum of Art, 1971).} In August 1969, Turrell resigned his commitment to the program and severed all ties with Irwin.

But Turrell’s recent exhibition at LACMA suggests a different story. While Irwin and Turrell’s time at Garrett Corporation did not result in a work of art, their collaborations with Wortz marked a turning point for both artists: the launch of Turrell’s career and a pivot in Irwin’s, who, after this moment, abandoned the studio in favor of creating large-scale light installations. As Tuchman explained:

\begin{quote}
Indeed the ramifications of the ‘Irwin/Turrell/Garrett project’ so far transcend the immediate parameters of A&T that it is not possible for us fully to know, much less to document, every phase or outcome of the ongoing work set in motion by the original A&T connection.\footnote{Ibid., 127.}
\end{quote}

Though Irwin and Turrell’s time at LACMA was marked by discord, their involvement in the museum’s program was essential to the maturing of both artists’ work.

In December 2013, LACMA announced that it would relaunch the spirit of the original Art & Technology program, now rebranded as the Art + Technology Lab. This iteration aims not to replicate the mid-century initiative, but rather capitalize on the continued interest in the program—the A&T curatorial files are the museum’s the most requested archives\footnote{Julia Kim, Jessica Gambling, and Courtney Dean, “Art and Technology in the Archives at the Balch Art Research Library,” \textit{Unframed: The LACMA Blog}, July 7, 2014, https://unframed.lacma.org/2014/07/07/art-and-technology-in-the-archives-at-the-balch-art-research-library.}—and, most importantly, learn from its failures. Amongst museum making initiatives, the A+T Lab is unique for its direct historical forebear, a major undertaking from the museum’s past that continues to hold a special place in popular imagination. Additionally, in comparison to the two other case
studies featured in this thesis (and perhaps because of its historical precedent), LACMA’s program is the most high-profile initiative, receiving extensive external funding and benefiting from strong institutional support. In this chapter, I outline the development of the new A+T Lab, which was devised in light of the lessons learned from the original program. The Lab’s narrative resonates with the ideas introduced in the previous chapter: that our understanding of what constitutes art and technology—defined differently by the original A&T program and today’s A+T Lab—is dependent on geographic and temporal contexts. Afterward, I discuss how other museums are also looking to their institutions’ pasts to justify and gain support for their own technology initiatives. I conclude by discussing how museums are institutions that must continually interpret their pasts while changing to fit the current zeitgeist, and that the ways museum professionals choose frame their institutions are always political acts.

3.1 Case study: Los Angeles County Museum of Art, Art + Technology Lab

Of the three case study sites presented in this thesis, LACMA is the youngest museum. Its roots date to 1910 with the founding of the Los Angeles Museum of History, Science, and Art; LACMA was established as a separate entity dedicated solely to art in 1961. Four years later, the museum opened its doors on Wilshire Avenue, set halfway between downtown L.A. and the Santa Monica pier’s entrée to the Pacific Ocean. Its collection of 120,000 objects makes it, according to LACMA’s website, the largest art museum in the western United States, although this figure is paltry compared to the Metropolitan’s two million.78 The collection is encyclopedic in scope, covering a broad geographic range and representing cultures from antiquity to present. (At the

time of the museum’s founding, LACMA did not exhibit or collect contemporary art.

Tuchman—hired as LACMA’s first curator of twentieth century art—made a bold move in establishing the A&T program just two years after the museum opened: he approached corporations for partnerships and funding in order to be able to work directly with living artists, sidestepping the need for approval from the museum’s board of trustees.) The museum receives over one million visitors a year.

Located in the United States’ strongest art center after New York City, LACMA holds a high level of prestige; however, it is tinged with a distinct California flavor. Amy Heibel, vice president of Technology, Web, and Digital Media at LACMA, suggested that, unlike other institutions that adhere to strict divides between curatorial and other departments, LACMA is able to be more experimental in its programming:

At this museum, there is a lot of cross-functional collaboration that makes a project like this one possible. We try to run a flat organization—to encourage experimentation and risk-taking in ways that get beyond job descriptions. This project is one that benefits from different curators, educators, librarians, archivists, and technical staff at the museum pitching in to make artist’s ideas happen.79

This attitude is distinct from East Coast museums and especially those in New York City, which tend to be characterized by a more hierarchical organization.

Geography also plays a role in the types of technologies with which LACMA engages. Though Tuchman partnered with a few sponsor corporations based outside of Los Angeles, the original A&T program had a distinctly Californian flavor. He wrote that his interest in tapping into technology and corporations was inspired by his environment: “In 1966, when Art and

79 Correspondence with Amy Heibel, April 2015.
Technology was first conceived, I had been living in Southern California for two years. A newcomer to this region is particularly sensitive to the futuristic character of Los Angeles, especially as it manifested in advanced technology.” His view of technology was defined by the industries prevalent in 1960s L.A.: defense (for example, the RAND Corporation, Lockheed Aircraft Corporation, Garrett Corporation, and Hewlett-Packard, then “heavily involved in defense equipment: radar, guided missile control, nuclear research”80), aerospace exploration (Jet Propulsion Lab, North American Rockwell Corporation), manufacturing (General Electric, Kaiser Steel Corporation, the Container Corporation), entertainment (WED Enterprises, Inc., the privately-owned subsidiary of Walt Disney Productions; Twentieth Century-Fox Film Corporation; and Universal City Studios, Inc.), and automobiles (Philco-Ford Corporation).

Our conception of technology, however, changes over time. Technology that currently dominates popular discourse veers toward software, data, and physical computing—a vision far off from the giant machines of Tuchman’s time—and finds its epicenter in the Silicon Valley and San Francisco Bay area. But today, as incubators, major companies like Google, and visual graphics and virtual reality startups begin to open offices in places like Santa Monica and Venice (dubbed “Silicon Beach”), L.A. is again emerging as a budding tech center. The current A+T Lab partners with companies in Southern California; the most recent request for proposals suggests that their “areas of interest and expertise” include “the Internet of Things,” “biological data,” “issues of perception and alternate or augmented reality,” and “the interplay between technology and the human.”

The contemporary A+T Lab aims to foster the development of new ideas and projects at the intersection of art, science, and technology. In a quote from a Verge article, Heibel explains

the A+T Lab aims to tap into “impractical and creative applications of technology,” and that “we are not looking for the next great mobile guide app.” The program is structured as a hybrid grant and residency program; artists compete for funding of up to $50,000 as well as in-kind support and mentorship from corporate partners such as Google and SpaceX. For artists, participating in the A+T Lab could be a career-changing opportunity: not only do they receive financial and technological support to undertake projects, but they gain prestige—a kin to what Pierre Bourdieu dubs “cultural capital”—for having been selected for a competitive award by a major cultural institution. Their projects could take place in L.A. or elsewhere over the course of a year. By the time of this writing, the A+T Lab was wrapping up its inaugural yearlong grant cycle, but the program will live on beyond the first year: LACMA has raised enough funding to support the program for six years, and is expected to continue beyond this period.

In addition to the grant program, the A+T Lab also is a physical space. In 2013, the museum had the opportunity to remodel its library and archives space. The library’s reading room now doubles as the Art + Technology Lab, a pristine white space punctuated with mid-century modernist furniture and a ribbon window overlooking a courtyard. A long white table outfitted with electrical outlets serves as a study nook for researchers and artists alike. Located in the basement of one of the LACMA campus’s many buildings, the Lab is not easily trafficked by everyday museum visitors; however, the Lab transforms into a meeting and workshop space during public events.

The A+T Lab emerged out of the museum’s Technology, Web, and Digital Media department and its efforts are led by Amy Heibel and Joel Ferree. Heibel’s background is fitting

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for this new initiative: she grew up in Silicon Valley, her mother employee 15 at Apple and her father an engineer who developed laser technologies. Prior to her role at LACMA, she worked at an experimental theater company that used emerging technologies to produce participatory theater experiences, and then trained product managers at Google. In her role as vice president of Technology, Web, and Digital Media, Heibel oversees the program more generally, while Joel dedicates himself full-time to the Lab. Ferree has a degree in urban planning and previously ran a gallery in New York City, working closely with artists to mount exhibitions. He initially came to LACMA as a project manager for the web and digital team, overseeing the development of web projects. However, “over the course of the Lab’s first year we saw how quickly it was growing and it demanded more and more of my attention. And so it basically just pushed my role into the Art + Technology Lab camp, like 100%.”82 He now manages all day-to-day aspects of A+T Lab activities, including coordinating grant applications, facilitating meetings between artists and corporate advisors, and planning public events. In these efforts, he often works closely with education and curatorial departments at LACMA; in some ways, his previous role as a project manager prepared him well for this:

I worked on a lot of mobile tours for web and digital and so I was working with our Education department on that. We would work together on the drafts for the mobile stops, so there was already that relationship in place. What we had to do was switch the focus from generating content from mobile stops to structuring and kind of working on the approach for a public program.83

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82 Joel Ferree, Interview, February 11, 2015.
83 Ibid.
The Education department provides feedback on public events, while curators will advise artists on the direction of their projects. While Heibel and Ferree helm the A+T Lab, its success requires collaboration across the museum.

The initial Art + Technology Lab call for proposals was due on January 27, 2014. LACMA received 476 applications, more than Heibel or Ferree had ever expected. An interdisciplinary team of six or seven staff members culled from the Web and Digital, Education, and various curatorial departments initially reviews the applications. These individuals pare down the applications, looking for the most exciting projects that best fit the goals of experimentation and public engagement. The shortlist is then shared with a broader group of internal staff and with the corporate advisors, who are invited to provide feedback on the projects. However, the final say goes to the museum’s director and the chief curator of contemporary art.

On April 9, LACMA announced the grant recipients, six artists working on a total of five projects. Compared to Peabody Essex’s Maker Lounge and Metropolitan’s Media Lab participants, A+T Lab grantees are more closely aligned with the visual arts world. But unlike the historical A&T program, the artists they selected for the new Lab aren’t necessarily major names in contemporary art. Most of the participants are professional artists: they have generally completed a higher education degree in art or a related field and consider their art practice as a major or substantial part of their career. According to Ferree, the breadth of participants “ranges from artists who are very established in the contemporary art world to artists who are more community-based, or artists who are more academic.” A handful teach in university visual arts, digital media, or computer art departments. The program is also an avenue for emerging artists.

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84 Conversation with Joel Ferree, Amy Heibel, and Jessica Gambling, August 2014.
85 Ferree, Interview.
As Heibel explained: “This program is one that encourages new work from artists, some of whom are at an early phase of their career. It’s a great way for us to meet and work with artists who are doing interesting work that we may not otherwise be exposed to.”

<table>
<thead>
<tr>
<th>LACMA Art + Technology Lab Projects, 2014-2015</th>
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<tr>
<td><strong>Taeyoon Choi and E. Roon Kang</strong> planned to undertake <em>In Search of Personalized Time</em>, an ongoing project that eschews Isaac Newton’s concept of Absolute Time in favor of exploring alternative modes for thinking about time. Their involvement at LACMA includes hosting collaborative public workshops in which participants generated ideas and prototyped new ways for conceiving and measuring time.</td>
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<td><strong>John Craig Freeman</strong> developed a new phase of his ongoing project <em>EEG AR: Things We Have Lost</em>. While in residence at LACMA in spring 2015, Freeman asked L.A. denizens what they had lost, create virtual objects based on their responses, and then, using augmented reality technology to overlay computer-generated images onto the real world via a screen, “scattered” these objects through out the city. He has also been exploring how brainwave sensing might be used to conjure these images.</td>
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<td>In <em>Piece of the Pie Chart</em>, <strong>Annina Rüst</strong> built robots that would place data visualizations of gender inequality in the art and technology sectors onto real, edible pies. She has also created a participatory web project in which users can mine gender equality data to create their own visualizations.</td>
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<td><strong>Tavares Strachan</strong> initially proposed to launch alternative fuel-powered glass rockets from Los Angeles and his native Bahamas. Over the course of his time at A+T, however, his project has shifted; he is now planning a series of performances, drawings, and sculpture focusing on an overlooked pioneer in space travel.</td>
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<td><strong>Rachel Sussman</strong> was funded to conduct research on the limits of human perception of deep time and deep space. During her time at LACMA, she has spent time working with experts at SpaceX and the Jet Propulsion Lab.</td>
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The first A+T Lab yearlong project cycle began in April 2014. To kickstart the program, Heibel and Ferree hosted a convening that brought together all of the artists as well as corporate advisors. The advising team consists of representatives (often high-level executives) from each corporate sponsor, as well as “independent” advisors who serve as mentors but do not necessarily...

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86 Correspondence with Amy Heibel, April 2015.
contribute monetary support. Over the course of two days, the artists visited various company headquarters, heard presentations on topics as broad as augmented reality and drones, spoke with technology experts, and witnessed project demos. They also had the opportunity to meet staff in other departments at the museum. This would be the only moment when all of the artists would simultaneously convene in Los Angeles, but it allowed for relationships between artists and advisors, as well as between artists and museum staff, to blossom. Through out the year, Ferree would facilitate follow-up meetings between artists and advisors and work with artists to plan and execute public programming.

Unlike the original A&T program, participating artists are not required to produce a work of art by the end of their tenure. But whereas many artists in the 1967 – 1971 iteration of the program felt constrained by the need to create a final product, the proposals that the renewed A+T Lab received were overwhelmingly product-oriented. Heibel explained:

We do not focus on the finished work of art. Our goal is to fund a process, one that is truly experimental. We want to see interesting paths of inquiry and we're willing to accept a lot of risk along the way—including the risk that a project may not actually result in a finished work of art. That said, I've been impressed by how entrepreneurial the artists are. Quite often, they are incredibly organized and they have a very clear vision and a production timeline and they operate with a discipline that isn't unlike what you see in small business entrepreneurs.87

This description is a stark contrast from the art scene during the original A&T program. In the 1960s, it was a time of experimentation, an explosion of new artistic genres such as conceptualism and performance that were focused more on idea and process than a completed object. Today, however, artists constantly vie for grants; Ferree described this as an “artist-as-
In some cases, Heibel and Ferree had to encourage artists not to produce an object; for example, photographer Rachel Sussman was encouraged to solely conduct research on deep time and deep space during her grant period. The 2015 call for proposals aptly describes this more process- and experimentation-based approach that Heibel and Ferree hope to solicit: “LACMA is not looking for traditional proposals. Some degree of uncertainty and ambiguity is encouraged, in the interest of identifying projects that truly explore new frontiers in art and technology.” Nor are artists required to have any prior experience working with technology, although many applicants do. Ferree explained:

I think for artists that are not used to collaborating so much, it’s a humbling experience, but they also learn a great deal, and it opens up the realm of possibility for their practice in the future. And that’s what we’re trying to do. Really introduce artists to new technologies, not just cater to artists who are already working with technology.

Perhaps the case of Robert Irwin from the original A&T program provides a strong example of what the contemporary Lab endeavors to achieve: to have a profound effect on the course of an artist’s process and thinking through the engagement with new technologies.

Growth of an artist’s practice is but one of the goals for the A+T Lab; the new Lab is also dedicated to engaging a public audiences through its efforts. In a blog post on LACMA’s website, Heibel explained that the A+T Lab aims to “offer opportunities for the public to witness work in progress and learn from artistic experimentation and trial and error.” The physical Lab space serves as a site where members of the public can view (and often participate in the development

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88 Ferree, Interview.
89 “The Los Angeles County Museum of Art Art + Technology Lab: Year Two Request for Proposals” (Los Angeles County Museum of Art, n.d.), http://www.lacma.org/sites/default/files/YearTwoRFP_12.9.2014_Fin.pdf.
90 Ferree, Interview.
of unfinished projects. The 2015 call for proposals encourages projects that incorporate “public engagement, ranging from activities that take place in the public plazas at the museum or in the Lab itself, to outdoor, online, virtual, and even extraterrestrial environments.” John Craig Freeman’s project, for example, engages LACMA audiences specifically, and Los Angelenos more generally, in many ways: his project literally takes place in the public space, where he interviews city dwellers on what they have lost; using geolocation, he places virtual lost objects throughout the city that can only be viewed via a tablet or mobile phone; he holds viewings of these objects in the museum’s plaza, rolling out a contraption with an iPad strapped to a rolling tripod so that passersby may easily participate; and he hosts several “clinics” in the Lab in which participants are connected to brainwave sensors in order to conjure an image from the lost object database.

Relationships with advisors are a key component of the Art + Technology Lab. The corporate advisors are Sheri Wenker, Managing Director, Marketing & Communications of technology and strategy consulting firm Accenture; Brian Mullins, chief executive officer and founder of virtual reality startup DAQRI; Chris Malachowsky, co-founder of computer graphics company NVIDIA; product manager Max Maxwell and linguist Chris DeFay of Google; Gwynne Shotwell, chief operating officer of space transport services company SpaceX; and Philippe Paré, principal at architecture, design, and planning firm Gensler. A+T Lab’s independent advisors are NASA visual strategist Dan Goods, UC Berkeley professor Ken Goldberg, and artist Peggy Weil. Many of the advisors had some sort of connection to art before being approached to participate in the A+T Lab, perhaps explaining their enthusiasm for donating time and company funds to the cause. Mullins didn’t have a background in art, but he was impressed by the museum’s

92 “The Los Angeles County Museum of Art Art + Technology Lab: Year Two Request for Proposals.”
exhibition of James Turrell, his favorite artist. Other advisors have studied art or have a relative who is an artist; Shotwell’s mother, for example, was a painter.

Advisors provide three kinds of support: financial, technical, and mentorship. The monetary contributions from participating corporations is what allows the Lab to happen, but these companies also provide their technical expertise to artists who may not have access to such knowledge, just as the original A&T program had intended. However, the relationships between artists and advisors are imagined differently. First of all, artists and corporations are not paired on a one-to-one basis as they have been in the historic program. Instead, Heibel and Ferree hope collaborations will form organically via the initial convening and through continued facilitated meetings. Additionally, artists are not obligated to work with an advisor to develop their projects if they cannot find a good fit. As Ferree explained, “Even if they do collaborate for a while and it doesn’t pan out, that’s fine... There were a number of artists who would have a couple of meetings with advisors and it wouldn’t work out. You don’t want to force an artist to collaborate with someone.” The role that advisors play differs from project to project, as well. At times, advisors can offer technological expertise, solutions, and equipment; in other moments, the advisor is more of a mentor that aids artists as they develop project concepts. According to Ferree,

for some artists, it’s just getting ideas from conversations with the advisors. So they’re not looking for particular technologies. Sometimes they’re just looking for, you know, ideas that could stimulate their abstract thinking. So for Taeyoon and Roon, it’s yet to be determined if they will actually use a technology provided by one of our advisors. But they’ve had a lot of conversations with NVIDIA about parallel-processing and how

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93 Brian Mullins, Interview, February 5, 2015.
94 Ferree, Interview.
computers think and use time and measure time. And also Taeyoon and Roon have had a lot of conversations with advisor Peggy Lyle who has opened them up to a lot of different writers that she had been fond of. And so in some cases it’s more of an exchange of ideas and in other cases it’s more of an exchange of technologies. So, like with John Craig right now, it’s quite possible [that] there could be some involvement with DAQRI as far as using their augmented reality app or some version of it for one component of his project.95

By not requiring a particular kind of relationship between artists and advisors and instead allowing their partnerships to be fluid and flexible, the Lab aims to foster successful relationships that avoid some of the struggles of the original A&T program.

Why have advisors so willingly signed on to commit to supporting the A+T Lab for six years, especially when the support requires not only funding but also time commitment from high-level employees? For one, many advisors have indicated that participating in the program has been an opportunity for personal growth. Mullins explains some of the perks:

I get to go to cool events and enjoy art exhibits and hang out with cool people talking about interesting things. I think from a functional standpoint, aside from the perks, I actually get a chance to work one-on-one with the artists several times and really walk through, connecting the dots between, you know, his vision and technology and what it would take to close the gap from a tech standpoint. And that’s been really exciting to me.96

The sense of personal growth can then funnel back into the advisors’ work. Artists provide technologists a perspective that is refreshing to these corporations, which are often driven by the goal of generating a profit. Again, Mullins:

95 Ibid.
96 Mullins, Interview.
I think the biggest benefit that we're getting is we're getting challenged. These artists, they don't think about implementing technology in terms of technology limitations; it doesn't usually cross their mind until the end. And that's such a cool challenge when you spend your whole life thinking about technological limitations and what you can do and cannot do, and try and work within the framework of can and can't do. And then these artists come along and they say, "No, I just have a vision, this is what it should look like." And at first glance you think, that's not even possible, they just don't understand what's going on. And then you step back and you realize, because of that challenge, that maybe there is a way to do it. Or you ask yourself other bigger questions about the role of technology in human interaction and communication and experience, and you're able to see much larger frameworks than you've ever classified the tech before.97

By supporting artists in their endeavors, advisors are exposed to creative ways of thinking that aren't usually associated with their line of work.

Matthew Wisnioski has written about the Center for Advanced Visual Studies at the Massachusetts Institute of Technology, a program similar to the original A&T program and other concurrent initiatives like Experiments in Art and Technology. Founded in 1976, CAVS hosted a series of artists realizing technology- and participatory social practice-related projects, often in collaboration with university researchers. Today, Brian Mullins champions the creativity that artists bring to his work in the field of augmented reality; in the 1960s, M.I.T. representatives similarly described the benefits of pairing artists with engineers. Wisnioski describes the dual pillars of collaboration and creativity upon which CAVS was predicated:

*Collaboration* was cast as a means of capitalizing on the integration of different knowledge domains to solve complex sociotechnical problems, and, in so doing, to bridge larger societal divisions. Above all, art was a mark of *creativity*, and as such was a

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97 Ibid.
universal marker of intellectual, professional, and social good that could rehabilitate the image of science and technology through the alteration of the self.\(^9^8\)

This statement hints at another reason that corporations are willing to donate substantial sums of money to the A+T Lab: many technology companies view aligning themselves with the arts as a strategic move that makes technology seem thoughtful and relevant to culture. When Heibel approached SpaceX about participating in the Lab, she was surprised by their response:

When we approached SpaceX to talk about their involvement in the program, they were very interested, and to my surprise, it wasn't about brand visibility for them. Instead, they expressed their interest in contributing to anything that might educate the public about science and technology, and help build a sense of all of the positive contributions science and technology can make to culture. They also have a talented team of engineers and were interested in the opportunity to expose those people to artists and thinkers from other disciplines.\(^9^9\)

Companies have long supported the arts; corporate sponsorship is one of the major fundraising strategies of museums in the United States. For the private sector, engaging in philanthropy is a way to mitigate their public image by “doing good” for society. But for technology organizations supporting the LACMA program, we see another dimension coming into play: affiliating themselves with the arts imbued their technology with a sense of humanity. For M.I.T., investing in CAVS and art more broadly was a way for the university—whose research was closely tied to (and often funded by) the cold war military agenda—to manage its public image, especially as escalation in Vietnam led to anti-technology and anti-corporation attitudes stemming from the civil rights, antiwar, and student movements. But Wisnioski identifies another impulse behind


\(^9^9\) Correspondence with Amy Heibel, April 2015.
efforts like CAVS; he argues that such initiatives were also predicated on an ideology he calls “aesthetic virtue,” or the idea that art lends technology a higher meaning.

In recent years, there has been renewed interest in the intersection of art and technology. Wisnioski points out several contemporary examples: Google holds an employee art contest; a recent National Science Foundation grantee claims to “broaden students’ engineering perspectives” through art. \(^{100}\) Wisnioski explains, “The general exuberance for a convergence of art and technology today is similarly built on competing claims to creativity and collaboration, on desires to refashion scientific and engineering selves, on projects to define the creative human in a technological age.” \(^{101}\) Aesthetic virtue explains why the tech and science sectors—and possibly the companies involved in A+T—are interested in working with the arts: art brings to these fields a sense of humanity and good that combat public images of malevolence and profiteering, especially in the wake of recent revelations of that companies and governmental organizations like the National Security Agency are abusing data privacy in the name of selling products and surveilling its citizens.

While advisors do contribute to the development of projects through the sharing of ideas and technology, neither they nor LACMA have any creative or intellectual property rights over any of the work produced during the grant period. (This decision is in contrast with the original A&T program, in which LACMA’s stipulation that one work of art be donated to the participating corporation brought a lot of strife.) The most recent call for proposals also indicates an interest in projects that are open-source or available in the public domain: “In addition, preference will be given to projects that are publicly accessible, consistent with

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\(^{100}\) Wisnioski, “Why MIT Institutionalized the Avant-Garde,” 115.

\(^{101}\) Ibid., 116.
LACMA’s mission, and produce models, prototypes, data, code, or other material that can be shared broadly.”

One of the challenges that the current Art + Technology Lab faces is articulating their vision for the kinds of projects they support. As discussed above, first-round applicants largely submitted proposals that were product-oriented, rather than projects geared toward process and experimentation. Additionally, often the program is perceived as targeting a very particular community in the vein of creative coders, hackers, and makers. As Ferree explained in a conversation,

You had a really good question... ‘Is there an art and technology community and do we work specifically with that community?’ And I think many people thought that’s what we were going to do, and we do to some degree. I think definitely think that community is important or doing really great stuff. But we don’t want to alienate a broader pool of artists as well.

While LACMA recognizes emerging communities of creative technologists, their program is not geared to this community as explicitly as, for example, the Metropolitan’s Media Lab might be. In fact, prior work with technology is not a requirement for participating in the Lab; the request for proposals explicitly states, “Artists who have not used advanced technology in their work are encouraged to consider how technology applications might build upon and expand the trajectory of their work.” As they enter their second year of the program—a new round of A+T award recipients will be announced in April 2015—LACMA uses the documentation, such as museum blog posts and project websites maintained by individual artists, to communicate what they are looking for in applicants. By pointing to “existing projects that we’ve been working on this first

102 “The Los Angeles County Museum of Art Art + Technology Lab: Year Two Request for Proposals.”
103 Ferree, Interview.
year,“Ferree explained, they let “the program define itself, and [let] the program answer the
questions for prospective artists.”

3.2 Analysis

Just like the mid-century Art & Technology program, the current Art + Technology Lab hinges
on a three-way relationship between the museum, artists, and corporate advisors. The staff
members who devised the new A+T Lab looked to the failures of the historical program, applying
these lessons to the current context of art and technology. In this sense, the relationships that
artists develop with A+T advisors are very much mediated by the museum’s past.

While LACMA is the only museum making programs with a direct historical precedent,
many museum professionals look to their institutional past to rationalize when and how they
introduce technology into the museum space. As spaces dedicated to preserving our cultural
heritage, museums sometimes frame technology as a threat, diluting the Benjaminian aura of
storied art objects through the implementation of new-age gimmicks. But museum making
initiatives upend this narrative. The forces behind Metropolitan Museum of Art’s Media Lab and
the Peabody Essex Museum’s Maker Lounge use their institutional histories in order to argue
that emerging technology, in fact, belongs within the art museum. These reframings become
strategies to justify museum making initiatives to their internal colleagues, outside press, and
potential funders deciding where to put their money.

In early 2014, Don Undeen, manager of the Met Media Lab, wrote an essay for *Make* magazine titled “All Art is Made by Makers.” In the article, he likens artists to makers—“Creative, curious, hands-on masters of the tools at their disposal. That sounds like a description of both artists and makers”—effectively aligning the objects in the Metropolitan’s collection with newer, technologically-inclined modes of creative production. Undeen often talks about how many of the works on view at the Met, from medieval armor to the earliest known surviving piano, were new technologies in their time. This carefully crafted rhetoric allows him to reframe the institution to as a site of experimentation: he overturns the stereotype of the museum as a musty, dark, old place filled with obsolete curios, turning it into a place where new ideas can emerge.

Juliette Fritsch, director of education and interpretation at the Peabody Essex Museum, similarly frames the Maker Lounge as a continuation of the museum’s past. PEM traces its origins to the East India Marine Society, an organization founded in consisting of travelers and merchants who collected wares and treasures from around the globe. In discussing the Maker Lounge, Fritsch points to these individuals, whose spirit of entrepreneurship and innovation can also be found in the maker movement today:

The museum was founded by innovators, explorers, entrepreneurs who traveled the world, collected things, but also invented things to help them travel and navigate, and brought stuff back to show people, expose them to a wide range of creativity and culture, and expand their minds. And, you know, it’s funny because PEM is one of the oldest

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museums in America and it’s always been a contemporary museum, because it’s always collected contemporary stuff, it’s just now some of that stuff is hundreds of years old.\textsuperscript{106}

Instead of portraying collection objects as dusty, fossilized artifacts, Fritsh presents them as living objects that stem from a particular time and place. This reframing finds commonality between centuries-old art works and technologically-based creative production today, despite differences in medium and aesthetic. PEM’s mission statement presents an equally broad definition of art. By “celebrat[ing] outstanding artistic and cultural creativity,” the institution can simultaneously house hand-painted porcelain and wearable technologies within its walls.\textsuperscript{107} For Fritsch, making is simply a new manifestation of creative expression.

Undeen and Fritsch look at the specificity within their particular institution’s pasts to more broadly define what creative production can be. This isn’t a completely novel strategy: Museums have long used their institutional history and their museum charters or missions to guide what they collect, how they exhibit it, and how they engage with audiences. Theopisti Stylianou-Lambert has written that museums, like other media forms, “are not monolithic or passive institutions. On the contrary, they are proactive and innovative organizations which are constantly guided by missions, goals, and ideologies.”\textsuperscript{108} Art museums must also attend to the “certain political and economic environment of their time.”\textsuperscript{109} As we saw in chapter two, museum making programs are emerging within a zeitgeist that destabilizes the boundaries between creative forms and that is dominated by the rhetoric of technology and innovation, two ideas now seeping into new political and economic decisions and structures.

\textsuperscript{106} Juliette Fritsch, Interview, February 27, 2015.
\textsuperscript{109} Ibid.
But while museums are institutions that change, just like all other institutions, they are also beholden to their collections, a reminder of the past. Simon Knell, Suzanne McLeod, and Sheila Watson recognized this tension: “museums are always reacting to a perceived future—they are all opportunists—but yet they must also reflect upon their past and on the inertia that surrounds them.” They ways they choose to change is a dual decision to interpret histories and align themselves with (or purposefully react to) the current cultural and economic climate. Because of this, the authors suggest, museums are consistently undertaking a “managing of myths,” an act that is always political.

Museum representatives often talk of a need to “advance” their missions, as if a mission is a starting point of a geometric ray that continues on in a straight line into infinity. In this metaphor, museums are compelled to progress, but they can’t veer from the path. In reality, that’s not how museums work; missions must be interpreted and narratives are constructed to justify these interpretations within the contemporary context. It would be foolish to think that museums don’t and shouldn’t change. Museums, like the rest of the world, are dynamic, social organizations, and must react to what’s happening around them. In museum making, we see art museums incorporating not just the past, but also the future, as part of their missions.

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11 Ibid.
CHAPTER 4
How Museum Making Happens:
Navigating Financial, Technological, and Institutional Barriers

The Met Media Lab is located on the fourth floor of the Metropolitan, a colossal museum that spans four New York City blocks. While the galleries below are characterized by impressive columns and high ceilings typical of its Beaux-Arts style, the Lab’s architecture consists of drop-tile ceilings and fluorescent strip lights: the hallmarks of an office space.

But a look past these humble trappings reveals that more than a typical cubicle wasteland. White boards occupy the length of one wall; their surfaces become covered in multi-colored scrawls during brainstorming sessions in which participants pitch ideas, a moderator jots them down on the board, and then interested and willing participants add their names next to potential projects. A central table serves as a home base for laptops and people to gather, the former charging their batteries while the latter engage in energizing conversation. During workshops, groups might disperse to far corners of the L-shaped office, previously an image library that went unused for years after the digitization of the museum’s slide collection. Or they might choose to perch at one of the computer stations set up at a standing desk, huddling as they manipulate forms using 3D modeling software.
Hints of creative production are scattered around the room. When I first walk into the space, pipe cleaners and wire cutters adorn a large workstation. At a neighboring desk rests an Oculus Rift virtual reality headset; I’m told that another head-mounted display, Google Glass, frequently makes a cameo in the Lab. A handful of iBeacons—low-powered transmitters used for indoor proximity and positioning systems—hang on hooks dotted along the walls. (At one point, when demonstrating how the device can be used to trigger a response on my mobile phone, Media Lab manager Don Undeen flings a light blue iBeacon across the rows of desks: this isn’t your grandmother’s office.) Two 3D printers perform a soundtrack, their high-pitched whirring indicating the painfully slow process of building layer upon layer of filament to form three-
dimensional objects. The products of these printers are displayed in every corner of the lab. One window ledge, brimming with tiny replicas of objects in the Met’s collection, is like a museum in its own right, although its jumble of objects resembles more a storage space than an immaculate gallery.

Virtual reality tours of the galleries, visualizations that explore algorithms in Islamic art, wayfinding mobile applications for the partially blind: The kinds of projects prototyped in this space might seem surprising for a place like the Metropolitan, known more for relics of the past than whizz-bang technology. But what’s more unusual is how Don Undeen has, on a tight budget and with limited staff and technological resources, transformed a drab office into what he calls a “walled-garden safe zone, a failure zone where experimental things can happen with a real different set of processes.” Don’s statement reveals a tension between the Met and its Media Lab, a tiny entity within the museum. A “walled-garden safe zone,” Media Lab is a welcoming oasis within the titanic institution, a respite from the kind of blue-blood legacy that looms over the Metropolitan.

“Museums tend to be culturally conservative, I think,” a museum archivist once told me. In a way, they have to be: they are institutions that confer legitimacy on art, and this power relies on a certain wariness of letting something new in. “And technologically conservative,” she added. “It’s hard for people to move forward in anything with technology in museums.” As non-profit institutions whose limited funds are primarily funneled into exhibition development and new acquisitions, it is difficult for museums to compete with new advancements in technology. But

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112 Don Undeen, Interview, June 5, 2014.
113 Interview, August 5, 2014.
moreover, many see technology as a threat to museums, something that can undermine the importance of “chosen” collection objects that give museums their clout.

This chapter explores how museum making programs must contend with the cultural and technological conservatism of their cultural institutions, with the Met Media Lab serving as my primary case study. Howard Becker’s Art Worlds provides a useful framing for this discussion. Becker argues that art is formed through a coordinated network of many individuals he calls an art world. Like Becker, I am interested in mapping the coordinated links that allow museum making programs to take place. First, I will outline the development of the Media Lab, a scrappy unit within a behemoth of a museum. In the analysis section, I examine the strategies of the Media Lab and other museum making programs that allow them to experiment with new technologies despite limited resources. These strategies involve both expanding outside of the museum through partnerships with technologists and technology organizations, as well as looking inward, devising strategies to work with colleagues within the institution. Finally, I discuss these within Becker’s analysis of innovation and change in the arts.

4.1 Case Study: The Metropolitan Museum of Art, Media Lab

In 1866, a group of Americans met in Paris and decided to form a “national institution and gallery of art” in order to bring civilized art and culture to the American people. The Metropolitan Museum of Art opened its doors in 1870 in midtown Manhattan, moving to its current location only a decade later. Its New York home is noteworthy, maintaining the title of the world’s artistic nerve center since World War II. The massive museum, perched on the edge

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of Central Park, spans several city blocks. Its neoclassical façade is iconic; on any given day, hordes of school children, foreign tourists, and New Yorkers populate the Museum’s granite steps.

The museum is international in scope, both in its collection and its visitorship. The Met is the most well-known and trafficked art museum in the United States, receiving 6.28 million visitors between July 2013 and June 2014. The 2-million-object collection is encyclopedic, representing exemplary works from regions all over the world, from ancient times to today.

A giant of a museum, with a giant collection, within the United States’ busiest and most populous city, the Metropolitan is viewed as an authority on art, and also one that is traditional, conservative, and slow moving. At the same time, the Met also captures the imagination of people around the world. In the 1989 romantic comedy When Harry Met Sally, the titular characters walk across the cavernous Sackler Wing on the north end of the museum, strolling by the ancient Egyptian collection’s Temple of Dendur. Sesame Street chose the museum as the site of its one-hour 1983 P.B.S. special Don’t Eat the Pictures, starring none other than a Cookie Monster who finds himself accidentally locked in the galleries overnight. A Met Media Lab intern described to me her own relationship to the storied cultural institution:

I grew up in rural North Carolina, but I have a really quite sophisticated and chic aunt who lives in Manhattan, and I would come up in the summer for a week or two and live with her. And we would always go to the Met; that was always the first thing we would do. We would get to the city and we would spend like five hours, and we would eat there and go to the museum. So I really have such a soft spot for the Met, and really it came to symbolize getting out of the South and pursuing a more cultured sort of life.\textsuperscript{115}

\textsuperscript{115} Interview, January 2015.
For her, the Met symbolizes possibilities, a window into many time periods and cultures. The Metropolitan is iconic beyond its seemingly endless collections and impressive façade; to many people, it is a site for reflection, beauty, and inspiration.

The Media Lab is situated within the museum’s large, 60-member Digital Media department. Digital Media is broken up into several sub-departments: the Media Lab sits within the creative development team, with currently only two staff members dedicated to the Media Lab full-time. The Lab was founded in 2011 when Erin Coburn, then the recently-hired director of digital media, reorganized the structure of the department. She tapped Don Undeen, an information architect who had spent five years at the museum, to run a new section of the department called the Media Lab. This team would work on what Undeen described to me as, “for want of a better word, junk drawer coding projects”—in other words, any software development projects that didn’t neatly fit into the purview of the other teams. The Media Lab’s functions would be two-fold: to work on legacy projects that had existed before the department’s reorganization, and to serve as an unofficial research and development (R&D) wing that focused on experimentation with technology.

With a team of three developers then in his care, Undeen faced the task of figuring out “what exactly is a Media Lab supposed to do in a museum.” One of his initial strategies was to adopt Google’s twenty-percent time as a way to spur the development of creative, unexpected products. The technology corporation popularized the model in which its engineers can develop

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116 The Metropolitan Media Lab is not the only entity with the museum experiment with new technologies; other teams are developing public-facing mobile applications, games, and interactive installations. However, the Lab is the only group at the Metropolitan inviting outside audiences to create with technologies in a semi-formalized way, sometimes in partnership with other museum stakeholders, such as members of the Education department. Undeen explained: “We don’t own innovation in the museum. What we do well is this outreach to the creative technology community and facilitating external people with their goals, conversation with the museum in ways that are really mutually beneficial.”
creative or personal projects of their choosing for twenty-percent of their work time. Undeen soon realized, however, that this model wasn't feasible for such a small team:

There's too many different types of technology to think that you're going to hire someone that knows how to do all those things. Or that you're going to be able to, internally, keep up with all of these projects, a lot of which aren't really going to go anywhere, you don't really know how to tackle them, you know, like, it was just not conceivable to do that internally.\textsuperscript{117}

This anecdote exemplifies the reality of R&D-style labs within museums: as non-profit institutions, museums often lack the financial and staff resources necessary to accomplish anything worthwhile. Instead, Undeen would have to search for alternative models.

The following year, he had a breakthrough when desktop 3D printing entered the market. Makerbot Industries began selling personal, open-source\textsuperscript{118} printers in 2009; even though 3D printing technology printing has been around since the 1980s, this was heralded as the first time printers were affordable and accessible to a broader public. Soon after, software company Autodesk released 123D Catch, a photogrammetry program that turns photographs into 3D models, alongside other free hobbyist software. For Undeen, this moment marked new possibilities for museums:

And that was like the first time photogrammetry became easy and free to use. This idea that anybody could just take a camera into the museum...so the first time that anybody showed me, he just took out his camera and laptop, took a picture of an object, and then put it on 123D Catch and returned a model and I was just like, holy shit, now we can

\textsuperscript{117} Undeen, Interview.

\textsuperscript{118} Makerbot has since discontinued its open-source model, something for which the company has been criticized widely.
actually like scan and print things. And we can just print anything we want at this museum. And anyone can.¹¹⁹

Undeen’s enthusiasm for 3D printing was representative a fervor for all things 3D that emerged in art museums a few years ago, itself part of a larger societal discourse on 3D printing. In October 2012, Wired magazine cover with a Makerbot printer with a headline proclaiming that “This Machine Will Change the World.” This feature article is just one instance of the media narrative on the inevitable ubiquity of 3D printing—soon to be affordable and found in homes across the world—that would surely transform society, for better or worse.¹²⁰ Some art museum staff became excited about the possibilities of 3D technologies and the implications of these technologies for their own work. Two-dimensional art works, such as paintings, drawing, and prints, have been easy to reproduce and disseminate since the advent of photography, but two dimensional formats cannot capture the scale and multiple viewpoints of three-dimensional objects. 3D technologies have also been championed for their ability to engage underrepresented audiences and circumvent conservation issues. Researchers have undertaken studies to explore the value of 3D printing for audiences; while conducting 3D workshops at the Art Institute of Chicago, for example, Liz Neely and Miriam Langer found that “introducing the opportunity to create a full 360-degree scan, which can then produce a 3D print, allow[ed] a visitor to go deeper into the experience of the object.”¹²¹ Printed objects have found use in access programs, allowing partially-sighted or blind visitors to gain a better sense of artworks through the handling of

¹¹⁹ Undeen, Interview.
replicas. Conservators at the Georgia O’Keeffe Museum use 3D technologies to monitor changes in O’Keeffe’s home, comparing architectural models to changes in the building over time. But 3D technologies are not without their controversy in museums, provoking questions of authenticity and originality when you take a supposedly singular art object and allow its form to be reproduced anywhere. For Undeen, the Met Media Lab was a perfect home to start probing at these kinds of questions through hands-on experimentation.

Awed by the possibilities of working with this newly and inexpensively available technology, Undeen approached Makerbot to brainstorm how they might be able to collaborate. They decided to host digital artists for a weekend-long hackathon in June 2012. Makerbot, then working closely with community of designers, artists, and creative technologists, tapped 30 artists from their networks to participate in the event. Participants heard from curators, roamed the galleries, scanned objects, and then let the curators’ stories inspire them as they mashed up 3D models and printed new works of art. Perhaps more important than the resultant objects were what Undeen and his colleagues discovered: “We learned from that that there is this amazing community of creative technologists in New York who are excited about the opportunity to do things in the Met, really excited about the collection we have and what one can do with that.” 2

From then on, Undeen structured the Media Lab around the vigor of the creative technology community. Bringing in outside creators became a way for the Met Media Lab to experiment with a broad range of new technologies within constraints of time, expertise, and budget, while tapping into new audiences. 3

122 Ibid.
123 Undeen, Interview.
124 In a sense, the Media Lab’s reliance on outside audiences to explore inventive applications of technology in the museum space challenges the traditional boundary between museum staff and audiences. This blurring of roles is
The structure of the Media Lab has evolved over time as Undeen and his staff strive to determine the best ways to facilitate interactions between creators and museum resources. In chapter one, I categorize the Lab as an “innovation lab,” because it serves as an umbrella for many types of projects and events. In addition to larger events like the initial 3D Hackathon, Undeen also hosts smaller, more informal “hack days” and “meetups” in which technologist and art enthusiasts come together to develop projects. In May 2013, I attended the first NYC Museum Media Lab Meetup, an event Undeen advertised on the social networking site Meetup.com. The event’s announcement described its goal to “figure out how cultural organizations can better support, and leverage, the incredible creative energy of NYC’s tech scene.” The event convened a medley of artists, technologists, and museum staff from institutions across New York City, all hungry for a chance to use technology in creative ways. Undeen continues to use the Meetup.com group page to develop a community, organize events around proposed interests, and post notes and photos from events.

The Media Lab also occasionally partners with outside organizations and universities to work on longer-term projects. For example, in the spring of 2014, the Media Lab collaborated with the Access and Community Programs wing of the museum’s Education department and the Parsons MFA in Design and Technology. Over the course of the semester, representatives from the three groups led a class centered around designing for visitors with disabilities. Graduate students met with industry professionals and advisors with disabilities who provided feedback as they developed new ways to make the visitor experience more inclusive.

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reminiscent of the more fluid relationship between amateur and professional art practices of the 19th century as discussed in chapter 2. Later in this chapter, however, we see that having audiences lead technological experimentation makes it more difficult to incorporate Lab prototypes within the museum’s offerings.
Since 2013, the Met Media Lab’s internship program\textsuperscript{125} has been central to the lab’s structure. The program is perhaps more akin to a residency than an office job: each intern\textsuperscript{126} develops a project—described as “prototypes and artistic provocations that fuel conversation and new ideas,”\textsuperscript{127}—directed by his or her personal interests. The call for applications for the fall 2014 season listed potential topics that an intern could take on, from trying out a specific technology (“Brain Scanning,” “Computer Vision and Image Analysis,” “Natural Language Processing, Sentiment Analysis, Collective Intelligence, and the Semantic Web”) to addressing a museum area of need (“Accessible Wayfinding,” “Crowdsourced Audio Descriptions of Art”). At times, the projects build on previous Media Lab work: In spring 2014, Yuliya Parshina-Kottas used data collected through the Parsons partnership on lighting, crowd, and noise level in the galleries in order to develop a wayfinding tool that generates paths through the museum based on personal preferences.\textsuperscript{128} The following fall, Rodrigo Narciso Gouveia de Silva and Xinyi Deng built on Parshina-Kottas’s algorithmic framework to develop a front-end user interface. While Parshina-Kottas, Gouveia de Silva, and Deng’s projects are functional investigations to aid the visitor experience, other projects might veer more towards art. Joselyn McDonald’s \textit{FEMET} project, for

\textsuperscript{125} As with many of the Metropolitan’s academic year semester-long internships, the Media Lab internship is unpaid. Because of this, Undeen emphasizes self-directed aspect of the program: “They’re all unpaid, focus is really strongly on making sure that we’re helping them implement their vision and that they’re getting what they want, so it’s very much externally directed.” Undeen, Interview.

\textsuperscript{126} It is not only interns who are invited to develop semester-long projects at the Met; Undeen also welcomes volunteers who want to work on projects but are not students and thus do not qualify for an internship at the museum. The internship serves as a structure to legitimate projects and more easily navigate the museum’s bureaucracy.


example, is a video installation that responds to the lives and artworks of women artists in the Metropolitan's collection. The Met Media Lab, thus, is receptive to a much broader definition of creative production than, say, the more limited scope of LACMA's Art + Technology Lab project, which are all projects that could easily fit within the world of contemporary art. Despite the diversity of work produced at the Media Lab, all endeavors share a commitment to the Metropolitan as an institution at the core of each project, whether by responding to works in the museum’s collection or by using the museum as a physical site for these projects.

Over the course of the semester, interns work with Undeen to refine their project proposals and identify staff members in departments across the museum who might serve as mentors or advisors. Each intern develops the project in a series of three three-week sprints; at the end of each sprint, the intern presents his or her progress to the staff partners, who provide feedback that will determine the project’s direction during its next phase. The process of iteration is one borrowed from agile development, a concept in software development that privileges projects that are rapidly prototyped and that allow for flexibility in their design over projects that are pre-planned and leave little wiggle room for change as they are built. An intern explained that one of Undeen’s most important roles is to facilitate the relationship between interns and staff:

He wants you to connect with curators, if you can, on your own. But if you can’t, he sets up lots of lunches with different curators and they come in...[He'll say], ‘On Monday, three times a day, different curators will stop and talk about an exhibit they have coming down the pipeline, or you can come down to the Arms and Armor department and we'll show you different ways that we clean the weapons, you can come into our space,’ which
is really just availing to you different technologies to the different departments that do conservation.¹²⁹

Staff members become an important resource for interns, providing expertise and equipment that interns-in-residence would otherwise not have access to. For example, a curator might share his or her knowledge about an exhibition or area of art historical research; an educator might contribute his or her experience working with certain populations, such as seniors; and an archivist might provide access to archival equipment.

More recently, Undeen has begun to hold end-of-term expos to showcase Media Lab projects. The first half of the four-hour event is open only to museum staff, while the second half is open to the public. The December 2014 pulled in a large crowd; I arrived to a bustling, congenially congested room in the museum’s Uris Center for Education. Crowds and conversations formed around projects on view, from robotic arms that used contemporary design software to replicate seventeenth-century prints to 3D-printed food molds in the shape of sculptures from the Met’s collection. The event also served to recruit future Media Lab participants: Undeen told me that he invited prospective interns to learn what the internship was all about.

¹²⁹ Interview, January 2015.
During the Media Lab expo in December 2014, a robotic arm sketched out the intricate lines of a 17th-century etching.

The internship program is just one example of a strategy to work with new technologies despite the museum’s lack of dedicated resources for research and development. Funding-wise, Undeen has done a lot on a limited budget. The Media Lab’s physical home—a former slide library—is itself repurposed; Undeen took advantage of the unused space when its contents became digitized. “I basically, like, commandeered space,” he explained. He furnished the Lab with hand-me-downs secured through an internal website called Surplus Furniture. When

130 Undeen, Interview.
departments at the Met have to get rid of furniture, they advertise it on the website for two weeks, at which point any other department can claim it. Some of the findings he snagged include a large work desk—now littered with electronics supplies—and a large touchscreen display salvaged from the American Wing galleries.

Of course, running a lab based around the notion of technology requires, well, technological tools and equipment. While Undeen is able to take advantage of free and/or open source software, such as Autodesk's 123D suite of design tools, some technological equipment requires financial investment, such as the $300 development kit for the Oculus Rift virtual reality headset. For these kinds of purchases, Undeen explained, finding funds gets creative: “I've managed to like, cannibalize budgets for other things, money I didn’t spend.”131 Expanding technological offerings also requires finding a way to maintain it. The museum recently hired a Media Lab Specialist who reports to Undeen and whose role includes, among other responsibilities, the “technical facilitation of MediaLab community members in their projects.”132 Managing a technology space necessitates staff who have the time and willingness to learn the use, simple troubleshooting, and maintenance of various hardware and software.

The tools and processes that Undeen borrows from the world of technology also bring with them a particular ethos or ideology. Case in point: Hackpad, a browser-based, collaborative, real-time text editor popular among computer programmers, serves as the textual headquarters for Media Lab ideas and projects. Media Lab “pads,” as individual documents are called, range from titles such as “3D at the Met's MediaLab: Useful Links,” “Spring 2015 Purchase Requests,” “Object-based Mapping, Arming the Armory with Beacons, and the Forgotten Carousel.” Any

131 Ibid.
non-staff person can browse the Media Lab’s Hackpad, read about current and past ideas, and watch as projects progress. Openness into works-in-progress is atypical in museums (a topic explored further in chapter five), in which the pristine veneer of stark-white galleries hides any imperfections. This ethos also extends to the Metropolitan Media Lab’s attitude toward intellectual property. All of the projects produced in the Media Lab are open source, with the source code published on the Met Media Lab Github page. Creators, not the museum, retain ownership of their projects. Undeen explained that this is in part because interns and volunteers are unpaid; having the rights to their creative work is one of the benefits, if not rights, of spending a semester in residence at the museum.

But is there ever an opportunity for these prototypes to be adopted by the Metropolitan? As I mentioned above, some of the projects—such as wayfinding applications—aim to solve a problem in the museum or aid the visitor experience. For the most part, Media Lab projects aren’t being implemented in the museum at a large scale (and in fact, the museum employs staff members outside of the Media Lab dedicated to building mobile applications and implementing interactive installations in the galleries). This is one of the drawbacks of not being a full R&D lab; the Metropolitan doesn’t have the funding or capacity to fold these projects into the museum’s offerings at scale. Some projects, however, do have an afterlife that benefits museum staff partners. For example, one intern conducted a projection-mapping project on the Temple of Dendur in collaboration with a curatorial fellow who had been doing research on the temple. By using a projector, he was able to non-invasively overlay the original colors that the ancient

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133 Github is a popular web-based repository service with a distributed revision- and version-control system. It is known as a strong community for free and open-source projects. The Metropolitan Media Lab’s Github page is available at https://github.com/metmuseum-medialab.
Egyptian structure had been painted. The intern’s final product was a packaged presentation that the fellow could use to give scholarly presentations in the future.

Even if the fruits of the Media Lab’s labors may not always be assimilated into the Met’s everyday digital offerings, there is a more intangible result: a sense of community. The Media Lab taps into networks of creative coders, hackers, and technologists who are excited to engage with what the Metropolitan has to offer. Interns are often graduate students enrolled in interdisciplinary media arts programs, such as Parsons’s Design and Technology, New York University’s Interactive Telecommunications Program, and Brooklyn College’s Performance and Interactive Media Arts (PIMA). This community is drawn to the Metropolitan for many reasons; perhaps the most important is the strength of its collection. A graduate student from PIMA contended:

I think that the collection at the Met is so vast...Access to that resource is really enticing because it is some of the greatest art in the world. Arguably. There’s so much there...And we had access to speak with curators privately in meetings where we would go to the Met and meet them and they would walk us through their collection.\(^{134}\)

For most, if not all, Media Lab participants, the collection serves as inspiration and as raw material upon which to base projects. Interns and volunteers also find access to staff members who can share their areas of expertise and provide feedback on prototypes is valuable. One intern explained that she “really liked this idea of having an internship that gets you the time and the space and the encouragement...[and provides you with] really good partners and resources at the Met.”\(^{135}\) Additionally, the museum site itself serves as a testbed for prototypes; for example, a

\(^{134}\) Interview, June 2014.
\(^{135}\) Interview February 2015
group of graduate students from PIMA created an augmented reality tour of objects in the
museum that they were then able to test out in situ.

Of course, communities do not form overnight; part of what makes the Media Lab work
is Undeen’s relentless recruitment of makers, hackers, designers, and artists interested in the
intersection of art and technology. He described his outreach process:

I talk at a lot of meetups. I'll just weasel myself invitations to speak at other meetups
where they invite people. I find that’s like a really great place—because you already know,
you’re already self-selecting people who are willing to take their spare time and go and
engage with this stuff. So the first question isn’t like who’s going to pay me for my time,
it’s, what do you have that’s cool, what can I do that’s neat.136

The PIMA graduate students, for example, first met Undeen at an event hosted by the
Volumetric Society, an organization of artists and technologists interested in physical computing
and its relationship to body and brain. Another intern—a student of industrial design at the Pratt
Institute—met Undeen while at a party. Anyone can find out about public Media Lab events
from the social networking site Meetup.com. Undeen sees it as a major part of his job to increase
the Media Lab’s visibility within the creative technology community, in turn expanding the
image of what the museum is and which audiences it might serve.

While Undeen is very welcoming, the museum isn’t always so. Undeen’s role revolves
around serving as a mentor and helping creators navigate the institution. He is cognizant of the
gatekeeping role of the museum, finding the metaphorical holes within the gates that might allow
a few Media Lab participants to accomplish their goals. He does this in a number of ways. First,
he maintains a welcoming environment, the “walled-garden safe zone” that serves as a meeting

136 Interview with Don Undeen, June 2014
point for the community. During one of my visits to the Met Media Lab, I was surprised to share the Media Lab space with an unusual coworker: London the seeing-eye dog, the companion of an intern who had a joint appointment between the Digital Media and Education departments. Undeen welcomed London into his space; as he explained, “it’s just the Lab happens to be a nice open space where people [and dogs] can be.” Maintaining the “failure zone where experimental things can happen” also means that Undeen must navigate institutional bureaucracy for participants. He explained:

But it’s also creating the procedural sort of environment for making things happen. Like streamlining, onboarding people through our volunteer department, like, figuring out how that works so I can give people volunteer badges easily. Working out how we get things through catering. Identifying how we share information and we share data.

Running the Media Lab, then, goes beyond a passion for and knowledge of new technologies; it requires a willingness to deal with organizational bureaucracy and find collaborators and allies across museum departments. Undeen has fostered important relationships with staff members: curators and conservators from Arms and Armor department, for example, serve as frequent collaborators. He identifies which departments are friendly to him and his cause, and leverages those relationships to assist interns and volunteers on their creative endeavors.

A graduate student compared Undeen’s attitude to the creativity and ingenuity of hackers:

Don has discovered this way to be very—I feel like he uses the sort of tech, media-based hacker mentality and hacks the Met, and he’s figured out how to navigate the red tape and bureaucracy of the Met. And how to word things, and how to present things to the

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curators and to the staff in a way that opens doors for him rather than shuts them and close everything down.\footnote{Interview, June 2014.}

By likening Undeen to computer hackers, she suggests that Undeen recognizes and works against the hierarchy of the institution, but does so by understanding the system he works within and using that knowledge to advance his goals. Large, prestigious cultural institutions like the Metropolitan are not always the friendliest to navigate, and issues of cultural authority—such as, who gets to be on view at the Met?—sometimes arise. One Media Lab project culminated in a performative tour through the museum. Though the creators consider the tour a work of art in its own right, they had to present it to the powers that be as a demo:

Because if it was more official, it has to actually be programmed, and they program like one to two years in advance. So by making it a demo, like, ‘these student-artists are just experimenting with different using art and technology to enliven the museum experience,’ we were able to, like squish through.\footnote{Interview, June 2014.}

By representing the work as a demo rather than an art project, the team found an alternative channel to cut through the institution’s proverbial red tape.

Recently, Undeen has shifted his focus from developing the infrastructure that allows technologists to easily work within the institution, now devoting his efforts to crafting the message and branding of the Media Lab. I visited the Lab in March 2015 to find the space much evolved. The Lab oozed further into the slide library, annexing nooks and crannies for its cause. Undeen repurposed old library carrels as long-term exhibition spaces to display Media Lab projects. In another corner, a couch—a popular spot for many interns—sits across a TV-and-console setup, providing a venue for viewing video-based projects. The main shared workspace
was reconfigured as a presentation space, with rows of chairs punctuated by a center aisle facing
where Lab creators share their work at the end of each three-week sprint.

A cubicle in the Media Lab showcases Edible Met, a kit that allows users to make food versions of
sculptures in the museum's collection.

These renovations are all in service of his new mission: to better communicate the goals
and spirit of the Media Lab in order to gain funding that can enable expansion in the future. The
study carrel displays play a double role: in addition to showcasing Lab projects, they serve as a
prototype to imagine what the Media Lab could be if they had a space open to the public. A
digital strategist from audio book company Audible.com now volunteers at the Media Lab,
coaching interns on how to present their ideas in tight, 60-second pitches. This strategy has two

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goals with this. First, by working on how they talk about their projects, interns are able to hone into their main ideas and rationales for doing these projects, thus leading to better final projects. But perhaps more importantly, the digital strategist helps them better communicate their ideas to internal staff and potential funders. As the Met Media Lab continues to be incorporated into institutional structures, it faces the challenge of maintaining its sense of experimentation and unbridled creativity.

4.2 Analysis

This case study exemplifies a grassroots-initiative within a slow-moving institution and how they are able to make things happen despite financial, technological, and institutional barriers. The Metropolitan’s Media Lab is a tiny unit, with only two dedicated staff members in a gargantuan museum that employs over 2000. At times, it struggles to find funding and must rely on strategic intra- and inter-institutional partnerships. Still, Undeen and his staff are able to do much with little, leveraging outside the enthusiasm and skills of technologically-inclined audiences to push forward his vision.

While, of the three case studies I examined, the Media Lab emerged as the most grassroots of efforts, all three of the case studies share strategies that allowed them to accomplish their goals despite the technological and cultural conservatism embedded in the institutions. One museum professional explained that museums, unlike their for-profit counterparts, lack the capacity for serving as innovation labs:

Corporations have R&D budgets, and museums don’t. So museums talking amongst themselves are never going to get to the place where we really can tap into real practical applications of truly new technology. As a market, we’re really small, and we don’t have
any spare cash. And it’s not a core business, so it’s not a good place to go looking for new ideas and technology.\textsuperscript{141}

In other words, museums alone cannot serve as sites for innovation; they just don’t have the money, time, or technological expertise.

Which is why many museums go straight to the source: technologists, technology companies, and maker organizations. Partnerships are a key strategy adopted by the three case studies in this thesis and by virtually all museum-making initiatives I’ve encountered. The Met Media Lab’s inaugural 3D hackathon was held in conjunction with Makerbot, a company that was able to not only provide a bevy of printers for free but also tap into their community of creative technologists. More recently, the Met worked with the Institute for the Future’s Maker Cities project, asking event participants to prototype technological solutions that consider the Metropolitan’s role within its urban community. The Peabody Essex Museum has collaborated with local organizations such as the Massachusetts Institute of Technology’s Media Lab and 3D printing start-up Form Labs. The ongoing partnership with the M.I.T. Media Lab, as described further in chapter 5, has been pivotal to the Maker Lounge’s development: a staff team from PEM visited the Media Lab as a source of inspiration and advice during their planning processes. Additionally, PEM has hosted several events that featured projects by graduate students in the M.I.T. Media Lab. LACMA’s Art + Technology Lab is entirely predicated on relationships with major corporations, which has brought it funding and connects professional artists with technology experts.

Museum making programs outside of these three case studies also draw from the expertise of outside technologists. NEW INC, a start-up incubator run through the New Museum

\textsuperscript{141} Interview, August 2014.
in New York City, has an advisory board with members from Google Creative Lab, design consultancy IDEO, Microsoft Research, and crowdfunding website Kickstarter, among other technology and design ventures. The Philadelphia Museum of Art invited Hive76, a local hacker space, for one of their Wednesday Nights programs, a series geared toward 18 to 35 year olds. At this event, Hive76 brought activities and demonstrations such as robot-on-robot battles, LED light painting, a karaoke machine made out of an old radio, and 3D printed models of the museum. The Museum of Modern Art in New York has now twice hosted the independent videogame collective Babycastles for CLICK@MoMA, digital media workshops for teens.

Partnering with these organizations provides museums access to technologies they could otherwise not afford while also reaching broader communities of technologists. At time, these collaborations also serve as ways to sidestep the bureaucracy of the institution. LACMA’s original Art & Technology program (1967 – 1971), as described in chapter three, exemplifies this idea. At the time that the program began, LACMA did not collect or exhibit works of art by living artists. For Maurice Tuchman, the museum’s first curator of modern art, partnering with major corporations provided him the funding to work with contemporary artists when the museum’s structure did not allow it.

By collaborating with technology organizations, museums are able to build the knowledge and financial capacity to have audiences experiment with technologies. But just as museums expand outward to build capacity, they must also look inward, working within (and at times against) the constraints of the institution. Often, museum making programs emerge out of the interests of staff members, who moonlight as creative coders or dabble in technology projects in

142 Correspondence with Jenni Drozdek, July 2014.
143 Conversation with Calder Zwicky, June 2014.
their spare time. For example, the Philadelphia Museum of Art learned about Hive76 through one of their front-desk visitor assistants, an artist who also works for the hacker space when he is not at the museum. Additionally, many of these programs wind up cultivating an interest in technology in their museum staff. Undeen identifies individuals in other departments who are willing to serve as mentors for Met Media Lab projects. These staff members become important resources for interns working on projects over the course of the semester, from curators who can provide expertise on an art historical period or a media archivist who gives them access to archival equipment.

In two instances, museum-making programs fostered meaningful relationships between women participants and staff. Annina Rüst, a first-year LACMA Art + Technology award recipients whose project explores how women have historically been represented (and underrepresented) in the worlds of art and technology, forged a close connection with the museum archivist. According to A+T Lab manager Joel Ferree, this relationship yielded discussions on the museum’s history, the history of the historical A&T program, and the feminist protests undertaken against the original program. And at the Met Media Lab, one intern found strong role models in her project advisors:

I was really impressed by how much [the audio-visual specialists], two women staff members at the Met, knew everything about technology: this works with this, this doesn’t work, this was the company that manufactured it. I spent like four hours with them that day, just touching equipping, asking what was in there; they have this treasure trove of knowledge of all of this different technology and when it was employed and for what exhibition...I was totally blown away. I was like, you two are my new biggest heroes. Just
extraordinarily brilliant and really tech-savvy and really blew away all the sort of stereotypes that I’ve battled a lot.\textsuperscript{144}

The above anecdote reveals that the relationships between staff and Media Lab participants extend far beyond merely providing project feedback. For this intern, working with strong women professionals on a technology project served as a source of inspiration, especially in light of the harassment and discrimination women face within the field of technology. By having participants work directly with museum staff, Undeen facilitates potentially long-lasting relationships.

The same intern was impressed by Met staff’s willingness to work with Media Lab interns, and she attributes this attitude to the network of supporters that Undeen has cultivated within the institution. “Just like at any point, culturally, it would have been understood if they had been like, I’m too busy too help out a visiting artist with her piece, like you’re on your own,” she explained. “That was never really the case. I feel like there’s this culture that’s adopted there which I think [is] probably from Don’s relationship with people.”\textsuperscript{145} These programs, thus, build capacity not only by gaining access to technology and knowledge, but also by developing a sense of community. I’d like to suggest that museum making programs like LACMA’s A+T Lab and the Met Media Lab, by connecting creators to staff members, are redefining what we mean when we say the museum is a public resource. It’s not just the collection that we connect to our audiences, but also the knowledges of staff at all levels across the institution.

By incorporating professionals in museum making programs, these initiatives have the potential to improve communication among museum departments. Although LACMA’s A+T

\textsuperscript{144} Interview, January 2015.
\textsuperscript{145} Interview, January 2015.
Lab is an initiative of the Technology, Web, and Digital department, it requires cross-departmental cooperation. Curators provide input on the development of artists’ projects, while the Education department might advise artists on how to work with community audiences during public programs. “You’re having to source [advice] from all over the museum,” Joel Ferree told me. “I think we’re all learning from it a great deal.” Don Undeen of the Met reported that staff members have an increased support for the Media Lab’s efforts once they have collaborated with participants. Years after the 3D hackathon, “a lot of these curators have these 3D prints still sitting on their desks,” he described. “I mean they all—they get especially enthused when they see their stuff, right, their expertise, their stories, being reused in creative ways. They get enthusiastic about that.” Museum making programs are avenues to not just empower audiences to create, but also to empower staff who feel that they have contributed their skills and feedback to the production of new creative projects.

Howard Becker wrote that “art worlds, rather than artists, make works of art.” Creative production necessitates entire worlds behind them to develop conventions and shared practices; mobilize resources including materials, equipment, and personnel; and develop a system of distribution. Confronted with a shortage of funding and technological access, the museum staff behind making programs must find alternative strategies to create spaces in which audiences can create. According to Becker, art worlds also require people, such as curators and critics, who assign aesthetic value upon works of art. Art world systems are thus fairly conservative, as cultural arbiters generally look for works that fit within their criteria. Museum making initiatives pose a challenge to museums because the projects that arise from them do not fit within the usual conventions of the institution. But not all is lost; art world boundaries are subject to change,

though “innovators must make a strong argument in defense of any substantially new practice,” working within the established system to gain acceptance.147

Museum making programs require that museum personnel build capacity in many areas, demanding access to emerging technologies, many kinds of expertise, and—at times—strategies for navigating institutions that may be hostile to such activities. The Metropolitan Media Lab provides an interesting case study for how grassroots initiatives can gain support within a more conservative climate. One could read Undeen’s institutional maneuvers as subversive; on the other hand, he’s still adhering to the hierarchy of the institution. Howard Becker might label him a maverick, one who “orient[s himself] to the world of canonical and conventional art,” “chang[ing] some of its conventions” while accepting others.148 In order to affect change, a maverick must “succeed in capturing existing cooperative networks” or develop his or her own organizational support system to survive.149 Either way, his strategies show ingenuity in the face of limited resources and support, opening new avenues for creators to take advantage of the Met as an institution that can provide physical space, access to art objects, and the knowledge bases of staff.

147 Ibid., 135.
148 Ibid., 244.
149 Ibid., 301.
“We’re Not Technology Specialists, We’re Learning Specialists”:
The Value of Technology in Museums

It was probably the continuous whirring that caught the thirty-something-year-old man’s attention. “Look, they have a 3D printer!” he said as he hurried a friend over to peer through the neon orange cover of the Form 1+ printer. They stood transfixed as the box intermittently flashed a green UV light binding a viscous resin—layer by layer—into a solid form.

On the other side of the room, four children were oblivious to the technological marvel a few yards away. They, instead, were intent on their own projects. One girl judiciously placed pipe cleaner after pipe cleaner into a wheel-shaped piece of foam. Her brother rushed over to a wall of drawers filled with supplies; he loaded ping-pong balls, tape, and cardboard scraps onto his tray.

The Peabody Essex Museum has a long history: its collection was started in 1799 by a group of seafarers and merchants who brought together objects assembled from around the world to establish one of the United States’ oldest museums. But in the PEM Maker Lounge, the brown wooden rafters and two simple columns are the few signs that betray the museum’s age. Modeled on the concept of a maker space, the Maker Lounge is infused with the language of technology and design. Upon entering the room, visitors are greeted by chalked-on signage proclaiming its manifesto:
Embracing the maker movement
this space lets you explore the high & low technology
and create objects!

The square cubbies of an oversized gray Ikea bookshelf are jam-packed with craft projects and books with titles like *Disruptus, Hacking Electronics,* and *Fabricated.* iPads are scattered in various locations: one at each of the two work tables, tethered down by a metal cord, and three others rest on a small shelf next to a red, boomerang-shaped chaise that looks like it came straight out of *The Jetsons.* On the other side of the room, the “Maker Lounge Takeover” area—activated when a facilitator is manning an activity—houses more expensive equipment: an oversize inkjet printer, a projector, and a 3D printer. Manila folders containing design activities challenge visitors to “data-mine [their] creativity” or “build a prototype.”
For all of the technology inscribed into the Maker Lounge, however, the kids were engrossed in a very non-technical activity: creating objects out of simple materials. As families strolled through the space, many of them stopping to make something, very few children noticed the printer at all. Museum making initiatives like the Maker Lounge are ostensibly about technology, but often, their benefits and outcomes lie outside of the world of tech. "We're not technology specialists," explained Juliette Fritsch, chief of education and interpretation at PEM and the brainchild behind the Maker Lounge, "we're learning specialists." As non-profit institutions dedicated to fostering the legacy of our cultural pasts, museums can't compete with

150 Juliette Fritsch, Interview, February 27, 2015.
the kind of so-called innovation happening in the private sector. Why, then, do museums invite people to create with technology, and what do they get out of it?

This chapter takes the Peabody Essex Museum’s Maker Lounge as its central case study. First, I examine the origins of the Maker Lounge, why PEM chose the maker space as its model, and how the model was adapted for the museum context. I also discuss other strategies and programming—including the residency program—that PEM has adopted and plans to implement to engage Maker Lounge participants with concepts from design and technology. In the following section, I argue that museums benefit from engaging with technology not because of the products that creators might produce but rather because of the attitudes, such as playfulness and flexibility, that these technologies bring to cultural institutions.

5.1 Case Study: Peabody Essex Museum, Maker Lounge

The Peabody Essex Museum is located in the town of Salem, Massachusetts, a suburb in Boston’s North Shore. First settled by Europeans in 1626, Salem is best known as the Puritan colonial city that was the site of the infamous witch trials of the 1690s. After the Revolutionary War, Salem developed into a major seaport. A group of merchants and sea travelers founded the East India Marine Society in 1799 to bring together the objects they collected from the far ends of the globe; these treasures would form the basis of the museum’s collection.

In 1992, the Peabody Essex Museum as we know it today was established through the merger of the Peabody Museum of Salem (the descendant of the East India Marine Society) and the Essex Institute, a regional organization devoted to the study of art, history, and architecture. PEM’s eclectic past spawned its equally eclectic collection, which is both regional and global in scope. Because of the museum’s seafaring origins, PEM houses one of the strongest Asian art
collections in the United States; the collection also features American, Oceanic, African, and Native American art, as well as objects representing maritime art and history. Additionally, the museum administers 22 historic buildings throughout the city of Salem. According to the website, the museum holds 1.8 million objects in its collection, but the majority of these are manuscripts and documents.

Located just outside of the Boston, the Peabody Essex Museum could be described as a regional museum. The museum receives approximately 250,000 visitors per year, many of them locals. Perhaps it is this off-the-beaten-path characteristic that lends PEM a willingness to take more risks than traditional museums like the Metropolitan Museum of Art. For example, in a 2013 article in the Wall Street Journal, Judith Dobrzynski writes about PEM director Dan Monroe’s151 unorthodox business model, which moves away from depending on annually-raised donations and focuses on raising revenue from local visitors rather than tourists.152 Director of Education and Interpretation Juliette Fritsch put it best: “One of the things PEM likes to do is not do it in the way that anyone else is doing it.”153

While I’ve described the museum as regional, its steady growth points towards a more ambitious future. In 2003, the museum completed a major renovation and expansion that included a new wing designed by the celebrated architect Moshe Safdie. PEM is expected to break ground on another expansion led by Ennead Architects in 2015; when complete, the museum will “rank among the top 10 art museums in the nation in terms of gallery space and total

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151 Dan Monroe has helmed the museum since the 1993, managing the merger of the Peabody and the Essex.
153 Fritsch, Interview.
endowment and in the top 15 in annual operating budget.” Stacie Slotnick, who partnered with
the Maker Lounge in her role as <assistant?> communications director at the Massachusetts
Institute of Technology Media Lab, described the museum as being at a “watershed moment
where they are poised to be even more amazing than they already are and go beyond being a
regional museum into something pretty special.”

The Maker Lounge is an initiative that emerged from the museum’s Education
department, helmed by Juliette Fritsch. Prior to her current role, Fritsch led interpretation
initiatives at the decorative art- and design-focused Victoria and Albert Museum in London,
where she managed a residency program that aimed to reveal creators’ processes to the public—a
goal that she would later incorporate into the Maker Lounge. She has long been interested in the
intersection of creativity and technology. Fritsch comes from a family of creative individuals
interested in both the arts and technology; her father, for example, was an architect, musician,
welder, and sculptor, who also built computers in the 1960s and taught her how to program
software in BASIC as a child.

In 2013, when the museum was completing a revamp of its Art & Nature Center (a suite
of galleries with interactive rotating and permanent exhibitions), PEM administrators found
themselves with an unoccupied gallery. Monroe approached Fritsch, asking her to devise a plan
for programming the space. The one stipulation: “What I want is somewhere where people can

155 Stacie Slotnick, Interview, November 19, 2014.
156 BASIC—an acronym for Beginner’s All-purpose Symbolic Instruction Code—is an easy-to-use programming
language developed in 1964.
make stuff at any time of the day. That’s my only criteria. I just want people to be able to create something.”

Fritsch decided to take the maker space as her model. A maker space is a community workshop where members work on short- or long-term technology projects using the space’s equipment. They are often community-oriented in their approach, emphasizing shared access to resources and knowledge. Of the three case studies presented in this thesis, the Maker Lounge is the initiative that most closely and explicitly aligns itself with the maker movement. By invoking makers and making, PEM taps into same educational ideals that the maker movement champions, such as open-ended learning and an emphasis on STEM fields; this strategy can be useful when appealing to schools to integrate museum visits into their curricula. Additionally, maker culture’s hobbyist origins and its inclusion of more traditional craft alongside newer technologies allows the Maker Lounge to justify its goals in connection to PEM’s collection.

In the context of a museum, Fritsch adapted the concept of the “maker space” into a “lounge.” The Lounge is situated on the ground floor of the museum’s oldest wing (the original East India Marine Society building) at a highly-trafficked corner connecting two galleries frequented by families with younger children. This location dictates the kind of making that can (and cannot) be done in the space. The Lounge is more often than not unfacilitated, precluding keeping high-tech equipment and materials that could easily be stolen. Unlike a maker space, the Lounge cannot house equipment that could be dangerous to visitors when left unattended, such as a laser cutter. Additionally, because of its proximity to artwork on view, the Maker Lounge cannot make use of low-tech materials that could damage artwork, such as paint, tape, or markers.

157 Fritsch, Interview.
But perhaps more important is how PEM staff expect museum visitors to interact in the space. Ed Rodley, Associate Director of Integrated Media, explained that most maker spaces have a "high barrier to entry" in which users are expected "to be willing to commit two hours, a day, a weekend, in order to get whatever program is being offered." But situated in the museum's galleries, the Maker Lounge becomes just one stop during an individual's larger museum visit; in other words, it is a place most people stumble upon rather than expressly plan to go to. While maker spaces are customarily places where members can intermittently work on projects over a

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138 Ed Rodley, Interview, February 27, 2014.
long period of time, many activities in the space are tailored for participants that might just drop in for fifteen or so minutes.

The staff behind the Maker Lounge designed a space that allows for many ways to learn about technology and design. Visitors can choose to participate as much or as little as they choose, from briefly observing the 3D printer in the corner or reading about wearable technologies to delving into art making for hours at a time. The multiple ways to engage also reflect the manifold aims behind the Maker Lounge. One major goal is to reveal the creative side of technology. Fritsch explained that the maker movement has

a lot of synergy with the mission of PEM, to do with art, culture, and creativity, and how that is expressed in terms of creative thinking...[But is also involves] an understanding of what art and creativity is, that is not limited to traditional art historical notions of painting and sculpture, and that creative expression involves technology now.159

According to Fritsch, fostering creativity is central to PEM’s mission. For her, making with new technologies can be a very creative act; this is perhaps best exemplified through the design process, which focuses on problem solving, experimenting, and iterating on prototypes to solve problems. The Maker Lounge broadly defines “creativity,” finding commonality between the traditional art objects on view in the museum’s collection and the technological products that capture public attention today.

Additionally, the Maker Lounge endeavors to make amateur creative production (whether art- or technology-based) more approachable. For Fritsch, “An eternal issue in art museums,” Fritsch expressed, “is that you have all this beautiful creativity around you but you’re

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159 Fritsch, Interview.
not even allowed to touch it."\textsuperscript{160} The Lounge provides audiences an outlet to respond to the work they see during their museum visit. But confronted by supposed art masterpieces, many people are intimidated to produce their own art. With the Lounge, Fritsch hopes to upend the idea that creativity is a matter of mastering a skill: "Creativity is a process. It’s not an outcome or an output. But that’s not actually what most people are taught in their lives. And I feel like on a very basic level, it’s freeing in there."\textsuperscript{161} Through its emphasis on technology and design, rather than art, the Maker Lounge attempts to make creative production a more accessible and equitable process.

In developing the Lounge, the PEM team hoped to create a physical space that would be flexible for their programming needs. The furniture can be arranged and rearranged for specific events or activities. During normal museum hours, the space is generally unfacilitated; however, facilitators (often interns in the Education department) sometimes occupy the Lounge during what they call “takeovers,” leading participants in design- and technology-based projects. Additionally, the Maker Lounge intermittently hosts mini-residencies—described further below—in which a designer, artist, or technologist occupies the lounge, engaging directly with visitors in a number of ways.

Designed for multiple uses, the Lounge aims to attract many audience groups but focuses primarily on teens and adults. At PEM, as with many museums in the United States, the typical visitor is middle-aged, white, and upper-middle class. In recent years, the museum has spearheaded museum programs and exhibitions that reach younger audiences, such as the family-oriented Art and Nature Center shows. The Maker Lounge’s focus on technology,

\textsuperscript{160} Ibid.
\textsuperscript{161} Ibid.
however, targets a slightly older audience: teens and young adults. Despite this goal, I found that the most visitors were families with kids ages 5 through 12. Special programs such as the evening PEM/PM event series, often featuring cocktails and live music, were the few instances when I observed adults making and designing in the space; otherwise, they primarily spent their time in the space as observers rather than as participants.

The Maker Lounge was developed by an interdisciplinary team of personnel from departments across the museum, including the Director of Guest Services, representatives from Integrated Media, members from Education, graphic designers, and a project manager. Fritsch concocted the concept of the Maker Lounge in August 2013, but research and planning did not begin until October 2013. The team had about five months to plan, design, and build out the space, which, for museums that often spend two to three years planning an exhibition, is “unheard of...normally for this kind of thing you’d spend a long time just talking about the idea and working out what it’s going to be and, you know, refining it.” 162 The Maker Lounge is funded through the end of 2015, and members of the museum’s development team continue to actively raise donations to support it. Fritsch and her team will find out about a current funding bid in September 2015; if it passes, the Maker Lounge will be funded for three more years.

The Maker Lounge officially opened on Saturday, March 29, 2014, celebrating the occasion with a day of activities planned in conjunction with the Media Lab at the Massachusetts Institute of Technology. The Media Lab is an interdisciplinary research center that describes itself as a pioneer of “disruptive technologies that happen at the edges,” tackling fields and issues as diverse as wearable computing, imaging technologies, the future of cities, and smart

162 Ibid.
prostheses. Fritsch had met Stacie Slotnick, the M.I.T. Media Lab’s assistant director of communications, in March 2013 during the South by Southwest Interactive conference in Austin, Texas, and the two “just connected right away.” Slotnick became instrumental in setting up an ongoing partnership between PEM and the M.I.T. Media Lab. For the Maker Lounge’s opening, graduate students contributed projects that they have developed during their time at M.I.T.’s Media Arts and Sciences program. Visitors to the museum were invited to play with the Makey Makey, a self-styled “invention kit for everyone” that uses a custom-built microcontroller and alligator clips to turn conductive objects into computer keys, thus allowing it to control specially-designed software; and the BubbleSynth, a project that tracks soap bubbles emitted from bubble machine, analyzing their position, velocity, and size to generate music. Additionally, PEM held a workshop in which teens and adults used M.I.T. student Jie Qi’s circuit stickers to build simple, whimsical electrical circuits on a piece of paper. The M.I.T. Media Lab would continue to partner with the Maker Lounge (and the museum more generally): in September 2014, the Media Lab hosted PEM/PM, a one-a-month evening event aimed toward an adult audience. Titled “Sound/System,” the event brought together projects such as RadiO_o—“a battery-powered speaker worn by hundreds of party guests, turning each person into a local mobile sound system”—and musical paintings, which used a Makey Makey to create conductive artworks that can be “played” by touching them.

One of the most fruitful outcomes of the M.I.T.-Maker Lounge partnership, however, was not about technology at all. During the Lounge’s planning stages, Fritsch and her team took a

164 Slotnick, Interview.
tour of the M.I.T. Media Lab. Slotnick notes being surprised by what piqued the PEM staff’s interest: “They wanted to see what sort of spaces, like work benches and furniture and shelving and—stuff like that that was here,” or, in Fritsch’s words, the “things that they find totally boring.” The PEM team emulated the sense of creativity and innovation that the physical space of the Media Lab elicits. For Fritsch, the visit was useful because it helped them “be okay about the things we weren’t going to be able to do because we don’t have, you know, mega-equipment in there, and feel like we can still deliver on engaging people with these ideas and this kind of creative process.” Even if PEM is not able to house the same kinds of high-technology that the Media Lab is known for, they can capitalize on the ethos of creative technology and, at times, host Media Lab students and staff to share their work.

The Peabody Essex Museum also brings in designers and technologists through the Lounge’s mini-residency program. While the maker space is a model borrowed from the world of technology, residencies are typical of the world of art, pointing again to how PEM adapts and merges models from technology and the visual arts to fit to the goals of the museum. During a period of six weeks, the creator-in-residence inhabits the space with the goal of communicating his or her process to the public. Residents are required to spend at least 50 hours in the space during museum hours, lead several workshops with local schools, and attend one PEM/PM event. In exchange, residents receive a small stipend and are given free rein to transform the space as they see fit.

Industrial designer Ryan White was the Maker Lounge’s inaugural resident (November 2014 to January 2015). A Salem native who used to visit PEM on school trips during his

166 Slotnick, Interview.
167 Fritsch, Interview.
168 Ibid.
childhood, he worked for several years in Palo Alto before moving back to his hometown. He was working on freelance projects when he saw PEM's call for applications while perusing the popular classifieds website Craigslist. White proposed to convert the Maker Lounge into a place where visitors could learn about advances in wearable technologies—electronic and often web-connected products incorporated into clothing and accessories—and then design their own ideas. Beyond engaging the public, White had an ulterior motive: he wanted to use the museum as a testbed of potential wearable projects, using his time there to conduct observational, ethnographic research that could inform designs that might aid museum visitors. In selecting a resident, PEM wanted someone actively involved in design and technology in their artistic or professional practice who could also communicate their process to general audiences in accessible ways. Fritsch explained:

We talked a lot with Ryan when he came on board, that you’re going to have some people who have no idea what you’re talking about. And that was part of the criteria for assessment, was, how well did we think Ryan was going to be able to explain this stuff? 169

Ideal Maker Lounge residents, thus, are not just individuals who are accomplished in the fields of design and technology; more important is their ability to convey their own thinking in a public and accessible way, taking on the role of an educator as much as an artist or artisan.

For his tenure at PEM, White redesigned the Lounge to maximize the shared workspace and highlight ideas generated by museum visitors. The original layout of the Maker Lounge devoted about one-third of the gallery to the “takeover” and creator-in-residence corner housing electronics that were only used during facilitated events; most of the time, this area remained roped off and unoccupied. White decided to minimize this area as much as possible:

169 Ibid.

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I didn’t want you to feel like you were a guest in someone’s design studio. I wanted you to feel like you were in a design studio and you were a designer working elbow-to-elbow with whoever was in there working. It wasn’t about me, it was about my process.\(^{170}\)

To that effect, he pushed three worktables together to encourage a communal atmosphere. During his time in the Lounge, White would load software and visual aids onto his laptop and walk around to visitors sitting at the tables. He often connected his laptop to a projector so that participants could see him working on designs in real-time.

The Lounge’s introductory wall also received a makeover: the graphics and signage discussed a four-step design cycle (“understand,” “ideate,” “prototype,” and “test”). On the

\(^{170}\) Ryan White, Interview, February 26, 2015.
opposite side of the room, White posted images and descriptions of wearable technologies ranging from Fitbits that track users' exercise and health patterns to gloves which, through a wireless Bluetooth connection, become a headset (or rather, a handset) for a smart phone. Black butcher paper covered an entire wall, serving as home base for accumulating post-its notes in varying shades of blues. On the post-its, participants wrote their own ideas and sketches for wearable technologies, from hover suits for dogs to rings with geolocation capabilities.

Maker Lounge brainstorm wall during Ryan White's residency, December 2014

Visitors to the Lounge were encouraged not just to brainstorm new technological products, but also create low-fidelity prototypes with materials such as cardboard, inexpensive
novelty glasses, and pipe cleaners. They could also observe and learn about rapid prototyping processes like 3D printing. Next to the fluorescent orange Form 1+ printer stood a plexi-glass-covered case containing objects White had fabricated using many types of printers and materials, including stainless steel and plastic. The case served as a conservation piece for the Lounge’s audience: White could pull off the case’s lid and allow participants to feel the objects as he explained how printing was a quick and easy way for him to test out his three-dimensional designs.

White’s vision for the space was soon tempered with the reality of running a maker space in a museum. First, most visitors to the Lounge were simply that: making a pitstop for ten
minutes in the middle of a larger museum experience. Additionally, the content he hoped to cover was too expansive for a lay audience to grasp during such a short period of time:

I think [that it was] just too much. Because now you’re trying to teach people the design and engineering—you know, the exploration and the prototyping and the testing and the revision—while at the same time you’re throwing all these new technologies at them from all ends of the spectrum. From prosthetic legs to, you know, health trackers, and to layer on another issue, you’re asking them to either draw ideas or to prototype them. And then you’re left with people scratching their heads. And to make it even more complex, you say, “Well don’t worry about prototyping. I can put it into CAD and I can use my 3D printer to make these ideas come to life.” Now you have these people staring at you blank-faced.\footnote{Ibid.}

White quickly realized he’d have to, as he put it, “dial it back.” He adapted his conversations with visitors, focusing primarily on the topics they seemed most interested in: 3D printing and the iterative design process. For many visitors, he noted, asking them to construct a prototype on the spot was a daunting task; he found engaging people in discussion through printed 3D objects and the Lounge design cycle signage was an effective way to ease into the topic of technology.

The next Maker Lounge residency begins in April 2015 and features David Yann Robert, an artist who records bioelectrical signals from trees and whose work is featured in the neighboring Branching Out: Trees as Art exhibition in PEM’s Art & Nature Center. Fritsch plans to continue the program and hopes to host lengthier (and better-funded) residencies in the future; she sees the current mini-residencies as experiments to help inform long-term plans. The Maker Lounge team is also devising an expanded suite of educational programming focusing on technology, such as half-day workshops on building with the open-source Arduino.
microcontroller. Eventually, Fritsch hopes that the Maker Lounge will serve as a “a kind of creative network hub where people can just come in and try out ideas on other people,” a central meeting place for creators working at the intersection of art and technology.

5.2 Analysis

Despite the Maker Lounge’s thematic focus on the maker movement, technology, and the design cycle, very little of the actual making that happens there involves new technologies. In the context of the museum, this makes sense: the Lounge is situated in an unfacilitated gallery and caters to audiences that may not be familiar with technologies such as digital fabrication, CAD software, or physical computing. Furthermore, as mentioned here and discussed further in chapter four, museums aren’t technology organizations. They lack the technological capacity, dedicated funding, and staff resources to develop the kinds of cutting-edge products that for-profit companies can.

If museum making programs are not competing (or cannot compete) with the supposed innovations of the private sectors, then what do museums gain from working with new technologies? For Pierre Bourdieu, museums are mechanisms for the perpetuation of class difference. Cultural institutions have been structured—through “their morphology and their organization,”[172] such as conventions on how they display their art (within gilded frames or in stark white galleries) and how one should behave within them (conversations not above a murmur)—to exclude those within the working class who find these environments alienating. PEM’s particular interpretation of technology, which taps into contemporary buzzwords such as the “design process” and “wearable technology,” allows art museums to go beyond their closed

world of cultural capital, finding touch points in the everyday life of the audiences they hope to attract. This analysis section will explore how museum making programs, even though they may not produce new viable technologies, draw upon the language and conventions of the contemporary technology world in order to bring attitudes of openness, playfulness, and flexibility that are not commonly associated with museums.

I view PEM’s appeal to maker culture as a strategic move: as discussed in chapter two, “making” has become an all-encompassing term that connotes technology but is not required to deliver on the promise of technology at all moments. The Maker Lounge’s additional focus on the design cycle functions in a similar way. In “Design and Environment, or How Political Economy Escalates into Cyberblitz,” theorist Jean Baudrillard argues that “design” becomes defined so broadly that it subsumes and neutralizes all fields of creative production:

Thus, the semiotic revolution (as in its time the industrial revolution) concerns virtually all possible practices. Arts and crafts, forms and techniques both plastic and graphic (keeping to domains that have obvious affinity with design, but once again the term goes far beyond the plastic and architectural), which until then were singular and distinct, are synchronized, and homogenized according to the same model. Objects, forms, and materials that until then spoke their own group dialect, which only emerged from a dialectical practice or an original style, now begin to be thought of and written out in the same tongue, the rational esperanto of design.173

In the case study above, I discussed how design can be a more accessible way into creativity than the fine arts. But taking Baudrillard’s interpretation into account, design becomes a diluting force, accepting everything and everyone within its scope. This is similar to what I discussed in chapter two about the appeal of the maker movement to museums: with its all-inclusive rhetoric,

maker culture allows museums to seem open and accessible in their educational programming while maintaining their status of authority in the galleries.

While the Maker Lounge may not be producing objects created with new technologies, the language of design and technology is encoded in the space. The design process wall texts, emphasizing a cycle of understanding, ideating, prototyping, and testing, is a thought process shared by many creative practitioners and popularized by companies like the consulting firm IDEO and academic units such as Stanford University’s d.School (“the Institute for Design at Stanford”). The Lounge’s signage bursts with vocabulary from the world of startups: the introductory text describes the design cycle as an “iterative process of exploration and discovery within the product development process.” The graphic identity also furthers the Lounge’s alignment with the world of design and technology. The typeface used on all Lounge marketing materials evokes the modernism of Bauhaus and the hand-drawn aspect of stenciled lettering, lending the Lounge both an attention to high design and the D.I.Y. attitude found in the maker movement.

Underlying the Maker Lounge is the idea that technologies prevalent today are just another manifestation of the creativity captured within PEM’s collection. Technology, then, becomes yet another way to entice people into the museum—specifically targeting an audience that might be more interested in technology than the visual arts—while simultaneously adhering to the museum’s mission. By expanding the definition of “creativity,” Fritsch and her team can broaden the museum’s purview while strategically aligning itself with the museum’s origins.

Additionally, the hacker and maker attitudes introduce a sense of playfulness and irreverence that is not commonly associated with museums. During a summer 2014 workshop at the Metropolitan’s Media Lab, participants were asked to imagine the role of museums, artists,
and makers in the future of urban area. One team used 3D models of works in the Metropolitan’s collection to make stamps to be used on dog poop that owners neglected to pick up, thus rendering waste into something beautiful. This kind of openness to humor and irreverence—characteristics not traditionally associated with museums—is reminiscent of today’s viral internet culture rife with cat videos and pop-culture-inspired memes. In a proposal for a panel at 2012 Museums and the Web conference, a group of museum colleagues contend that, “considering 90% of people use the internet to look at funny cat pictures,” museums should consider how they use “humour online, and how humour can be integrated into an institutional voice in a professional way,” suggesting that humor is a rare sight in museums but has the potential to engage audiences in new and exciting ways.

Certain uses of technology within museums can loosen rigid understanding of how people should behave within cultural institutions, infusing playfulness into the art experience. For example, a graduate student collaborated on tour that used augmented reality to overlay stories and images over works of art in the Metropolitan’s collection. She described tour participants’ reactions:

A lot of people said, “I feel intimidated by the Met, it’s not normally a museum I want to go to,” but they felt like after the tour their interest was piqued and they’d like to come back...I feel like the augmented reality tour structure that we created...makes people feel really empowered and like a museum can be a playful and permissive space.175

This is not to say that fine arts cannot incorporate, or historically have not incorporated, humor; in fact, satire, irony, and comical juxtapositions can be powerful strategies to communicate an

175 Interview, June 2014.
artist's message. However, many visitors feel that museums are serious places of contemplation with little room for playfulness. David Mason and Conal McCarthy, for example, surveyed young people about the Auckland Art Gallery who described it as "boring and old, and old fashioned," and its ambience "dusty, cold, don't touch anything." Several of the people interviewed in Theopisti Stylianou-Lambert's study on how people perceive museums reported that museums are alienating institutions; one interviewee, for example, "envisioned the art museum as a place with low lighting, paintings on the wall and a few snobbish, high-society visitors perusing art while artists wander around the room in odd clothes." In a survey conducted by the London Museums Service in 1991, respondents reported that museums are "boring, dusty, gloomy places," "austere," and "something all fusty, musty, and dusty." They expressed a desire for cultural institutions that are "brighter, more lively and exciting places to visit." Technology can lighten the seriousness of museums, making sites usually associated with dignity and authority slightly more welcoming to audiences.

Audiences are not the only people who benefit from the technology ethos. Museum staff members at LACMA, PEM, and the Metropolitan share a dedication to flexibility derived from the world of tech. "Agility," "agile development," and "iteration" are startup buzzwords that museums are starting to pick up and incorporate into their own practices. Fritsch, when discussing how the Maker Lounge came together in the short span of five months, explained that her team "embrace[d] a core philosophy of the space itself," allowing them to "be adventurous

179 Ibid., 36.
and to try things out and to be iterative and to never assume something’s finished but to constantly go back and refine it.” Ed Rodley, Associate Director of Integrated Media, explained that they “treat[ed] this first year as an experiment,” testing out a variety of activity and workshop formats and assessing which strategies are successful. And the development of the Lounge did not end when it opened to the public: each creator-in-residence is invited to lead the vision for the physical space during their tenure.

Flexibility is key to the success of LACMA’s Art + Technology Lab, as well. The goals of the Lab are deliberately open-ended: artists can engage with corporate advisors if they would like, but are not required to; artists can produce a work of art or just focus on research; and any tangible works of art produced are entirely up to the artist’s jurisdiction. One of the major lessons that the Art + Technology Lab has learned from the original program is to allow for flexibility in the program structure. In a sense, what they are doing is redefining what it means to be successful. They recognize that art is not something that can easily be measured, and that relationships between artists and corporate entities hinge on interpersonal relationships and thus cannot be forced.

The Metropolitan Museum of Art’s Media Lab incorporates the agile methods borrowed from startup culture into interns’ project development. As I discussed in chapter four, interns work on a project over the course of a semester, periodically presenting their progress to a group of interested museum staff. Undeen borrowed this approach after reading The Lean Startup, a book by Silicon Valley entrepreneur Eric Ries that advocates practices such as short development cycles and rapid experimentation. While many of the projects that arise from the Met’s Media

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180 Fritsch, Interview.
181 Rodley, Interview.
Lab are closer to works of art than commercial products, Undeen applies processes meant for product development to the creation of these expressive objects.

All three case studies place more emphasis on the process over final products. For LACMA and PEM, spaces open to the public—in LACMA’s case, the museum’s library; in PEM, a centrally-located gallery—are sites for witnessing the creative process on view. What we see here is a paradigm shift, transforming museums from sites that exhibit objects to sites that exhibit processes.182 Art that emphasizes process is not an entirely novel concept: in the 1960s, post-minimalist artists created works out of materials that would decay or morph over time; the eventual disappearance or destruction was part and parcel to the work of art. Post-minimalism was one of the forebears to relational aesthetics, a term coined by Nicolas Bourriard to describe an emerging trend in the 1990s in which artists took “as their theoretical and practical point of departure the whole of human relations and their social context”—in other words, the facilitation of every day interactions could serve as the basis of their art. Still, these art forms are vetted by curators, whereas PEM and LACMA’s programs emerged from their museums’ Education and Technology, Web, and Digital Media departments, respectively. Moreover, in post-minimalism as in relational aesthetics, the process is the final product, whereas museum making initiatives hope to reveal as snapshot in the development of a final work; thus it is not that we see the project concept as it evolves, but rather as the artist intended to exhibit it.

By underscoring flexibility and process, museums must also concede control to a degree of messiness. For the Maker Lounge, having a space where people can create in the midst of the galleries means that the orderliness typical of its other galleries would have to be compromised

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182 Writing in 2000, Hilde Hein similarly observed that museums are transitioning from being sites centered around objects to sites centered around experiences. Hilde S. Hein, The Museum in Transition: A Philosophical Perspective (Smithsonian Institution Press, 2000).
within the Lounge, something which evokes uneasiness from some staff members. Fritsch recounted how “a big job that we had as we came close to opening was to work with Guest Service and Security team to let them understand that it’s okay that this is a messy space.”

This messiness reminds audiences that the museum, as with art, is not a static place, but one that is constantly being shaped by many hands. Not being able to compete with their for-profit counterparts technology-wise does not render that museum making initiatives unsuccessful. As we’ve seen here, museums have adopted attitudes and strategies from technology, hackers, and makers to make the museum a more approachable place for their audiences and to infuse flexibility into their own workflows. This is not to suggest that introducing new technologies have the inherent ability to automatically and inevitably combat inequities of the museum space, but rather that the particular implementations of museum making that I observe have adopted particular ethos that align with a broader contemporary attitude of openness. In the conclusion of this thesis, I’ll critically examine the question of museum making and openness, arguing that while such endeavors open the museum in small ways, they also uphold cultural institution’s existing hierarchies.

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183 Fritsch, Interview.
Conclusion

In this thesis, we have seen that:

- Museums are institutions that evolve, but are also beholden to their pasts;
- Museum technology programs tap into a mainstream interest in emerging technologies in order to stay relevant;
- They also call upon a wider zeitgeist prevalent today, in which creative production is not as narrowly prescribed as it is within the contemporary art world;
- Museum staff have found alternative strategies to circumvent the lack of financial, technological, and institutional support in order to maintain museum making programs;
- And while these programs may not produce innovations in a traditional sense, they are working to open up the museum, an idea I explore further in this section.

In the introduction, I posed a question: how does change happen in cultural institutions? To answer this, I'd like to revisit our two theoretical pillars: Howard Becker and Pierre Bourdieu. Becker will help us briefly address the kind of change that museum making has brought to museums and how these changes have to negotiate existing organizational and ideological structures. The bulk of this discussion, however, returns to Bourdieu—and his critics. Their thinking serves as a launching point for a further discussion: if museum making can and does effect change in museums, are they making these spaces any more open?

Art worlds, according to Howard Becker, are predicated on conventions within which artists produce work. That is not to say, however, that art worlds cannot and do not change; in fact, they change all the time. Becker outlines two different paradigms for how art worlds evolve. In one model, change happens slowly and without much fanfare, in the same way that languages
drift over time. On the other end of the spectrum, art worlds can undergo revolutions, sudden disruptions of the conventional patterns of cooperation that “attack, ideologically and organizationally, the standard activities of the art world at that time.” Museum making might feel like a revolution to certain parties, such as Lee Rosenbaum, who described remixed collection objects as “sacilege,” or to staff members who feel that these new processes disrupt the status quo. They feel threatened by the introduction of new forms of creative production, feeling that their ways of doing things and their core beliefs are being undermined. But many of the professionals behind museum making treat it more like drift, aligning technology processes within existing museum ideologies (such as how museum staff fit their programs within the historical narratives of their institutions, as we saw in chapter three) and their organizations (as they develop structures that allow their technology initiatives to happen, as discussed in chapter four).

We have seen that museums do change, and we have gleaned some of the strategies that museum making takes on to make them change. But the question remains—is this change any better? “Democratic,” “populist,” “accessible,” “equitable”—these are some of the terms that are thrown around to describe the potential of museum making programs. I prefer the term “open.” For one, it touches upon David Carr’s concept of the museum as an open work that is only completed when an individual brings his or her identity, background, and knowledge to the museum experience. Moreover, I like how it to alludes to the free and open source software movement—which holds that code should be available for individuals to use, alter, and redistribute as they see fit, just as many museum making programs allow their “content”

(collections, staff, and physical space) to serve as the basis of museum projects. Writing within the context of new media art, Richard Rinehart proposes an Open Museum that is

- A preservation repository for born-digital new media artworks
- An online resource that allows unprecedented access to these works,
- An innovative legal, economic, and cultural framework for new media arts,
- A project exploring the values and practices of participatory culture applied in the context of fine arts institutions
- A series of experiments in the following museological providing grounds.185

Even though he comes from the perspective of new media, Rinehart’s ideas can be applied more widely to “imagine museums whose authority is used to facilitate and engage a community rather than treat its members as passive cultural consumers.”186

For Pierre Bourdieu, museums are very much not open; in fact, such institutions work to keep in cultured classes in and working classes out. Nick Prior critiques Bourdieu for his “vague and monolithic version of the institution,” characterizing Bourdieu’s view of the museum as a “static and unreflexive upholder of a tightly-bound high culture” as lacking in “subtlety and precision.”187 Since long before the advent of museum making, many museums endeavored to be inclusive through actions such as providing educational programming for underserved audiences, involving citizens in the co-creation of narratives, and repatriating objects that were wrongfully taken from groups years ago. Museum making emerges within institutions that are already well aware of many of these issues. But still, as Prior points out, much of what Bourdieu said about museums—and art museums in particular—still hold true: many people still find them alienating and irrelevant.

186 Ibid., 106.
As I’ve suggested in this thesis, in some ways, yes, museum making does open the museum. In the case of the Peabody Essex Museum Maker Lounge, a focus on the design process and new technological tools is a strategy to make creativity accessible to public audiences, rather than intimidating them through the presentation of supposed masterpieces. Relatedly, hacker and maker attitudes allow for the injection of humor and playfulness within institutions that are at times considered solemn, stultifying, and unapproachable.

Since the founding of the Louvre in Paris in 1792, the museum has been seen as a public-facing institution that provides access to works of art that were previously locked away in princely palaces. In this sense, museum making programs work to make accessible the technologies that people have heard about in the media, but maybe haven’t had a chance to see in the wide. Juliette Fritsch of the Peabody Essex sees her role as providing audiences a window to the things they cannot see elsewhere: “I think one of the things about art museums is that you can give people access to stuff they don’t have, interesting materials that are difficult to get hold of, or expensive, or new, something you’ve never heard of. So something like the 3D printer was just a given from that.” Maker-style initiatives in museums parallel a similar maker trend emerging in libraries that reimagine what it means to be a public resource.

Museum making initiatives also aim to bring in new types of creators into the museum and acknowledge new forms of creation. With PEM’s Maker Lounge, these technological forms are right in the middle of the museum’s galleries, putting them on equal footing—at least real estate-wise—as the exhibition galleries. Amy Heibel of the Los Angeles County Museum of Art views the Art + Technology program as a way to give younger, more emerging artists some kind

188 Juliette Fritsch, Interview, February 27, 2015.
of recognition and support even though they might not yet be ready for the big leagues, such as a major retrospective or entry into the permanent collection.

Finally, programs that allow artists, designers, and technologists to create new works from the museum’s collection have the potential to destabilize the museum’s authority, allowing the museum to be a site of critique. The 3D Hackathon at the Metropolitan Museum of Art, introduced in the very beginning of this thesis, brought about controversy precisely because certain critics found that these projects questioned the “authenticity” of the works, while others argued that there are many ways to understand a work of art. Museum making programs also give participants a platform to respond to the inequities of the institution within which they are working. One of the interns at the Metropolitan Media Lab landed on a project topic after roaming the galleries in search of women artists:

We start walking around and it was probably twenty-four minutes until we found our first female artist in the classical European paintings. And it was funny because [a fellow intern] and I, we like to joke a lot, and we were laughing and talking to each other. And maybe fifteen minutes in, we had stopped laughing and started getting really sad. We were like, I know this is on the Met’s radar, people like Don work at the Met, Don’s really caring, every curator we met is really caring and curious and this is—there’s something wrong here, and it’s probably not the curator’s fault, and it’s probably not the people who work here’s fault, but there’s just a larger issue here, a greater issue which is historical oppression of women, not being able to access education, or not being allowed to paint, which is a way to make your own income.189

After this incident, she redirected her project goal, focusing on promoting women artists who are in the Met’s collection who are understudied and underrepresented. Her project—now on indefinite view within the Met Media Lab’s office space—is able to question the museum’s

189 Interview, January 2015.
authority by providing an alternate and critical version of art history, while also working within the museum’s institutional structure.

While the above examples demonstrate ways that museum making opens museums to multiple readings and destabilizes the sense of hierarchy, these programs only go so far. Yes, these programs may acknowledge new forms of creative production that incorporate emerging technologies, but what enters the museum’s collections or is exhibited in its galleries still follow older, established conventions. Of the three case studies in this thesis, LACMA’s Art + Technology Lab is the program most closely aligned with the museum’s curatorial departments—the museum’s chief curator and director have the final say on which artists are selected—and is the most competitive program, with only a tiny fraction of applicants awarded grants. Compared with participants at PEM’s Maker Lounge and the Met Media Lab, the profiles of the participants selected for the A+T Lab most closely resemble those of artists in the contemporary art world. Look at their resumes and it is clear to see that they have been legitimized through other art world channels, often through teaching appointments in university art departments and exhibitions at commercial galleries. And while mashing up and remixing objects in the museum’s collection can be interpreted as an act that liberates the objects from their prescribed readings, the appropriation of collection objects can be viewed as a way to perpetuate and elevate these art work’s status further. (Edvard Munch’s *The Scream*, one of the most recognizable images in the world, remains in popular memory in part because it has been reproduced and parodied over and over.) We saw in chapter two that museums are tapping into the ethos of hackers and makers because it lends them a veneer of futurity and anti-authoritarianism, but in actuality, this serves to keep a foothold on their own position as cultural authorities. We allow an expanded sense of
what creative production can be in one corner of the museum, while the galleries tell a different story.

In discussing the performance/spectacle audience model (a paradigm in which audiences are seen as active shapers of meaning, as discussed in chapter one), Theopisti Stylianou-Lambert suggests that “what is often ignored is that even identity and the resulting meanings are constructed in an environment of unequal relations.” She warns against buying into this “false sense of absolute freedom,” because museum audiences are still very much subjected to Bourdieuan social and economic structures. Nick Prior suggests that we need to gatekeepers and the more recent (and more forgiving) postmodern arguments of cultural institutions as open community centers.

Perhaps Nuria Rodríguez Ortega’s framework can address this: In her analysis of the so-called “digital turn” in art history, Rodríguez Ortega proposed three different models that legitimizing institutions undergo when introducing digital and networked approaches into their work. The first, which she dubs hyper-canonization, marks a continuity of existing institutional policies, authorized power structures, and hierarchies; what the digital realm allows these institutions to do is amplify these pre-existing messages to wider and more global audiences. Alternatively, cultural institutions working with digital media might achieve a sense of de-canonization, in which technologies’ affordances of appropriation and reimagination empower communities and highlight their own values above all. But perhaps what is happening in the case of museum making is what Rodríguez calls inter-canonization, an intermediate

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modality in which a new kind of institutionalism based on democratic values. I would like to invoke the aphorism “two steps forward, one step back” to describe museum making’s ability to achieve a more open institution. I truly believe that museum making has the potential to introduce a certain level of openness into museums, but simultaneously contend that museums will never—and perhaps should never—fully shed their positions of power. Susana Smith Bautista acknowledges the paradox inherent within the hybrid populist-authoritarian turn in museums, and she argues that this is not necessarily a bad thing.192 Art museums cannot and should not be flat institutions, because doing so would deny a key function—serving as stewards of selected cultural objects. And even though museum making may not be able to overcome the authority inherent in museums, however, these programs are causing audiences to be aware of it and the fact that what is meaningful and valuable are ideological constructions.

Creative technologies are currently having their moment in art museums and in popular discourse at large. It remains to be seen if and how the new creative forms that museum making brings about will be assimilated into the museum. Similarly, it remains to be seen if these newfangled program models (hackathons, incubators, maker spaces) will survive, and if the intersection of art and technology is something museums will be interested in years down the line. Whether or not museum making, or creative uses of technology more broadly, lives beyond its Warholian fifteen minutes of fame, there is much cultural institutions can learn from this thesis. While I believe museums and creative technologies have the power to empower audiences and destabilize authority, I hope that this thesis provides an opportunity for museum professionals to reflect upon the ideologies embedded in their work. We need to be critical about

where implementations of new technology stops short of openness, and when we use technology as an excuse to perpetuate the kinds of structures we have always known.
Bibliography


   http://www.media.mit.edu/about/about-the-lab.


   http://hackathonfaq.com/.


   http://www.newyorker.com/magazine/2015/01/12/outside-game.
Hall, Stuart. “Encoding/decoding.” Media and Cultural Studies: Keywords, 2001, 166–76.
Heibel, Amy. “Hey, Artists: Submit Your Proposal for a Art + Technology Lab Grant!”
   http://whitney.org/Research/ISP.


http://www.lacma.org/overview.


http://pem.org/about/expansion.


https://www.media.mit.edu/research/groups/playful-systems.


“The Los Angeles County Museum of Art Art + Technology Lab: Year Two Request for Proposals.” Los Angeles County Museum of Art, n.d.


