

An Experimental Preservation Practice Visualizing Data as Code, Object, and Architecture

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by

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Abstract

HWILSDON is a practice-led research project intent on communicating "a life." The original owner of a USB flash storage drive titled "HWILSDON" who left it at a Rapid Prototyping Facility. The longevity of data is increasingly compromised by what several data scientists and researchers describe as an informational black hole and an era of unrestrained permanent data deletion designated the "digital Dark Age." Consensus amongst data preservation experts is to copy our digital content into as many different media formats as possible and hope that some survive. As a tripartite project, HWILSDON experiments with speculative preservation practices. This includes translating data into the Relic – a bespoke code, the Reliquary - data visualization materialized as a fabricated object, and the Reliquarium – an architectural typology for commemorating data.

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Dedication

My Parents
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HWILSDON

Introduction

HWILSDON is a practice-led research project intent on communicating "a life." A USB flash storage drive named "HWILSDON" was left at a Rapid Prototyping Facility at OCAD University in October 2017 and the material fact of its immaterial contents raised questions about data storage, data mortality, and the challenges attending the long term preservation of code and the retrievability of the information.[1] Indeed, the longevity of data is increasingly compromised by what several data scientists and researchers describe as an informational black hole and an era of unrestrained permanent data deletion designated the "digital Dark Age." Consensus amongst data preservation experts is to copy our digital content into as many different media formats as possible and hope that some survive.

As a tripartite project, HWILSDON experiments with speculative preservation practices. The conceptual model for this undertaking includes translating data into what I am calling the Relic or a bespoke code, the Reliquary where data visualization is materialized as a fabricated object, and the Reliquarium namely an architectural typology for commemorating data.

The experimental preservation at the centre of this project begins with designing the code for the HWILSDON Relic. The process of designing the Relic and subsequent Reliquary establishes the choreography of a deliberate procedure using straightforward variables, specifically the "Date Created," and "Date Last Modified" of folders and files contained in the specific USB used. The data is subsequently inputted into a custom code that outputs digital and analogue visualizations.

[1] When referring to the name of the USB Flash Drive "HWILSDON" is used. When referring to the practice-led thesis project HWILSDON is used.

The analogue Reliquary is a "hard copy" translation of data. It is conceptually inspired by the relics and reliquaries of early Christian practice where both house content of ineffable worth. The HWILSDON Reliquary preserves the code in a precious container meticulously designed and carefully crafted with digital fabrication.

As both practice and scholarship attest, architecture can exist beyond the parameters of building and place making and become an exercise in, and site, of narrative. Architects and designers for centuries have used storytelling to reveal worlds that do not exist. We then can self-reflect on the world we inhabit and consider the material or symbolic entities which best mirror our aspirations.

HWILSDON strives to be what visual theorist, Johanna Drucker, describes as a "knowledge generator." Drucker stipulates a "basic distinction can be made between visualizations that are representations of information already known and those that are knowledge generators capable of creating new information through their use. Knowledge generators have a dynamic, open-ended relation to what they can provoke."[2] HWILSDON relies on existing metadata on a specific USB and is aimed to eventually process increasingly complex and nuanced data to tell more compelling stories.

[2] Johanna Drucker, *Graphesis: Visual Forms of Knowledge Production*, metaLAB (at) Harvard (Cambridge, Massachusetts: Harvard University Press, 2014), 64.

Paris (Part 1)

The original proposal for my thesis topic was a queer-centric exploration of speculative architecture that integrated emerging practices of spatial representation and preservation. Queer spaces are commonly described as the architecture of same sex desire, but the most significant and consequential qualification is that they are used for queer purposes, such as the inversion of what exists for what it can be. They prioritize experience in, or of, a place as well as the place itself.[I] The archived content would address aspects of queer history that may eventually be lost due to inadvertent or deliberate cultural appropriation and homogenization. I developed ten case studies for commemorative spaces each assigned to a single topic: the "Procession of the Unheard Underground" (dance music from gay clubs), "Monument to Rosa Winkel" (history of the Pink Triangle), "Crematorium for Lost Knowledge" (destroyed research), "Reliquary of Black Bars" (censored images of nude men), "Cenotaph of Latency" (loss of artistic and cultural contributions due to AIDS), "Repository of Lost Spaces" (typologies of public queer spaces), "Tomb for Future Initialisms" (evolution of initialisms), "Vault of Queer Semiotics" (non-verbal social codes), "Mausoleum for the Unheralded Antagonists" (contested history of the Stonewall riots), and "Memorial for Darkened Spaces" (public and self-imposed stigma).

In the Summer of 2017, my Parisian friend took me to a peculiar museum located in le Marais in the 3rd arrondissement in Paris, France; Le Musée de la Chasse et de la Nature (Museum of Nature and Hunting). It was founded by a wealthy industrialist, François Sommer, and his wife Jaqueline Sommer in 1964[II] The collection is housed within two adjoined buildings, the Hôtel de Guénégaud and the Hôtel de Mongelas.[III] It is curated like an imaginary residence of a hunter and collector that express two primary themes, the relationship between man and animal, and hunting's contribution to culture as a source of inspiration for past and future artists.[IV] The museum hosts lectures, symposia, music and dance performances, and display contemporary artists. When I visited, I saw installed on the black grand piano, hidden between bouquets of white flowers, a cache of gruesome ceramics including coloured tendrils forced out of crevices in a miniature landscape, and gnarled children chasing each other across fetid fields strewn with putrid trees.[V]

[I] Aaron Betsky, *Queer Space: Architecture and Same-Sex Desire* (New York: William Morrow and Company, Inc., 1995), 5.

[II] Claude D'Anthenaise, "Le Musée de La Chasse et de La Nature," *Connaissance des Arts*, no. 309 (2007), 3.

[III] Claude D'Anthenaise, *A Singular Museum* (Paris: Musée de la Chasse et de la Nature, 2015), 8.

[IV] D'Anthenais, A Singular Museum, 10. The first theme examines the changing status of species over time, specifically animals that are considered a threat and those that do not. The second theme makes prominent within the museum historical iconographies of hunting throughout the entirety of human history.

[V] The artist exhibited was Marléne Mocquet.

HWILSDON

Preface

Prominent data-journalist and information designer David McCandless exclaims on the cover of a book he authored that *"Information is Beautiful!"* The relationships between facts and contexts make information meaningful, and communicating them by visualizing them as images, diagrams, or models is a "visual miscellaneum [or] a series of experiments in making information approachable and beautiful."[3] The beauty is the efficacy of conveying at times complex ideas into representations that are more approachable. Johanna Drucker, a professor in the Interdisciplinary Department of Media Arts at UCLA and an affiliate of metaLAB (at) Harvard, offers data is more than aestheticized content; it can be a theory of knowledge.[4] Drucker contributes the neologisms "graphesis" and "visual epistemology" to the nomenclature of representation. "Graphesis" as Drucker sees it, is "the study of the visual production of knowledge" and "an outline of principles and precepts that structure visual forms of knowledge production and representation in graphic formats."[5] A visual epistemology (or epistemologies because of their multiple forms) are "always interpretations" because, as Drucker argues "data does not have an inherent visual form." My thesis acknowledges McCandless' assertion that information can be visually compelling, adopts Drucker's proposition it can be instructive and erudite, while adding another dimension. HWILSDON is a speculative biography; instead of words and pictures, it is code made with zeros and ones.

[3] David McCandless, *Information Is Beautiful* (London: Collins, 2009), 7.

[4] On its website, metaLAB (at) Harvard is described as "an idea foundry, knowledge-design lab, and production studio experimenting in the networked arts and humanties." Refer to metaLAB (at) Harvard, "MetaLAB (at) Harvard: About," *MetaLAB (at) Harvard*, accessed November 1, 2018, https://metalabharvard.github.io/.

[5] Johanna Drucker, *Graphesis: Visual Forms of Knowledge Production*, metaLAB (at) Harvard (Cambridge, Massachusetts: Harvard University Press, 2014), 4; 5.

Paris (Part 2)

The rooms and sights during my visit included a taxidermied fox nuzzled into itself, resting on the padded seat of a fauteuil from the period of Louis XVI's reign in "Le Salon Bleu" (The Blue Lounge), and a booth painted with the cosmos where monkeys dined with fine wine glasses in the "Cabinet des singes" (The Monkey Study). My friend and I entered the "Salle des Trophée" (The Trophy Gallery) and saw stuffed heads of every animal imaginable staring eternally into the eyes of another animal mounted on the opposite wall. Along our journey we encountered an XVIIth century German cabinet fastidiously engraved in ivory and tortoiseshell, two sumptuous Ruben paintings in "The Ruben's study," a contemporary installation of sculpted non-functioning imaginary bird calls in the "Salon des Oiseaux" (The Aviary), a forever obedient porcelain puppy by Jeff Koons in the "Salons des Chiens" (The Hound's Antechamber), and the statue of a nude man with birch bark skin proudly poised in a darkened room dedicated to a mythical animal, "Le Cabinet de la Licornce" (The Unicorn Study).[VI]

During the summer before I had to submit my thesis proposal to the Graduate Program Director and my Primary Thesis Advisor, I felt deflated because I could not imagine how the form of the memorial spaces should be generated nor the content within the structures. A prominent characteristic for me as a designer is a systematic process that proved to be elusive for this project. The arduous undertaking was resolving the conundrum of producing deliberate form. I had the revelation that my thesis could be a queer version of "Le Musée, de la Chasse et de la Nature." The "Procession of the Unheard Underground" could contain more than speakers blaring dance music with beat structures developed in gay bars in the 70s and 80s. The "Reliquary of Black Bars" should be more than a wall of redacted images in publications of men's genitals that were illegal to sell until the 1960s. I had confidence that my practice-led research project could be a cacophony of content, including objects, film, music, photographs, and graphics.

By mid-July, I felt disconnected and needed to admit that I am not, cannot be, or should be a maximalist. I reflected on previous projects when similar trepidations were confronted; momentum to move forward is catalyzed when constraints become opportunities. My design process is best described as pitched at the point when an additional component is superfluous, and excluding an element makes it incomplete. I finally apprehended that in order to clearly assert who I am as a designer my project could not be a queer permutation of my cherished Parisian museum; it had to be an inversion. Rather than opulence, individuality, aggregation, and object-centrism, my project needs to be generic, reductive, modest, and process driven. Selecting my antithetical object was easy, a USB flash storage drive was the first item I thought of because it is a familiar vessel containing what we use every day - data.

[VI] The French titles to the rooms are taken from *Connaissance des Arts* and the English translations are from *A Singular Museum.*

HWILSDON

Research Questions

The technical evolution of digital data storage includes a moment where once-upon-a-time data was captured in paper physically decked and punched. I grew up in the 1970s (in Thompson, Manitoba, Canada) seeing stacks of computer cards as carriers of operational code and data. In 2020, data now "vanishes" into thin air. However, despite the seeming ease of contemporary data storage and its seeming infallibility, there does exist a sobering truth: the data held within paper cards, storage facilities, magnetic tape, optical discs, and microchips is permanently disappearing.

The longevity of data is increasingly compromised by what several data scientists and researchers describe as an informational black hole and an era of unrestrained permanent data deletion designated the "digital Dark Age." It is a consequence of recording on non-resilient material, discarding data storage devices considered irrelevant, and missing retrieval software capable of accessing the stored data. Unanimity amongst data scientists is to copy our digital data into as many different media, formats, and encodings as possible and hope that some survive.[6] My thesis asks: how can speculation, experimentation, and uncertainty be considered legitimate preservation practices?

[6] Kurt D. Bollacker, "Avoiding a Digital Dark Age," *American Scientist*, last modified March 13, 2019, accessed April 24, 2019, https://www.americanscientist.org/article/avoiding-a-digital-dark-age.

The enquiries for the HWILSDON project are tested with a proposal comprised of three speculative case studies. The first is the Relic, a custom-designed code, the second is the Reliquary, the digital and physical object generated from the Relic, and the third is the Reliquarium, an imagined architecture typology where Reliquaries can be preserved, produced, and exhibited.[7] I deliberately select the term "speculative" because my designs are latencies; they are not answers, but merely potentials for what something could or may be.[8] It is an act of faith. The questions that guide the project are:

1. If experts suggest preserving data into multiple formats, how can speculative processes contribute to data preservation?

2. If preservation typically aspires to secure longevity, how can it respond to a premise where decay is always certain and inevitable?

3. Counter to an expectation for design to terminate in a resolution, how can indetermination be a process?

[7] When describing the three case studies, usage as regular nouns will be identified as relic, reliquary, and reliquarium Otherwise, they are differentiated as proper nouns, e.g., the Relic, the Reliquary, the Reliquarium.

[8] My interest in the preservation of overlooked and unregarded histories with speculative architecture and speculative objects began in a research project initiated at the University of Manitoba Faculty of Architecture in 2015. The outcome was a research-led project, the Library of Queer Spaces. is intended to be an archive of queer men's recollections of their interactions in various spatial environments used almost exclusively for sexual encounters. The library would not be comprised of books, but rather a compilation of remembrances translated into scent because it is the sense most strongly associated with memory.

Flashback

During a studio review in Fall 2017 with Dr. Barbara Rauch and Professor Michelle Gay, I was blindsided by several comments revealing the fissures between the stated intent for the studio work and what I produced. On my computer screen were several shapes that resulted from playing with 3D modelling software. I was told that what was shown did not accord with what I was saying was my interest; how shapes are generated versus the objects themselves. It was pointed out that what I described was making algorithms that could produce form. They were enthusiastic in their estimation that being a designer, I would output the most beautiful code. For my eventual exhibition, they suggested the code itself could be presented as a super graphic that would cover the vertical surfaces of a gallery like wallpaper.

My initial reaction was that it was an incredulous pivot; it was unfathomable for me to graduate without something tangible. I attended OCAD University to be a maker, and the proposal was antithetical to my ambitions. I imagined scenarios when my friends are asked, "What is your thesis about?" and they can point to their material objects, paintings, drawings, etcetera. When I am asked the same question, what am I supposed to do? Pull out a USB flash storage drive?" I was obdurate that I could not have numbers and equations as a studio-based thesis project.

My position changed in Winter 2018 after I recalled seeing four coloured ghosts and a hungry yellow circle on a monitor in an esteemed art institution.

Inspiration

“Pac-Man”

When I made the decision to go to graduate school, the Interdisciplinary Master's in Art Media and Design (IAMD) program at OCAD University intrigued me because I did not imagine myself becoming a maker. My previous design background specialized in concept development, research, graphic design, and writing. I was seldom implicated in the production of analogue or digital images, models, or construction. As my practice-led research project developed I was challenged by the potential that it would be data-centric. How could I be identified as a maker when my thesis would be based on code, something inherently ephemeral and intangible?

From the initial trepidation in Fall 2017, fast forward to Winter 2018 when I remembered the exhibition that I attended at the Museum of Modern Art in 2013 titled "Applied Design." It was organized and curated by Paola Antonelli, the Senior Curator of the Department of Architecture and Design at MoMA.[9] The exhibition focused on design's fundamental tasks to help people respond to changes in science, education, or politics. Examples of work included data visualizations, internet interfaces, interactive design, and digitally fabricated furniture.[10] Surprising for me, were the rows of monitors, each assigned a specific playable video game.

In 2013, Paola Antonelli made the highly controversial decision to acquire 14 video games for the MoMA's collection. The criteria for selecting the games were "Behaviour, Aesthetics, Space, and Time."[11] Antonelli continues to assert that the debate needs to shift from the banal argument of whether video games are or are not art to the certainty that they are examples of design. The criteria she still emphasizes is "the visual quality and aesthetic experience of each game, ... the elegance of the code [and the] design of the player's behavior."[12] The radical aspect of her curatorial efforts is the long-term investment in maintaining relationships with the various companies to eventually acquire the game's source code as an integral aspect of the collected work. Paola Antonelli has disclosed she works with scholars, digital conservationists, legal experts, historians, and critics to help "refine not only the criteria and the wish-list, but also the issues of acquisition, display, and conservation of digital artifacts that are made even more complex by the games' interactive nature."[13] The acquisition of digital content is an inclusive process involving multiple stakeholders, it is not as straightforward as asking for a digital copy from a company.

[9] I admire her inclination to challenge our expectations of what design is or can be. For her first exhibition titled "Mutant Materials," she commissioned a limited-edition book with covers hand poured with coloured latex from an artist featured in the exhibition. Allegedly, she was the curator who inducted a music video into the permanent collection, Chris Cunningham's for Björk's song "All is Full of Love." Her recent project is a collaborative effort with Jamer Hunt titled "Design and Violence" where the premise plainly states that a history of design is at times a shared history of violence (https://www.moma.org/interactives/exhibitions/2013/designandviolence/). They leave open for discussion that design is implicated in weapons development, facilitating death penalty executions, and manufacturing computer viruses capable of compromising nuclear power plant security.

[10] Museum of Modern Art, "Applied Design," *Museum of Modern Art*, last modified 2013, accessed July 16, 2019, https://www.moma.org/calendar/exhibitions/1328?locale=en.

[11] Paola Antonelli, "Video Games: 14 in the Collection, for Starters," *The Museum of Modern Art*, November 29. 2012, https://www.moma.org/explore/inside_out/2012/11/29/video-games-14-in-the-collection-for-starters/ (accessed August 28, 2017). The video games in the MoMA Art and Design permanent collection are Pac-Man, Tetris, Another World, Myst, SimCity 2000, vib-ribbon, The Sims, Katamari Damacy, EVE Online, Dwarf Fortress, Portal, flOw, Passage, and Cobalt. Over the next few years, Antonelli wants to include Spacewar! 1962, an assortment of games for the Magnavox Odyssey console, Pong, Snake, Space Invaders, and Asteroids, Zork, Tempest , Donkey Kong, Yars' Revenge, M.U.L.E., Core War, Marble Madness, Super Mario Bros., The Legend of Zelda, NetHack, Street Fighter II, Chrono Trigger, Super Mario 64, Grim Fandango, Animal Crossing, and Minecraft.

[12] Antonelli, "Video Games."

[13] Antonelli.

This precedent should quell any hesitation that the interrogation of the preservation of code can be a thesis project: it is critical, purposeful, and generative. Paola Antonelli settles the squabble of whether video games, specifically its source code, are more than entertainment. By procuring a selection for the permanent Architecture and Design collection at the Museum of Modern Art, she sanctions digital content as examples of design. Although the games are artistic, coders do not necessarily want to be considered artists. Like many creative makers who produce aesthetic objects, they simply aspire to be great designers.[14]

[14] Bo Moore, "All Hell Broke Loose: Why the MoMA is Exhibiting Tetris and Pac-Man," *Wired*, May 30, 2013, https://www.wired.com/2013/05/moma-video-games/ (accessed August 28, 2017).

A viewer's engagement with design can be led by an aesthetic response. However, my process is attuned to making decisions based on function and purpose. The HWILSDON project, especially the Reliquary, is an artifact generated from a rigorous data-driven iterative process. The metadata of years, months, days, hours, minutes, and seconds is taken from the "Date Created" and "Date Last Modified" of digital files in the found USB drive titled "HWILSDON." They are entered into a custom code, translating them into a speculative object with points in space, resulting in a form and trajectory lines.

There are myriad design pedagogies from dogmatic to intuitive that can engage design. The curator and author, Deyan Sudjic, reminds us that design is a language and designers are storytellers.[15] Like the film *Rashomon* by Akira Kurosawa, where the plot device involves alternate accounts of the same incident from multiple points of view, the narrative differs when told from the perspective of woodcutters, a bandit, a samurai, or a deceased samurai's wife. The somewhat didactic process of design and making for HWILSDON is not without subtlety. The mono vision of design presented in HWILSDON should not be mistaken for obstinance, it was chosen deliberately to provide clarity. A risk is taken to prioritize a single operation because it might be misconstrued as being monotonous and prescriptive.

[15] Deyan Sudjic, *The Language of Things: How We Are Seduced by the Objects Around Us* (London: Penguin Group, 2009), 216.

Interdisciplinary design is inherently inclusive of many fields, but as a designer, I mark rigid delineations because I often find the variety of multiple disciplines to be overwhelming. The curator Paula Antonelli maintains that interdisciplinary designers are the best sponges in the world because they can absorb influences from art, architecture, and science.[16] She argues that designers are "superheroes" because design is the most complete form of creative expression.[17] While this choice may be inspiring for some designers, I get easily lost within the din. It is only by narrowing my focus am I able to find lucidity in the design process.

In his book, *Design as Art*, Bruno Munari gives a description of the design process that best reflects my own process. Munari explains that design practitioners work in vast sectors including visual, industrial, graphic and research design.[18] Within the litany of choices for HWILSDON, I adopt just one, research design. I do so because this sector "is concerned with experiments of both plastic and visual structures in two or more dimensions. It tries out the possibilities of combing two or more dimensions, attempts to clarify images and methods in the technological field, and carries out research into images on [media]."[19] The diversity of concerns, that fall under the auspices of research design, provides sufficient range of experimentation while maintaining an organising framework. Thus, the selection and ascription of a singular methodology does not negate the others, rather it is a commitment to one process already comprised of a diverse and interconnected grouping of methods. Indeed, for HWILSDON, a narrow focus acknowledges it is an extrapolation from - not the exclusion of - other design processes.

[16] Geneva University of Art and Design. *AC|DC: Contemporary Art Contemporary Design* (Quart, Italy: Musumeci S.p.A., 2008), 75.

[17] Genera University, *AC|DC*, 79.

[18] Bruno Munari, *Design as Art*, trans. Patrick Creagh, Penguin Modern Classics (London: Penguin Group, 1971), 32.

[19] Munari, *Design as Art*, 33.

Visually composed design is not a lesser category than process driven design. The HWILSDON project is meant to be an affirmation of my values. The form finding was logical, and the process was as valuable, if not more, than the material outcomes. The inquiries were informed by the importance of conveying indetermination is a design principle. But sometimes there is a schism between the integrity of a designer's pedagogy and the realization sometimes our relationship to design is nuanced.

The perfect foil to my design values is Patrick Schumacher. He is the current principle of Zaha Hadid Architects, and early adopter of parametric technology, and author of the *Parametricist Manifesto* in 2008. In a recent interview he talks about "Parametricism 2.0." The reporter mentions that Schumacher's dream scenario is to unify all architecture and urban design with Parametricism.[20] Digital models can be infinitely scaled, and his ambitions move beyond architecture and into urban plans. In the article Schumacher reminds the reader that regardless of how outlandish his vision is, Modernism was once considered unorthodox.

Despite my aversion to form-driven work, I have to acknowledge that my practice-led thesis project would not be possible without the research Patrick Schumacher advocates and develops. The outcomes of a project reinforcing the value of indetermination and speculation could not be easily facilitated without systematic program computation refined by designers like Schumacher. Ultimately, we are still designers who have the same ambition: contribute as much as we can to the world with the skills and knowledge gifted to us from our predecessors and contemporaries.

[20] Sam Lubell, "Meet Patrik Schumacher, Zaha Hadid's Ambitious, Abrasive Successor," *WIRED*, last modified October 26, 2016, accessed May 3, 2020, https://www.wired.com/2016/10/meet-patrick-schumacher-zaha-hadids-ambitious-abrasive-successor/.

Peacocks (Part 1)

Located behind a Burger King fast-food restaurant was what I consider the magnum opus of 2017 Skulptur Projekte Münster, Germany; Pierre Huyghe's "After ALife Ahead." It was an installation located in an abandoned skating ring slated for demolition. With upended building materials and the large-scale pit, it felt like an archaeological dig. Beneath the ceiling were immense apertures periodically opening and closing with views out into the sky. It was a finely calibrated responsive eco-system that "involved bio-and media-technological interventions and required extensive architectural de-and reconstruction [sic]."[VII] Once inside the excavated dug out ground, electrical cables, sensors, speakers, and a centrally located aquarium melded with a field of mud, clay, sand piles, pools of water, and concrete platforms. Despite the primordial materiality, it was a sophisticated interdependent data-driven network. Sensors monitored the bees, carbon dioxide, and bacterial levels, and an algorithm used the data to calculate fluctuations. Information was transmitted to an incubator containing HeLa cancer cells; lower fluctuations decreased the production rate, and higher fluctuations increased it.[VIII]

An aspect of "After ALife Ahead" that enthralled me was the downloadable app that supplemented a project bewildering in breadth and scale. Its integration begins when a musical cue triggers the opacity or transparency of the centrally located aquarium, causing the ceiling apertures to open or close. When looking through the augmented reality app, floating pyramids appeared on the screen. Pierre Huyghe explains that "[a] new pyramid is created every time a [HeLa] cancer cell splits, but when two pyramids are close enough together, they can also 'mate' and regenerate. When the ceiling opens, however, every pyramid disappears or 'dies' - except for those with a special strength, granted to them by an evolutionary algorithm integrated into the app."[IX]

I am still astonished by the coherence of all the constituent aspects; the interior landscape, the repurposed architecture, and the app are laudable autonomously and as a comprehensive project. Despite not having a single superfluous detail, when I visited it had two things missing. Amongst the menagerie of organisms already included in the work, two more were expected, the rare Chimera peacocks. When I inquired, the attendant told me they had to be removed shortly after the debut because the peacocks were constantly frightened from people chasing after them. It amazed me that despite being immersed in a profound experience produced with extreme detail and care, it could not compete with a tourist's desire for a social media post.

[VII] Kasper König et al., eds., *Skulptur Projekte Münster 2017* (Leipzig: Spector Books, 2017), 210.

[VIII] Emily McDermott, "Pierre Huyghe's Latest Project Is Part Biotech Lab, Part Scene from a Sci-Fi Film," *Artsy*, last modified June 19, 2017, accessed August 21, 2019, https://www.artsy.net/article/artsy-editorial-pierre-huyghes-latest-project-biotech-lab-scene-sci-fi-film. Huyghe says, "the deeply intertwined yet unpredictable and constantly evolving results of this system are what interests [me] most about the work." He is "not interested in interconnected things, in relation to each other, but in their interdependency."

[IX] McDermott, "Pierre Huyghe."

Rationale

The informational black hole and the "digital Dark Age"

Technological advancement is like a runner in a competitive race in that its agenda seems to be focused on achieving the fastest times and results. Technological society streamlines its software to manage complex applications quicker, and our storage hardware is smaller but capable of retaining more. Unbeknownst to us when pushing off the starting blocks is that we will never reach the finish line. We try catching up to the moment we are satisfied with our accomplishments, but it keeps surpassing us, we carry onward with our ambitions, without ever looking back to see what is left behind.

The durability of the storage media, outmoded hardware, and outdated software are obstructing access to existing data. The materials that store it, devices we use to transfer it, and the software required to access it, are increasingly expendable. Computer and data scientists refer to our current era as the "digital Dark Age," while other experts identify the 21st century as possessing an informational black hole.[21] In 2015, we were cautioned by Vint Cerf, then Google's vice president, who expressed the fear about the obsolescence of hardware because our memories are increasingly digitized, making them more precarious in the accelerating digital revolution.[22]

[21] Adam Wernick, "Scientists Warn We May Be Creating a 'Digital Dark Age,'" *Public Radio International,* last modified January 1, 2018, accessed April 24, 2018, https://www.pri.org/stories/2018-01-01/scientists-warn-we-may-be-creating-digital-dark-age. The term "digital Dark Age" is nomenclature for the digital age that is confronting increasing amounts of permanent data loss. I first encountered the idea in the book *Visualizing Complexity-Mapping Patterns of Information* by Manuel Lima (Lima, Manuel. *Visual Complexity: Mapping Patterns of Information.* New York: Princeton Architectural Press, 2011), and it continues to appear in publications and online resources as current as 2018. In my research, it is an expression used solely amongst data visualizers, computer and data researchers and scientists. When the expression appears in HWILSDON, it is used as the current convention.

[22] Pallab Ghosh, "Google's Vint Cerf Warns of 'Digital Dark Age,'" *BBC News: Science & Environment*, last modified February 13, 2015, accessed April 24, 2019, https://www.bbc.com/news/science-environment-31450389.

A 71-year-old retired magnetic tape technologist, John Koski, just several years ago forecasted where we are now, sharing "[i]f all the [drives] that are able to read and write a particular format of data fail, then the data on the disks [that] are recorded with that form becomes unreadable … If you can't find [a] device to read the data … 'you've lost it.'"[23] I grew up with all the major formats: my father's punch cards, 8", 5.25", and 3.5" discs, Iomega Zip, CD, DVD, USB, the cloud, Betamax, VHS, SuperDisk, Blu-ray, vinyl, 8-track tape, cassette tape, and Digital Audio Tape. With every upgrade, I am aware of the interrelationship between technological advances and accessibility. Each new technology often results in the previous version becoming redundant or have redundancies built in.

[23] Wernick, "'Digital Dark Age.'"

Unfortunately, different data formats can only be read and written on with the appropriate storage drive, "retrieving the information is similar to trying to read a message written in a lost language: To read it back, you need a translator, but this is impossible if there is no one left who can decipher the words."[24] Even if, hypothetically, we get a copy of the retrieval software, it may not be formatted or recognized by our operating systems. Given the unreliability of finding media with material integrity and rummaging for functioning devices, our data remains unsafe in the "digital Dark Age."

[24] Wernick.

Peacocks (Part 2)

When I originally proposed developing information visualization as a form of preservation, it was my original intent to integrate data from five different USB Flash Drives. I thought having access to more information would be beneficial because it would increase options for what I could test. When they were all opened, it was immediately apparent that a surfeit of information could easily compromise my capacity to control the scope of the research. My concern of not having enough data to work with from a single device was assuaged when I looked at the several ways content could be indexed. From a single device, I had the option of looking at the file and folder management based on Kind, Size, Version, Comments, Tags, etcetera.

I decided to focus solely on the dates and time of each file and folder. The selected qualifications are admittedly banal, yet a qualifying rationale relates to the circumstance when one commemorates someone or something, regardless of the nuance of an existence, convention dictates that it is reduced to the bracket of a first and last date. “After ALIfe Ahead” made me appreciate the importance of conceptual clarity and refinement. Not everything has to be a grand gesture, small variables can be of consequence; like the movement of bees within the ecosystem, and with my thesis, a single 64 GB USB Flash Storage Drive.

Theory

Experimental Preservation

My practice-led thesis project, HWILSDON explores how experimental preservation can catalyze alternative approaches to information visualization and safeguard against data loss. Jorge Otero-Pailos, is considered the authority in this sphere of preservation. An artist, professor, and Director of Historic Preservation at Columbia Graduate School of Architecture, Planning, and Preservation (GSAPP), he advocates for this specialization to exist as a consequential field of study. Experimental preservation locates itself within what Otero-Pailos terms the "future anterior," seeing history as "a construction with a contemporary and future purpose" and considers what is preserved or archived beyond the idea of returning to some pure historical point.[25] Otero-Pailos quotes the cultural critic, Frederic Jameson, writing that "[t]o imagine the future … one [has] to establish some historiographical relation to it from the point of view of the present … [w]ithout its mooring in a historical present, the future [is] inconceivable."[26]

Drawing from his formal training in architecture and preservation, Otero-Pailos' practice deals with memory, culture, and transitions. As a preservationist, he is always asking, "Why do we preserve buildings? What do we preserve? What is our cultural heritage? If preservationists are restoring objects that have already been made, is the field still a creative discipline?"[27] Unique to him, Otero-Pailos includes "Why do we clean buildings? And which ones? And how?"[28] In 2008, working closely with the National Trust for Historic Preservation, Jorge Otero-Pailos and perfumer Resendo Mateau produced an olfactory reconstruction of Philip Johnson's Glass House. Using Mateau's resources as the head of the Puig Perfumery Center, they reconstructed three scents that conjured recollections of building materials, soirées, and inhabitation. The first aroma reconstructed the smell of the new house when it was built in 1949, the second reconstructed the eau de colognes popular at that time, and the third was the smell of living in a house for decades.[29]

[25] Nickolaus Hirsh, review of *Experimental Preservation*, by Jorge Otero-Pailos, Erik Fenstad Langdalen, and Thordis Arrhenius, eds. (Zürich: Lars Müller Publishers, 2016), back cover.

[26] Jorge Otero-Pailos, Erik Langdalen, and Thordis Arrhenius, eds., *Experimental Preservation* (Zürich: Lars Müller Publishers, 2016), 20.

[27] Laura Raskin, "Jorge Otero-Pailos and the Ethics of Preservation," *Places Journal*, last modified January 2011, accessed May 1, 2020, https://placesjournal.org/article/jorge-otero-pailos-and-the-ethics-of-preservation/.

[28] Raskin, "The Ethics of Preservation."

[24] Jorge Otero-Pailos, "An Olfactory Reconstruction of Philips Johnson's Glass House," *Architectural Association School of Architecture*, no. 57, AA Files (2008): 40–45. Scent 1: "It is a blend of newly lacquered wood closets, newly painted steel, fresh plaster from the ceiling, cement mortar from the floor and a hint of leather from the new Barcelona chairs and bathroom ceiling." Scent 2: "A blend of the most popular eau de colognes worn by mid-century American men, including Old Spice, Canoe, English Lavender and Acqua Velva." Scent 3: "Smell of the house in the late 1960s, by which point its porous surfaces, especially the plaster ceiling, had become impregnated with the smoke of thousands of cigarettes and cigars." Regarding a recent project with Otero-Pailos and his students, Christine Nelson, the curator of literary and historical manuscripts at the Morgan Library, says "One of the reasons I was very drawn to working with this project was that for years people have come to me and said: 'Oh God, it must smell so great where you work! I remember that old book smell from my favorite library as well.' Everybody has some sort of olfactory memory of a library that probably had an effect on their lives." Randy Kennedy, "What's That Smell? Rare Books and Artifacts From a 1906 Library," *The New York Times,* last modified March 3, 2017, accessed April 30, 2020, https://www.nytimes.com/2017/03/03/arts/morgan-library-book-smell.html.

In the series *The Ethics of Dust*, Otero-Pailos postulates that "the material source of preservation's existence is pollution … Had there been no pollution, I sincerely doubt we would have preservation as we know it."[30] Time is recorded with traces of pollution accumulating in the recesses of a surface. For the series, Otero-Pailos applies a special latex on a historically significant building that absorbs dust while it dries on the wall's surface. When the panels are peeled off, the years of dirt are trapped in what looks like translucent sheets. Otero-Pailos believes pollution is our "cultural legacy," that it is "not the style of building that makes the difference … It has to do with time."[31] Regardless of the country, culture, epoch, or architectural style, what we all share in common are layers of dirt, dust, and soot hidden in our most cherished buildings.[32]

The design process begins with doubt, regardless of expertise. Because alternative methods and techniques are being explored, we are simultaneously outsiders and insiders with our projects. Uncertainty is necessary because the need to experiment is necessary "for advancing the knowledge of objects — and indeed for protecting their future."[33] The philosopher Johnny Golding describes the exchange between people and things as a "surface," and suggests "experimental preservation needs a 'surface methodology' in order to document, understand, and intervene upon objects that are not enclosed by physical boundaries but rather expand across a spectrum of the tangible and intangible."[34] The precedents of work and practices most commonly used in books, journals, and lecture material suggest the total of projects specific to digital content preservation is uncommon in experimental preservation studies.[35]

[30] Raskin.

[31] Ibid.

[32] Jorge Otero-Pailos' *The Ethics of Dust: Westminster Hall* is the largest casting to date at 50 meters long and 6 meters high. Westminster Hall is the oldest part of the Houses of Parliament in London, England. Its illustrious history includes the coronation banquet of King George IV in 1821, the trials of Guy Fawkes in 1606 and King Charles I in 1649, and it is still used for public ceremonies and lyings-in-state, most recently the Queen Mother in 2002. "Jorge Otero Pailos: The Ethics of Dust," *Artangel*, last modified 2016, accessed May 1, 2020, https://www.artangel.org.uk/project/the-ethics-of-dust/. Fortuitously, Otero-Pailos' installation opened days shortly after the Brexit vote. It is only fitting his work, one that compels us to better appreciate and reflect upon architectural landmarks that represents our respective cultural identities, was shown to the public in a time and place that once again was the backdrop for when, and where history, was made.

[33] Jorge Otero-Pailos, "Experimental Preservation," Journal, *Places*, last modified September 2016, accessed October 21, 2018, https://placesjournal.org/article/experimental-preservation/?cn-reloaded=1.

[34] Otero-Pailos, Langdalen, and Arrhenius, eds., *Experimental Preservation*. 15.

[35] The most familiar projects include, *The Ethics of Dust* series by Jorge Otero-Pailos, *Future Heritage Collection* by Azra Akšamija, *Cemetery of Architects* by Tayfun Serttas, and the *Facsimile of Tutankhamun's Tomb* by Factum Arte. Factum Arte work digitally and materially, they pioneered "non-contact preservation," digital scanning surfaces in high resolution.

Factum Arte, a company that deploys new technologies as a conservation practice for cultural heritage, has developed a digital and analogue practice. The founder, Adam Lowe, echoes Otero-Pailos in stating, "heritage can no longer be thought of in terms of unique immutable objects. Digital technology has thrown the concept of heritage into a new reality where scanning and printing, dematerialization and rematerialization, blur the boundary between the physical and the virtual, the tangible and the intangible."[36] HWILSDON is a generative project that speculates and proposes new objects and typologies. With digital and analogue visualization, it realizes data into multiple formats to counter permanent deletion. Most importantly, HWILSDON is an iterative design project, not a practice reliant on the repetition of existing techniques.

It is unnecessary to categorize ideas, disciplines, intentions, or outcomes in experimental preservation. Rory Hyde, the curator of the Victoria and Albert Museum in London, remarks, experimental preservation is a radical and provocative version of historical assessment, "which does not merely seek to freeze objects in time, but seeks to tell long narratives into their history and project them forward."[37] The informational black hole and "digital Dark Age" makes necessary challenging conventions because they are demonstrably ineffective.

[36] Jorge Otero-Pailos, Langdalen, and Arrhenius, eds., 160.

[37] Victoria and Albert Museum, *Experimental Preservation: Jorge Otero* Pailos *and Mari Lending in Conversation with Rory Hyde 17th July 2015*, V&A, YouTube video (Victoria and Albert Museum, 2015), accessed October 21, 2018, https://www.youtube.com/watch?v=tapfWBSSt1k.

Experimental preservation is an inclusive interdisciplinary practice, a junction including art, architecture, engineering, history, data science, material science, philosophy.[38] Rem Koolhaas, author, architect, and principle of the Office for Metropolitan Architecture (OMA), invokes Paul S. Byard, the former Director of Historic Preservation at Columbia Graduate School of Preservation and Design (GSAPP), in his lecture "Preservation is overtaking us." Koolhaas claims "preservation is a progressive art form, and intellectual and design challenge of the very highest level."[39] What constitutes a necessary architectural preservation practice can include demolition because taking care of a building might mean knocking a wall down and revealing something that was not seen before. In this sense, preservation is always understood as a radical act.[40]

[38] Otero-Pailos, Langdalen, and Arrhenius, eds., 20.

[39] Rem Koolhaas and Jorge Otero-Pailos, *Preservation Is Overtaking Us*, Columbia Books on Architecture and the City (New York: Columbia University Press, 2016), 7.

[40] Koolhaas and Otero-Pailos, *Preservation Is Overtaking Us*, 7.

Methodology 1

Sketching and Drawing

Sketching and drawing are methodologies that support my process of making. Paper and pen were the primary media used to test concepts with multiple drawings. The acts of sketching and drawing convert ideas into a communicative format that is not accidental; they are used to determine pertinent design decisions. I am accustomed to sketching and drawing as a precursor to form making - specifically objects, environments, and architecture - as an effective conveyance of process, concepts, and instructions.[41]

A recent symposium titled *Drawing Futures: Speculations in Contemporary Drawing for Art and Architecture* was hosted in 2016 at The Bartlett School of Architecture, UCL, London, and in the catalogue of the proceedings the editors remind us that "Drawing has always had an implicit relationship to technology. While drawing is often framed as an instinctive and intuitive act, we should not forget that many of the principles we take for granted today were developed through technologies as much as through the hand. Alberti's devices for perspectival drawing helped the artist manage the complexities of perspective and in turn assisted its proliferation as a representational mode."[42] For the HWILSON project, an intuitive process like hand drawing made me better appreciate the logic necessary for what information needs to be provided, and in what order, to generate a form with minimal ambiguities.

[41] Igor Marjanovic and Jan Howard, *Drawing Ambience: Alvin Boyarsky and the Architectural Association* (Chicago: Mildred Lane Kemper Art Museum and Museum of Art, Rhode Island School of Design, 2014), 29. At the forefront of embracing drawing as a proxy for form was the Architectural Association (AA) in London, England. As director of the AA, architect Alvin Boyarsky, during his tenure from 1971 until his death in 1990, instituted the prominence of drawing in the studio unit system. In the 2014 exhibition and publication, *Drawing Ambience: Alvin Boyarsky and the Architectural Association*, the authors posit "[the] efflorescence of interest in [drawing] reflected not only the growing prominence of drawing as a medium of discourse but also the centrality of discourse itself."

[42] Laura Allen and Luke Caspar Pearson, eds., *Drawing Futures: Speculations in Contemporary Drawing for Art and Architecture* (Cambridge, Ontario: Riverside Architectural Press, 2016), 205.

Throughout the undertaking of my practice-led research project I demonstrate how sketching and drawing can manifest seemingly fantastical but rigorously undertaken code design, generated form, and speculative architecture. Nine feet of drawings from a Japanese accordion-fold Moleskine notebook, hundreds of pages in several sketchbooks, multiple packages of grid paper from Muji, and hundreds of sketches comprehensively account for every concept. Each squiggle and note represents a single idea, either as an addition to a train of thought or something independent. Every response, decision, question, and breakthrough are proven and profusely catalogued.[43] This includes the logic for the code design, the series of digitally fabricated material operations, and the function of a unique building typology.

[43] The drawings anticipated the concern of authorship for producing components of HWILSDON that required external assistance. The process for generating each case study - the Relic, the Reliquary, and the Reliquarium- is thoroughly documented in more than 80 sketches.

Methodology 2

Multimedia Prototyping

My relatively obvious tactic for designing the Relic's code and ideating potential object manipulations for the Reliquary directly correlates to my cursory familiarity with programming, digital modelling, and 3D printing. Surprisingly, those insufficiencies never compromised my work product. Adopting the Cartesian co-ordinate system for form-making, and appropriating simple steps like rotating and extracting for further manipulations, does not diminish the project's rigour. The value of testing material data visualization is not dependent on making intensely complex forms from manipulating geometry. For HWILSDON, the merit of multimedia prototyping is scrutinizing the efficacy of how an idea can be communicated. But such seeming abstractions of form as holders of factual knowledge are hardly new.

Inca society is known by archaeologists and historians as the only "Bronze Age civilization" without a written language. Instead the Inca used quipus.[44] Quipus are cotton or wool strings dyed in various colours hung from a horizontal chord as repositories of numerical and narrative information.[45] Knots convey meaning through their location, direction and type, and a basic understanding exists of the numerical system incorporated with knots representing numbers.[46] In 2017, Manny Medrano, an undergraduate student at Harvard, discovered that "the rope may in fact, contain far more than just numbers ... their complex colour system appears also to represent more complex narrative information like names, geography and history."[47] Medrano's research gives import to the conviction held by Patricia Landa, the conservator for Incahuasi Archeological Project that "Quipus ... show that it was a very developed culture [and a] Quipu is the accountance [sic] of life."[48]

[44] Alternatively spelled *khipus.*

[45] Jill Radsken, "A Student Mines Voices from the Incan Past," *Harvard Gazette*, August 25, 2017, accessed November 5, 2019, https://news.harvard.edu/gazette/story/2017/08/a-students-mines-voices-from-the-incan-past/.

[46] National Geographic, *National Geographic - Threads That Speak: How The Inca Used Strings to Communicate*, n.d., accessed November 4, 2019, https://www.youtube.com/watch?v=AmPyz1kCbOw.

[47] CBC Radio, "Harvard Undergrad Cracks Code of Knotted Inca Rope Used as 'an Ancient Excel Spreadsheet'/CBC Radio," CBC: *As It Happens*, last modified December 28, 2017, accessed November 4, 2019, https://www.cbc.ca/radio/asithappens/as-it-happens-thursday-edition-1.4466385/harvard-undergrad-cracks-code-of-knotted-inca-rope-used-as-an-ancient-excel-spreadsheet-1.4466388.

[48] National Geographic, *Threads That Speak*.

The inherent visual appeal of a quipu, perhaps a concession to the aesthetic properties and sensory draw of machines, with their multiple arrays of colourful chords, is deceiving. The aesthetic is a consequence of logic, it is not the driver of the design. In a similar fashion, the HWILSDON Reliquary is the analogue interpretation of the metadata collected from the original flash storage drive. The multifaceted mass and location and length of trajectory rods are generated from the years, months, days, hours, minutes, and seconds of when a file in the flash drive was first created and when it was last modified. An observation Dr. Laura Miller, a Professor at the Daniels School of Architecture, Landscape, and Design, mentions in her course outline is that "knowledge is embedded within the act of making."[49]

The digitally fabricated form made from 3D powder printing is an interpretation of information that physically depicts time. HWILSDON is a case study for data visualization that is deliberate, not whimsical. It forecasts a future when the data can be read in reverse, when the fabrication can capture every attenuation so painstakingly precisely that metadata can be deciphered from the form not just born from it.

[49] Dr. Laura Miller, *"Graduate Course Outline: On the ARTIFACT"* (Daniels School of Architecture, Landscape, and Design Fall 2018).

Methodology 3

Narrative

HWILSDON tells stories in multimedia and multi-format representations. A chronicle of data identified in the files and folder from a USB flash drive is visualized as digital renderings and digitally fabricated reliquaries, and a tale for a potential endeavor to be scaled into an industry is told with collaged architectural drawings of a production facility called the Reliquarium. The architectural theorist, curator, and historian, Beatriz Colomina, contends that "physical building is just one of many possible modes of architectural representation [and] the site of architecture production has moved from the built environment to other media such … a 'displacement that presupposed a new sense of space, one defined by images rather than walls.'"[50] Narrative production as an experimental preservation practice can potentially be a type of contemporary architectural practice, or at the very least, an architectural typology.

A correlation exists between how architecture – defined here as the critical process that encompasses a wide variety forms and structures, functional and otherwise, replete with meaning actual and represented – is depicted and what is being communicated. In the book *Short Stories: London in Two-and-a-Half Dimensions* by C.J. Lim, Roland Barthes' comments in "Introduction to Structural Analysis of Narratives" are referenced, highlighting that narrative is present in every age, in every place, and in every society.[51] Canadian journalist Robert Fulford mentions in his November 1999 *CBC Massey Lecture, The Triumph of Narrative: Storytelling in the Age of Mass Culture,* that narrative's principal function is "to tell great sweeping stories [that] will inspire and instruct all."[52]

[50] C.J. Lim and Ed Liu, *Short Stories: London in Two-and-a-Half Dimensions* (Abingdon: Routledge, 2011), 15.

[51] Lim and Liu, *Short Stories*, 7.

[52] Robert Fulford, *The Triumph of Narrative: Storytelling in the Age of Mass Culture*, CBC Massey Lectures (Toronto: House of Anansi Press Inc., 1999), 30.

The inclusion of the Reliquarium in the HWILSON project may seem odd or peculiar, however, there is precedent for what is a decidedly profound and moving procedural commemoration of personal digital objects.[53] In 1999, 3,000 Sony AIBO entered the market, and It was promoted as the world's first entertainment robot for home use. It was hugely popular with thousands of units of responsive and interactive robotic puppies finding their ways into domestic spaces and the hearts of their owners. When Sony ended production in 2006, the realities of mechanical/digital failures became widely known.[54] In the past several years, AIBO dogs expired. For some owners, their machines were transformed across the years from pure amusements to cherished companions. There is an option for owners now to send them to A-FUN, a company that repairs vintage products and honours them with a compassionate send-off to Kofukuj, a 450-year-old temple near Tokyo.[55] Often the dogs arrive at A-FUN with letters attached providing name and details of their life. The contents of one letter says, "Please help other Aibos [sic]. Tears rose in my eyes when I decided to say goodbye."[56] The deceased AIBOS are brought to the Buddhist temple, and the Buddhist Monks perform traditional funeral rites.

Noted futurist and author of influential BLDG BLOG, Geoff Manaugh believes unequivocally that architecture is always telling stories, including how to grieve defunct technology, in addition to satisfying the necessity of engineering and material sciences. He identifies architecture's inherent interpretability outlining "[b]uildings can physically represent certain storylines as strongly, and far more viscerally, than a written text. Architecture encodes messages; call it my own belated discovery of architecture *parlante*."[57] Manaugh implies that architecture as a discipline can be purposed to have storylines. The HWILSDON Reliquarium manufactures and archives the Reliquaries that are generated from the Relic. For the HWILSDON project, data is preserved at different scales, beginning with data that cannot be seen, objects that can be held, and an architectural repository for the objects.

[53] A traditional reliquarium is an interior space where multiple relics are housed, displayed, and venerated.

[54] Justin McCurry, "Japan: Robot Dogs Get Solemn Buddhist Send-off at Funerals," *The Guardian*, last modified May 3, 2018, accessed July 16, 2018, https://www.theguardian.com/world/2018/may/03/japan-robot-dogs-get-solemn-buddhist-send-off-at-funerals.

[55] McCurry, "Japan: Robot Dogs."

[56] McCurry.

[57] Geoff Manaugh, *The BLDG BLOG Book* (San Francisco: Chronicle Books, 2009), 17. (Italics in the sourced text).

Basics

Data

A consensus does not exist between all data specialists when asked: "what is data?" I selected responses from three scholars and practitioners often cited in my research sources because they have expertise in their respective fields of data-centric studies and projects. Sandra Rendgen, an art historian who previously practiced in print and interactive media, describes data as "the new raw material … [that] are in themselves are of negligible value [because] they need to be filtered and evaluated."[58] Theorist Johanna Drucker offers an equally sober reply, "[d]ata pass themselves off as mere descriptions of a priori conditions."[59] She continues to say that "no 'data' pre-exist their parametrization. *Data are Capta*, taken not given, constructed as an interpretation of the phenomenal world, not inherent to it."[60] A compelling reply comes from Minye An, a postdoctoral researcher in the Department of Architecture at ETH Zürich and author of *Atlas of Fantastic Infrastructures: An Intimate Look at Media Architecture*. She believes that data has a narrative potential, that unlike its practical application, supersedes empirical accuracy.[61] This interpretation suggests that data is more than a commodity to be used; it has agency. I know data cannot abdicate its responsibility to function, however, I concur when An says, "it can also be anything else, even something that has never been thought of."[62] After ruminating on the various responses, whether it is more utilitarian or imaginative, my choice is the same, "Yes" to both.

Perhaps it is our shared background in contemporary architecture that makes me lean towards Minye An's reasoning. Despite writing specifically about media architecture in her dissertation, she identifies how designers, regardless of classifications, practice in a media-saturated world. Access to more data affords options in how it can be employed, and "[d]epending on what kind of data is streamed, from where and how far, [data] can come to us with different meaning and experience."[63] I believe that data is more elusive to describe than Rendgen and Drucker's appraisals; they can, as An writes, be "set out as provisional, extrapolating, conceptual markers rather than as definitive, analytic parameters."[64]

[58] Sandra Rendgen, *Information Graphics*, ed. Julius Wiedemann (Köln: Taschen, 2012), 9.

[59] Johanna Drucker, *Graphesis: Visual Forms of Knowledge Production* (Cambridge: Harvard University Press, 2014), 125.

[60] Drucker, *Graphesis*, 128. (Italics used in the sourced text).

[61] Mihye An, *Atlas of Fantastic Infrastructures: An Intimate Look at Media Architecture* (Basel: Birkhäuser Verlag GmbH, 2016), 237.

[62] An, *Atlas*, 253.

[63] Mihye An, *"Media Architecture and Categories of Spatialization"* (Ph.D. diss., Swiss Federal Institute of Technology, 2016), 10.

[64] An, *Media Architecture*, 21.

Nevertheless, I am simultaneously appreciative of their expectations that data performs. My position in this exchange is that concordance is attained when data is understood as a composite. An identifies a shapeable "Digital Infrastructure" where "[c]ode strictly pre-defines meta operations, rations, and processes while being able to embrace and index various kinds of data."[65] Algorithms and code are dependent on access to all behaviours, and an idea is only actionable when content is dictated. HWILSDON requires coexistence; data has permission to be ambiguous and exploratory and something that has never been thought of, but it has to accept empiricism to become what we imagine it can be.

[65] An, 21.

Minye An provides an appropriate and useful summary. The analogy she uses to describe the unyielding interchange between data, information, media, and devices of what we know to be digital infrastructure is that of roads and bridges, namely their relationship to one another and the results or consequences of their joint work. An asks and answers her own question of what is digital infrastructure and where it can be found, admitting she does not know because "it is constantly changing, [n]ever the less, it does have its own stability."[66]

[66] Ibid.

Basics

Metadata

Data About Data

That metadata is data about data makes sense. However, a more extensive discussion is needed. For an immediately relatable description, I default to the analogy of a bookstore divided into sections. On the shelves, we see metadata is a biographical story highlighting data's specific achievements; describing what and for how long it did something. When we walk into the reference section, a book titled "data" is pulled from the shelves. It has an unusual cover. It is an accordion fold comprised of seven pages, and each page has a single topic written on it: "A Title." "Author(s) name(s)," "Publisher and Copyright details," "Description on a Back," "Table of Contents," "Index," and "Page Numbers." Going down an alternate aisle, we find a great spy novel. Spoiler alert: the big surprise happens when metadata is discovered and divulges data's name; whom it met with, for how long, what it had to do, from where, and at what time.

The computer scientist Jeffrey Pomerantz, argues in his book *Metadata*, that it is more than just data about data. It is a means to represent the complexity of an object in a simpler form.[67] Within the milieu of omnipresent data generated by computers and personal mobile devices, "metadata has become infrastructural, like the electrical grid or the highway system. These pieces of modern infrastructure … like the electrical grid and the highway system, [metadata] fades into the background of everyday life."[68] Despite the substantive influence metadata has on contemporary existence, its success is measured by how well it disappears from consciousness.

In developing my practice-led thesis project, I encountered four significant ways to situate a intellectual and critical position on what metadata means to me. This was unexpected since my interest in data and metadata as topics included the specific elegance of unfussy rationality, simplicity, and generality. The points of view most intriguing were not banal descriptions, rather they are best described as the difference between metadata as 1. an implacable monolith as in Stanley Kubrick's *2001: A Space Odyssey*, 2. a disappearing act, 3. potential killer, and 4. architecture.

[67] Jeffrey Pomerantz, *Metadata*, The MIT Press Essential Knowledge Series (Cambridge, Massachusetts; London, England: The MIT Press, 2015), 11.

[68] Pomerantz, *Metadata*, 3.

Monolith

On June 6, 2013, at 11:05 a.m. (GMT), a whistle was blown that was heard around the world. *The Guardian* published an article written by Glenn Greenwald with the headline "NSA collecting phone records of millions of Verizon customers daily."[69] Greenwald divulged that under an order from President Barack Obama's administration, Verizon, one of the USA's telecom providers, provided information from telephone calls, specifically the phone numbers of each individual, the location of the call, the time of the call, and duration. Prior to this event, I was familiar with the term metadata when Julian Assange leaked documents in *The Guardian*, *The New York Times*, and *Der Spiegel*. It was at the time an unrelateable concept. After the deluge of reporting subsided, I was left with the idea that seemingly innocuous information can be nefarious.

Five months after the release of *The Guardian* article, an essay was written in *The New York Times* that described metadata as a necessary evil. Devon McCann Jackson cautions us to be aware of what it really is versus what is assumed to be and what it can do. In "When Meta met Data," Jackson alerts us, "metadata is implacable, unreasoning, unironic. As abstract as meta once was, metadata is painfully, unamusingly, unentertainingly real, even while it's also unfathomable and therefore abstract. It's an abstraction made concrete by its implications: the data, whatever that data is, can be used against us. It's threatening, but we're not sure exactly why. It's endless; we can only stop it if we ourselves cease existing."[70] During the arc of researching and making for my practice-led this project, my experience is different from Jackson's assessment. For HWILSDON, metadata is not solely dormant and empirical; it represents possibilities of what it can describe.

[69] Glenn Greenwald, Ewen MacAskill, and Laura Poitras, "Edward Snowden: The Whistleblower behind the NSA Surveillance Revelations," *The Guardian*, June 11, 2013, sec. US news, accessed September 8, 2019, https://www.theguardian.com/world/2013/jun/09/edward-snowden-nsa-whistleblower-surveillance.

[70] Devon McCann Jackson, "When Meta Met Data," *The New York Times*, last modified October 4, 2013, accessed July 23, 2019, https://www.nytimes.com/2013/10/06/magazine/when-meta-met-data.html.

A Disappearing Act

Data is many things. It can be raw, unprocessed, untouched by our hands, unseen by our eyes, and not thought about in our minds.[71] Jeffrey Pomerantz likens data to potential information, analogous to potential energy: work that is required to release it.[72] My preliminary research and discussions with a data analyst working for a firm scrutinizing online behaviour for retailers leads me to believe that metadata presupposes data does something actionable and, at times, demonstrable. It cannot exist outside of a container: a metadata record must exist in some format, be it physical or digital.[73] However, what happens when there is no container because the format is unspecified. Pomerantz advances his Idea that it momentarily disappears when the vessel that represents an assigned purpose becomes a latency: "[d]ata must be understood not as an abstract concept but as potentially informative objects" and in addition metadata can be defined as "a potentially informative object that describes another potentially informative object."[74] My practice-led thesis project HWILSDON supplies options for how data can be preserved for the future. In it I design a means against permanent data deletion with visualization, using images and objects, without a guarantee it will be successful.

[71] Pomerantz, 16.

[72] Ibid, 21.

[73] Ibid, 26.

[74] Ibid.

Potential Killer

In the article "Metadata That Kills," Peter Brantley tells the story of advising his friend about which ebooks should be distributed to underserved populations around the world. She asks him if it is possible to limit the ebook catalogue for different countries. Her concern being depending on the region, there can be mortal consequences if a woman is caught reading the wrong book.[75] The revelation Brantley garnered is that data is not impartial. He sagaciously remarks, "[d]escriptive metadata is never neutral. It reflects our understanding of our society, and our interpretation of how we think the world should be. It is unavoidably evocative of not just a book, film, or song, but rather the whole society which gave it genesis."[76] As the generative content used in HWILSDON, metadata is more than a list of digits for the time a file was created and last used. Brantley reminds us that the files they broadly describe, capture, and convey is a moment in time within our collective history.

[75] Peter Brantley, "Metadata That Kills," *Medium*, last modified October 15, 2015, accessed August 24, 2019, https://medium.com/@naypinya/metadata-that-kills-59a7c9e0de1f.

[76] Brantley, "Metadata That Kills."

Architecture

Metadata and architecture are a relationship that is coming into the foreground of public recognition with research being produced by the agency named Forensic Architecture (FA).[77] It was founded in 2010 by Eyal Weizman, a Professor of Spatial and Visual Cultures at Goldsmiths College in London and is joined by an interdisciplinary team that includes architects, designers, digital modellers, archaeologists, and filmmakers. Forensic Architecture is a research practice that investigates state and human right violations by modelling contentious sites using aggregated digital and analogue metadata as evidence. They are an experimental practice because as Weizman explains, "the work of forensic architects might seek to adopt the imaginary gaze of a future archaeologist looking back at the present. The archeology of the present is not only physical but requires all sorts of digital [sources]."[78] My practice-led project uses metadata from an unclaimed USB flash drive to better understand the history of its usage.

Forensic Architecture are noted for recreating digital crime scenes, from the scale of a family café in Kassel, Germany, to a 3D model reconstruction of one of the heaviest days of bombardment in the 2014 Israel-Gaza war.[79] Indeterminacy can be the purpose of an exploration. Forensic Architecture requires the acquisition of metadata to serve as evidence. For Eyal Weizman, pieces of "image flotsam" can be taken from security camera footage, photographs, videos, and social media posts.[80] He admits it "can be as confounding as it is can be useful, and it needs to be assembled. It requires construction and composition - thus, architecture."[81] The process of establishing the relationships between the metadata are "evidence assemblages."[82] When it is sorted and aggregate, the metadata gets inputted into a computer; and with specialized architectural rendering software, Forensic Architecture can build an accurate digital model of investigatory environments.[83]

[77] In interviews and articles, FA has been identified as a firm, agency, and a practice. FA uses the classifications interchangeably.

[78] Eyal Weizman, *Forensic Architecture: Violence at the Threshold of Detectability* (Cambridge, Massachusetts; London, England: ZONE BOOKS, 2017), 57.

[79] A list of Forensic Architecture's investigations is available on their website (https://forensic-architecture.org)

[80] Michael Kimmelman, "Forensics Helps Widen Architecture's Mission," *The New York Times*, April 6, 2018, sec. Arts, accessed April 29, 2020, https://www.nytimes.com/2018/04/06/arts/design/forensic-architecture-human-rights.html.

[81] Michael Kimmelman, "Forensics."

[82] Kimmelman.

[83] A comprehensive account of an investigation was done for the *New York Times Visual Investigations* series, aided by Forensic Architecture. Titled "How Bashar al-Assad Gassed His Own People," the reporter disputes the claim from Syrian official that there was not a chemical attack in an apartment building in Douma, Syria. (*How Bashar Al-Assad Gassed His Own People, The New York Times Visual Investigations*, 2018, accessed April 29, 2020, https://www.nytimes.com/interactive/2018/06/25/world/middleeast/syria-chemical-attack-douma.html.ul.html?smid=yt-nytimes&smtyp=cur&smvar=yd-article.

In addition to Forensic Architecture's acclaim for working with international human rights, humanitarian, and activist groups; they have been lauded for the information visualizations, graphics, models, and videos that were produced for their investigated cases.[84] For their exhibition in London's Design Museum, titled *Counter Investigation*, FA received the Beazley Design of the Year 2018 Award. In that year they were shortlisted for the prestigious Tate Museum's Turner Prize. Despite the aesthetic allure, Forensic Architecture's relevance in architectural discourse was recognized with their exhibition for the Venice Architecture Biennale 2016. *The Reporting from the Front* installation included a full-scale reconstruction of a room that was destructed. Graphic lines that emanated from the blast point conveyed the trajectory, distribution of the fragments, and location of where people were most likely standing when the explosion occurred.[85] The room is a spatial representation of the metadata sourced from video footage.[86] Their works affirm that research content represented in digital and material media can be important and visually compelling.

In his book *Forensic Architecture: Violence at the Threshold of Detectability*, Weizman opines that our environments are sentient.[87] My interpretation is that the size and detail of a Forensic Architecture digital model changes every time it is given newly acquired metadata. The sources may include digital files, material traces, acoustic recordings, surveillance footage, and first-hand accounts. Similarly, in the HWILSDON project, indeterminacy as a preservation practice is supported by the unique association between architecture and metadata. What may be interpreted as digital detritus, like metadata left behind in a physical USB flash storage drive, can be a consequential resource for enriching research.

[84] Forensic Architecture's criteria for determining the cases they will undertake must involve a human rights or environmental issue not otherwise adequately addressed by the state in which it took place. There needs to be a spatial or architectural dimension that can engage with their techniques. It should offer them an opportunity to develop new research techniques. (https://forensic-architecture.org/about/agency).

[85] Weizman, *Forensic Architecture*, 43.

[86] Weizman, 43.

[87] Ibid.

Basics

Algorithm

Unlike data, metadata, and code, algorithm infrequently appears as a topic in non-field based publications. It was, and is, frustrating to not easily find algorithms referenced in design-centric publications or project descriptions.[88] Each instruction must be identified and placed in the correct order because this informs a computer to do something we want it to do and convey how we want the task to be specifically performed.[89] An algorithm can be defined as having four qualities: there are many ways for it to be written, it requires assumptions, it includes decisions, and a complex algorithm should be in modular pieces.[90]

[88] I found the topic of algorithm in design and architecture discussed in the book written by Benjamin Aranda and Chris Lasch, collectively known as Aranda\Lasch, titled *Tooling*. Aranda\Lasch is an American-based design studio that designs buildings, installations, and furniture. In *Tooling*, they showcase their research into computations as new tools for architectural design. They address algorithms as more than actions, they are consequential components for evolving architecture. They observe that "[t]oday, as modelling, representation, and fabrication technologies shift from manual to automated processes, this issue of the algorithm is pressing precisely because it confronts the design of procedures themselves." (New York: Princeton Architectural Press, 2006), 9.

[89] BBC Bitesize. "KS3: Computer Science," *BBC Bitesize*. https://www.bbc.co.uk/bitesize/guides/zpp49j6/revision/1. (accessed June 16, 2019).

[90] Chandler McWilliams and Casey Reas, *Form and Code: In Design, Art, and Architecture* (New York: Princeton Architectural, 2010), 13.

Basics

Code

In the book *Form+Code in Design, Art, and Architecture,* artists Chandler McWilliams and Casey Reas inform us that code directs how a computer operates, they define it as an algorithm written in a programming language.[91] Code can only be interpreted in a single way, but a pre-condition is that it must be converted from a human-readable format to a computer-executable format. This conversion transforms code into software. For McMilliam and Reas, despite its rote performance, computation can attract and inspire innovative artists and designers. The authors remind us that "[software] is a tool of the mind … [that] the information revolution is producing tools to extend the intellect … [and] software is not only about increasing our ability to work with large volumes of information; it also encourages new and different ways of thinking."[92]

There is a liberty expressed in McWilliams'and Reas' text. They succinctly remind us that technology is simply another medium that can be used to express our creativity. The written work that most influences the relationship established between HWILSDON, as a practice-led thesis project, and my relationship with technology is a 38,000-word article authored in 2015 by the former programmer and current journalist, Paul Ford, titled "What is Code?"[93] Published in *Bloomberg Businessweek* magazine in June 11, 2015, it is a rare issue entirely dedicated to a single topic and an interactive primer requiring a team of editors, graphic artists, and web developers.[94] The website accompanies the contents of the print article with interactive elements, purposed to teach how computers process code. It is described as "something like a book, skipping back and forth between theory and culture with narrative arcs between."[95] In the article, code is "a sequence of symbols (using typical keyboard characters, saved to a file of some kind) … When software developers think of coding, most of them are thinking about lines of code in files. They're handed a problem, think about the problem, write code that will solve the problem, and then expect the computer to turn word out into deed."[96]

[91] McWilliams and Reas, *Form and Code*, 15.

[92] McWilliams and Reas, 15.

[93] The editor of *Businessweek Magazine* at the time, Josh Tyrangiel explains the relevance of the article, "[n]ow that software lives in our pockets, runs in our cars and home, and dominates our waking lives, ignorance is no longer acceptable. The world belongs to people who code. Those who don't understand will be left behind. (Sid Holt for the American Society of Magazine Editors, ed. "Bloomberg Businessweek - Winner-Single-Topic Issue." In *The Best American Magazine Writing 2016. Columbia* University Press, 2016), 7.

[94] Paul Ford, "What Is Code?," *Bloomberg*, last modified June 11, 2015, accessed June 21, 2019, https://www.bloomberg.com/graphics/2015-paul-ford-what-is-code/. Rather than reciting familiar technological terms and definition for data, metadata, algorithm, and code, Ford immerses the reader into a narrative of programming culture from the point of view of an anonymous middle management executive.

[95] Clinton Nguyen, "What Is 'What Is Code?,'" *Vice,* last modified June 12, 2015, accessed June 21, 2019, https://www.vice.com/en-us article/qkv9vd/what-is-what-is-code. The article includes an interview with Jason Scott, the proprietor of *textfiles.com* and curator and *the Internet Archive*. Scott informs "[i]t is a particularly complicated piece of art. With the parallel description of what code is, it implements code as part of the in-built process." Additionally, Josh Tyrangiel mentions "the piece is worth reading, not only because of the herculean efforts behind programming the page, but because it truly does bridge the gap between laypeople and programmers."

[96] Ford, "What Is Code?"

Coding as a process, not instruction, is best introduced in the online version of the article. The content of Ford's essay recognizes that people can change their relationship to technology if it is made accessible, relatable, and relevant. The reader is shepherded through the mire of jargon with Paulbot, or simply bot, a stylistically pixelated blue square avatar with basic facial features.

In the section "The Thing About Real Artists Is That They -" the bot says, "[s]ome code is beautiful, and you want to read it, reuse it, and take it into your program and your heart. Some coding is annoying and pretentious, and some code looks good at first and turns out to be kind of mean. Estimating code quality is a big part of programming."[97] Ford argues that code is never done or completed. He quips "[y]ou can tell how well code is organized from across the room. Or by squinting or zooming out. The shape of code from 20 feet away is incredibly informative. Clean code is idiomatic, as brief as possible … [c]olloquial and friendly."[98] Finally, he states, "[a] computer language is not just a way of getting a computer to perform operations."[99]

The article secures my belief that code possesses the same qualities often attributed to design; it is produced iteratively, with purpose, and tasked to resolve an inquiry or task. It also substantiates my stance that design can be introspective, possesses the potential for narrative, and can be uncertain. The code Ford describes is to what I aspire. It attests to data's industrious efficacy to produce it, but the result can possess personality. My code extrapolates the value of speculating a data preservation practice. The data harvested from the "HWILSDON" USB Flash Store Drive feeds the code to create digital and analogue forms. Paul Ford recognizes that "[a] great program is a letter from current you … to the person who inherits your code. A generous humanistic document."[100]

[97] Paulbot provides supplementary commentary and hosts the interactive elements. For example, he allows you to change the flow of a simulated circuit, shows you what happens in code when you mash keys on a keyboard, change its attributes to plainly demonstrate what code is, and collaborates on an exercise where you can try writing a couple lines of code. After completing the article, you are rewarded with a digital certificate and he will either be congratulatory or dismissive if you take too long to read it.

[98] Ford.

[99] Ibid.

[100] Ibid.

Case Study 1

The Relic / Code

The process of designing the Relic and subsequent Reliquary constitutes the choreography of a deliberate procedure. HWILSDON is reliant on metadata from a single resource, a series of drawings to resolve the specificity of the algorithm, and a collaborative effort to realize my bespoke code. Despite the intricacies of ordering the interdepended components, the logic is as simple as a familiar children's exercise song, "Head, shoulders, knees, and toes."

The metadata used for the project is taken from the files and folders from the "HWILSDON" 64 GB Lexar USB flash storage drive acquired from a rapid prototype facility. I use straightforward parameters, the category titles columns that appear when files and folders are opened, "Date Created," and "Date Last Modified." These parameters are the beginning or the birth of the file or folder, and the finality of existence is the last time it was used, frozen in a moment of its disuse. The files are never opened during the collection because I wanted to circumvent compromising the original owner's anonymity. Constraints are established in the metadata acquisition; it is a maximum of two levels into the file and folder organization, e.g., one file, one subfolder and one file, one subfolder and one sub-subfolder. Additional metadata was unnecessary because anything further was too similar, the time often differentiated by seconds. The metadata sequence was written in the order of year, month, day, hour (24-hour clock), minutes, and seconds.[101] (Image 1)

[101] In the Summer 2017 term I took an Independent Study with Professor Immony Men from the Digital Futures Graduate Program to learn Photogrammetry and the 3D digital modelling software *Rhinoceros* and *Grasshopper* with the expectation I would require the skill for my practice-led thesis project. Mr. Brandon Bergem and Mr. Xiaolong Lee were contacted in Summer 2018 when I commenced making because although I have familiarity with the software, it was rudimentary and lacked proficiency. It was during initial conversations with them about modelling software capabilities and fabrication that Mr. Bergem and Mr. Lee offered their expertise as favours of in-kind support.

Mr. Bergem and I have an extensive seven-year history with competitions, publications, projects, and co-curating and installing small exhibits. He and Mr. Lee worked on a course assignment using generative design software. Their inclusion in the process expedited the work flow and made the process more efficient and productive, e.g., the code that required a few hours of Mr. Lee's time to write, would have taken me a couple weeks. Similarly, the hours it took Mr. Bergem to generate the digital models would have taken me weeks to refine. Additionally, Mr. Bergem and Mr. Lee knew the tolerances of the machines and the powder-based printing material used at the Digital Fabrication Lab at Daniels School of Architecture, where the objects would be manufactured.

They anticipated a variable I did not, highly defined shapes composed of thin lines are not possible for the material and the machine. Precise increments were lost because all the lines and triangulation had to be thickened for structure; without doing so, the object would collapse in the printer. Every piece of data I collected could not be individualized into its own shape, they would have to simplified as bundles of mass.

Simply expressed, I am the conceptualizer, designer, and author of HWILSDON; Mr. Bergem was the translator who prepared my ideas for production; and Mr. Lee was the coder who facilitated the powder print digital fabrication.

For the thesis exhibition an additional colleague, Simon Rabyniuk, was recruited to be the intermediary between me and the digital fabrication facilities at Daniels.

Caution was observed to ensure assistance from Mr. Bergem, Mr. Lee, and Mr. Rabyniuk was not part of the original concept and design development.

Year, Month, Day, Hour (24 hour clock), Minutes, Seconds

Format example 1: 1 file
HWILSDON
all pieces to print.stl
2017, 10, 20, 16, 18, 46 (date created)
2017, 10, 20, 16, 28, 38 (date last modified)

Format example 2: 1 subfolder and 1 file
HWILSDON
hal (folder)
2017, 10, 18, 16, 53 18 (date created)
N/A (Date Last Modifed changed every time data was procured for code)
Z (subfolder)
2017, 9, 27, 12, 56, 56
2017, 9, 27, 12, 56, 58
letter forms Zubi.ai (file)
2017, 9, 27, 12, 57, 10
2017, 9, 27, 13, 32, 32

Format example 3: 1 subfolder and1 sub-sub folder
HWILSDON
hal (folder)
2015 (subfolder)
2015, 9, 27, 21, 6, 4
2016, 3, 24, 11, 46, 56
2015-01-29 (sub-subfolder)
2015, 9, 27, 21, 6, 4
2016, 3, 24, 11, 46, 0
2015-02-01 (sub-sub-subfolder)
class-6.CR2 (file)
class-7.CR2 (file)
untitled-6.CR2 (file)
Untitled-7.CR2 (file)
2015-02-12 (sub-sub-subfolder)
class-8.CR2 (file)
class-9.CR2 (file)
class-10.CR2 (file)
class-11.CR2 (file)
class-12.CR2 (file)
untitled-8.CR2 (file)
untitled-9.CR2 (file)
untitled-10.CR2 (file)
untitled-11.CR2 (file)
untitled-12.CR2 (file)

Image 1
Data sample for the "HWILSDON" Lexar 64 GB USB flash storage drive

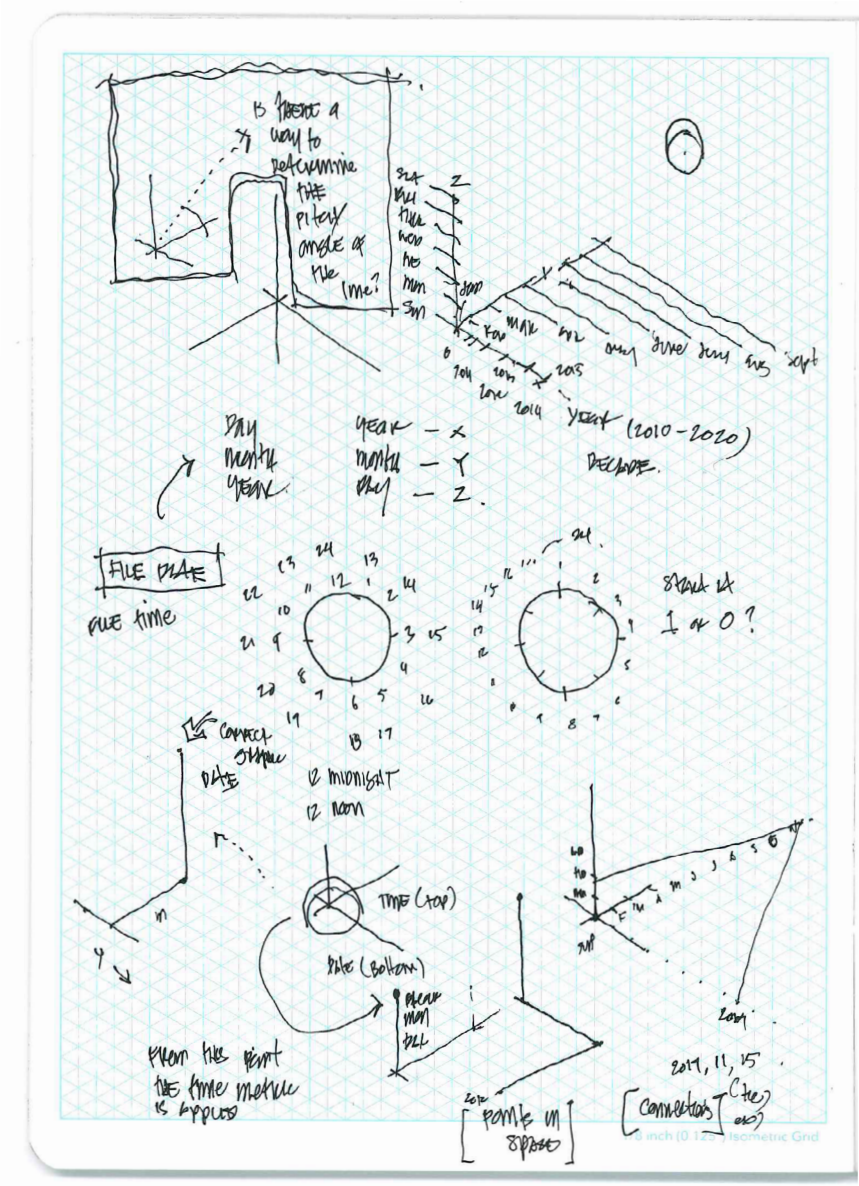

Image 2
Process of determining which variables to use for the code

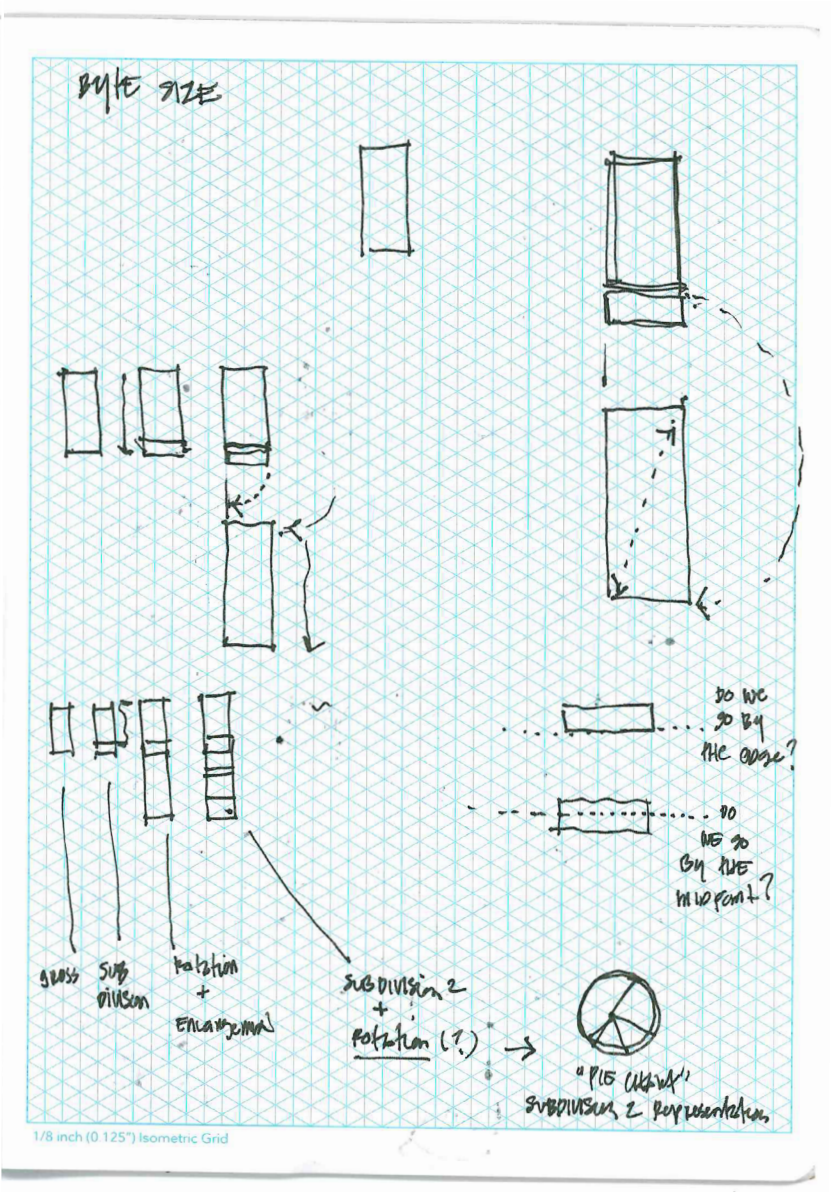

Image 3
Exploring option of using the file sizes as the data to visualize

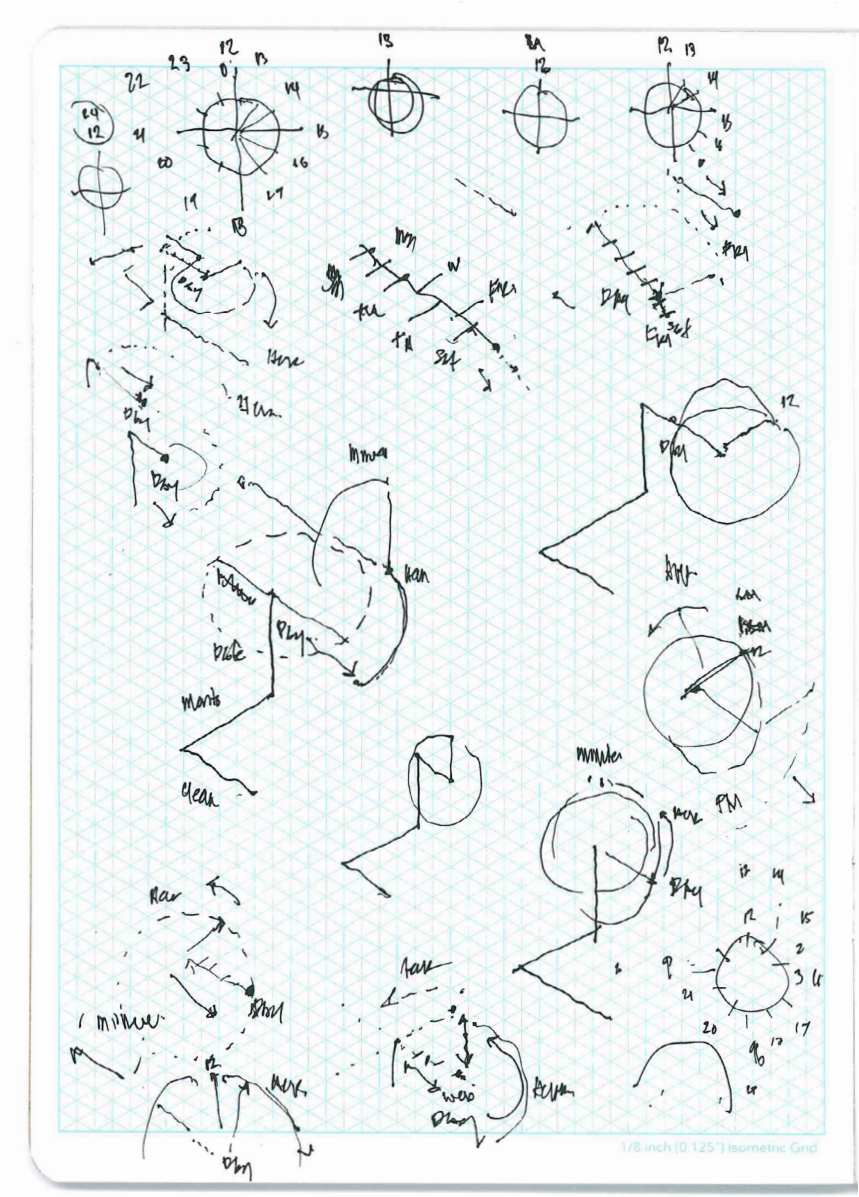

Image 4
The process of situating points in space by using year (X-axis), month (Y-axis), day (Z-axis) for the object mass

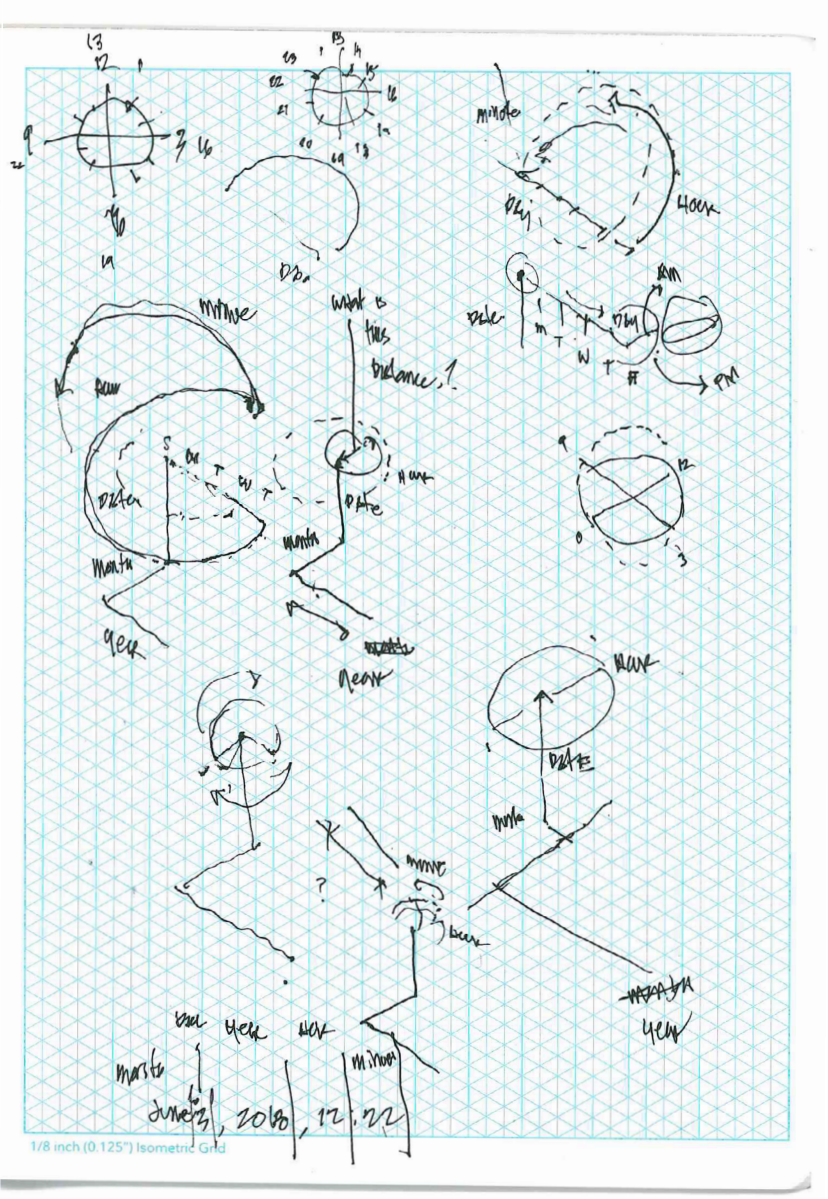

Image 5
The process of situating points in space by using hour, minute, and seconds for the trajectory lines

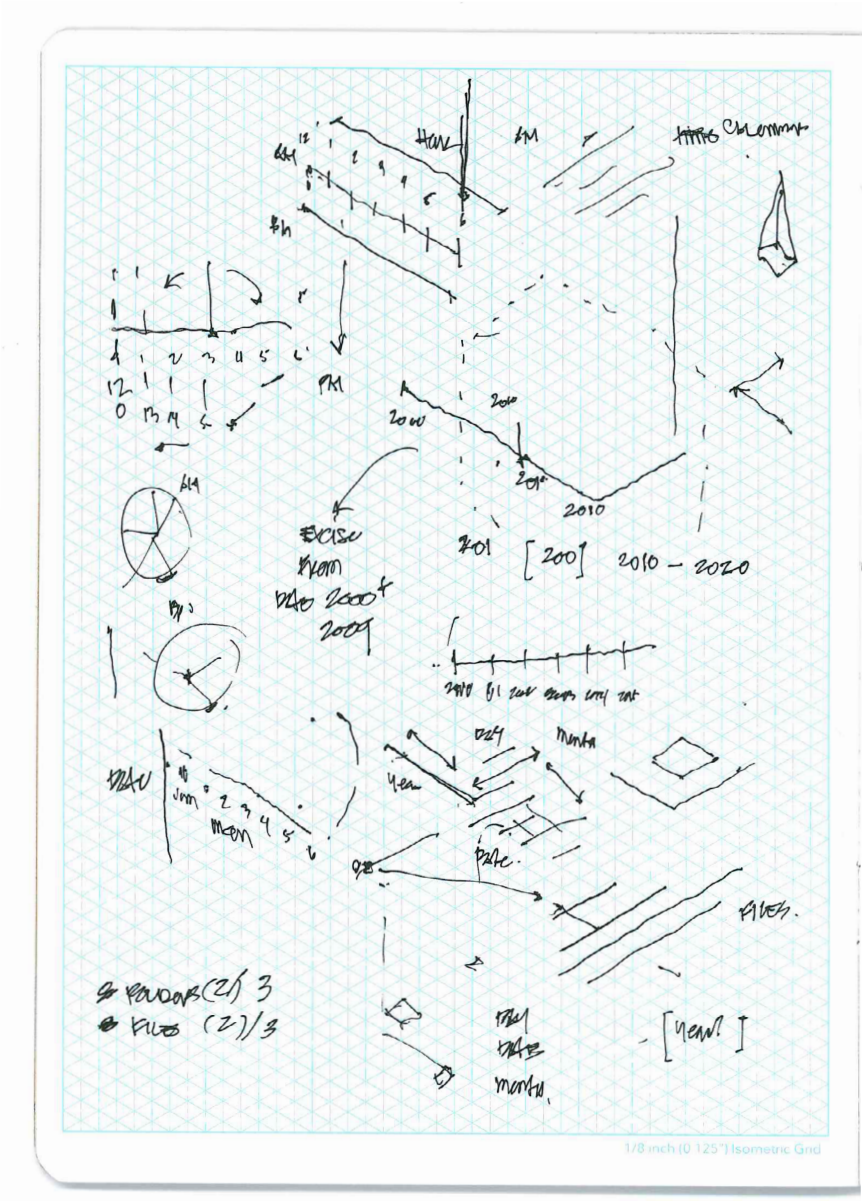

Image 6
Decision to use the metadata from the files and folders from the USB

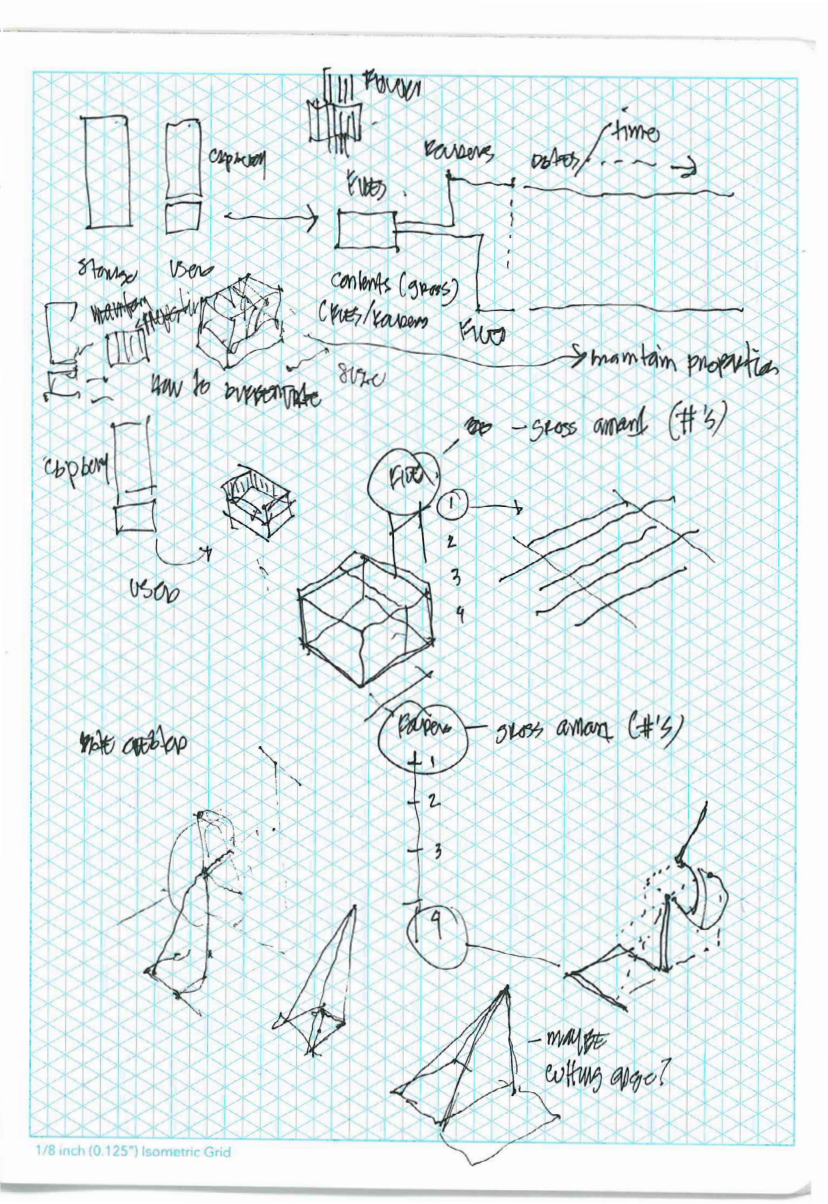

Image 7
Sketches for form-making

Seeking technical assistance was necessary; the project's increasing specificity and sophistication were outside my capacities. I recruited Brandon Bergem and Xiaolong Lee, (each being graduate students enrolled in the M. Arch program at Daniel's Faculty at the University of Toronto). Each of us had different backgrounds, experiences, education, and skill, but we all self-identified as being architecture and spatial designers. Mr. Bergem is the ideal intermediary because of his familiarity with my design process, and he can decipher my sketches with minimal explanation. He also knows Mr. Lee's deftness with parametric design using the 3-Dimensional graphic computer-aided design application called *Rhinoceros (Rhino)* and the *Grasshopper* plug-in.

The effort started with sketching then explaining them to Mr. Bergem, who would draw very clear instructions and send them in emails to Mr. Lee, who in turn, wrote the code. Afterward, digital files were sent by Mr. Lee to Mr. Bergem, that we could test to verify it functioned according to my design. This cycle was repeated several times. The final component was the most difficult because separate algorithms were needed to locate the hours (24-hour clock), minutes, and seconds. The hours are placed by using the arrangement of a clock face, minutes are compressed to fit within a 90° angle, and the seconds are the length of a trajectory line. (Images 8-11)

My elementary grasp of digital modelling necessitated an equally schematic design. It is effortless for me to get lost in the sizeable capacities of the chosen software that is predominantly used in practices reliant on parametric computational design to create multidimensional forms.[102] To retain authorship of the work, it is essential to use familiar variables and comprehendible logic for form-making. Anything more elaborate requires increased reliance on a programmer who could better navigate sophisticated three-dimensional outcomes. In my practice, less knowledge equates to less control. HWILSDON's code receives collected metadata and situates them as points in space with a simple Cartesian co-ordinate system. The first form (year=X-Axis, month=Y-Axis, day=Z-Axis), the mass, connects each of the points, resulting in multiple triangulated surfaces. The second forms are the second data set (hour, minute, second) that supplement the first. They are translated as lines, or "rods," with trajectories starting from their respective points positioned in the first step. The HWILSDON object can be infinitely scaled, and sliders in the code control the thicknesses variable for printing from different machines using other materials. (Images 12-13)

[102] Prominent projects like the Heydar Aliyev Center in Baku City, Azerbaijan by Zaha Hadid Design and UN Studio's Arnhem Central Station in Arnhem, the Netherlands, included parametrics in the design process to generate complex geometries. Parametricism is based on developing algorithms that express parameters that can be modified by changing the variables.

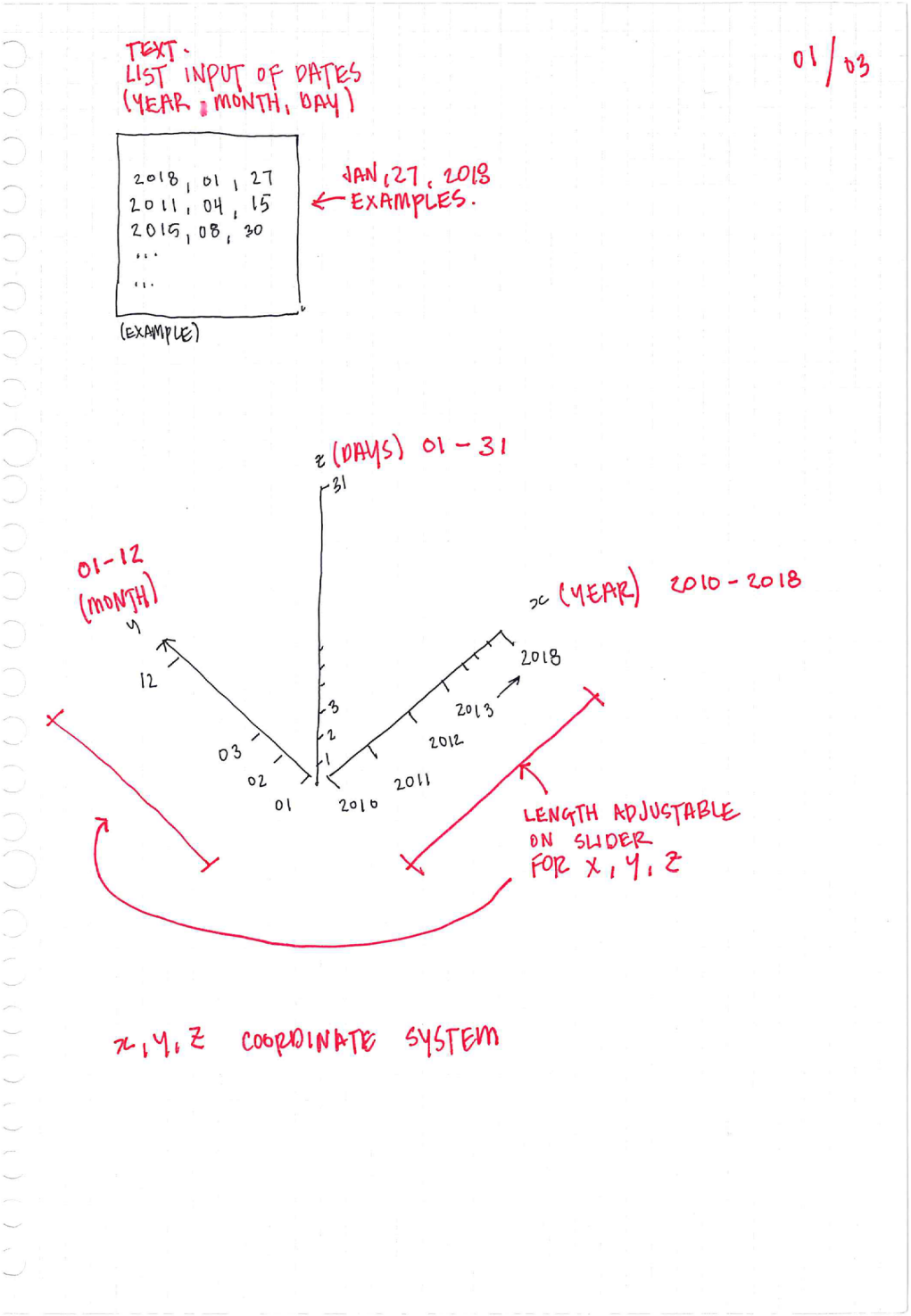

Image 8
Brandon Bergem's instructions for Xiaolong Lee indicating the coordinate system for locating points in space

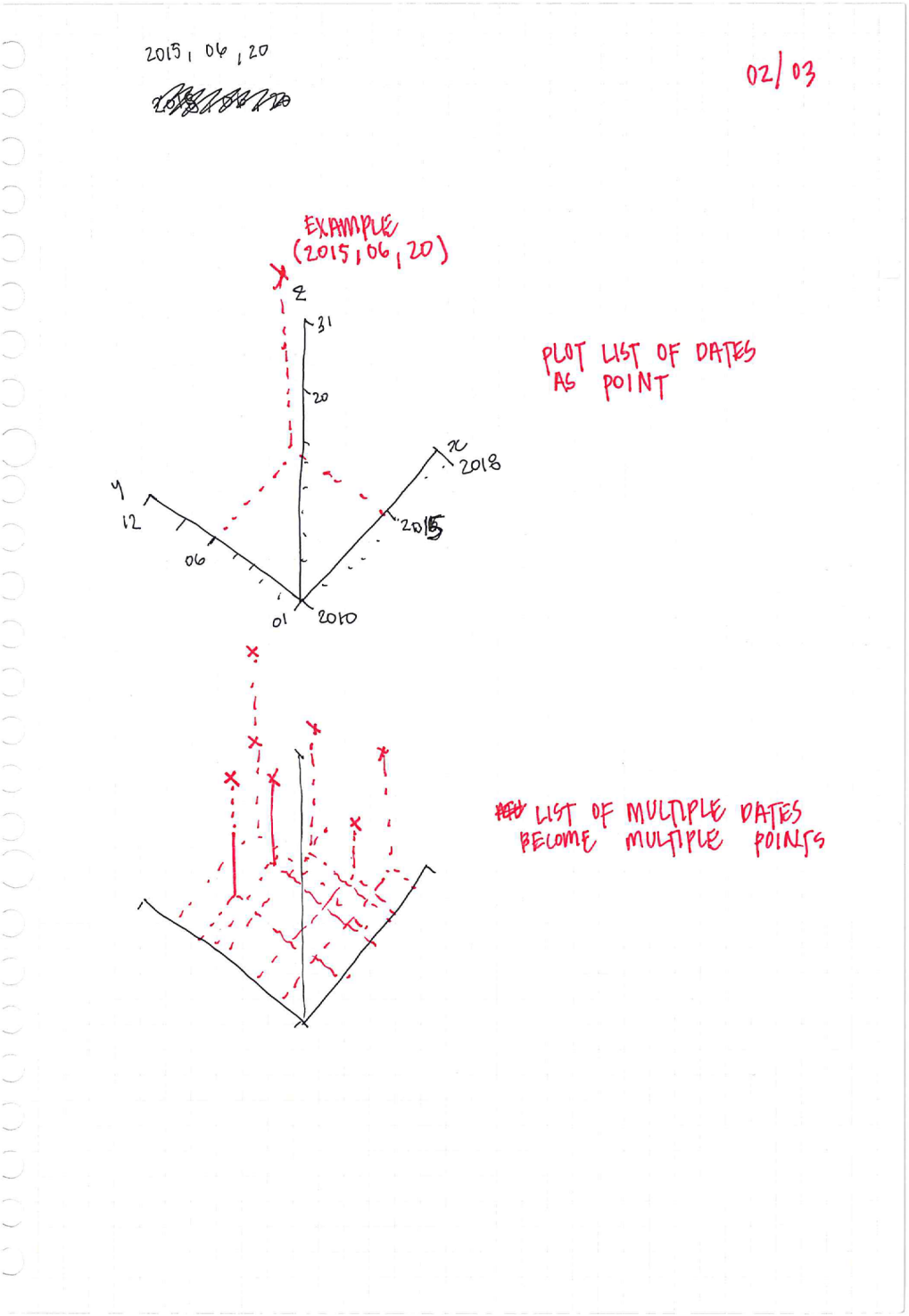

Image 9
Mr. Bergem's instructions for Mr. Lee indicating how the metadata is located on the Z-axis

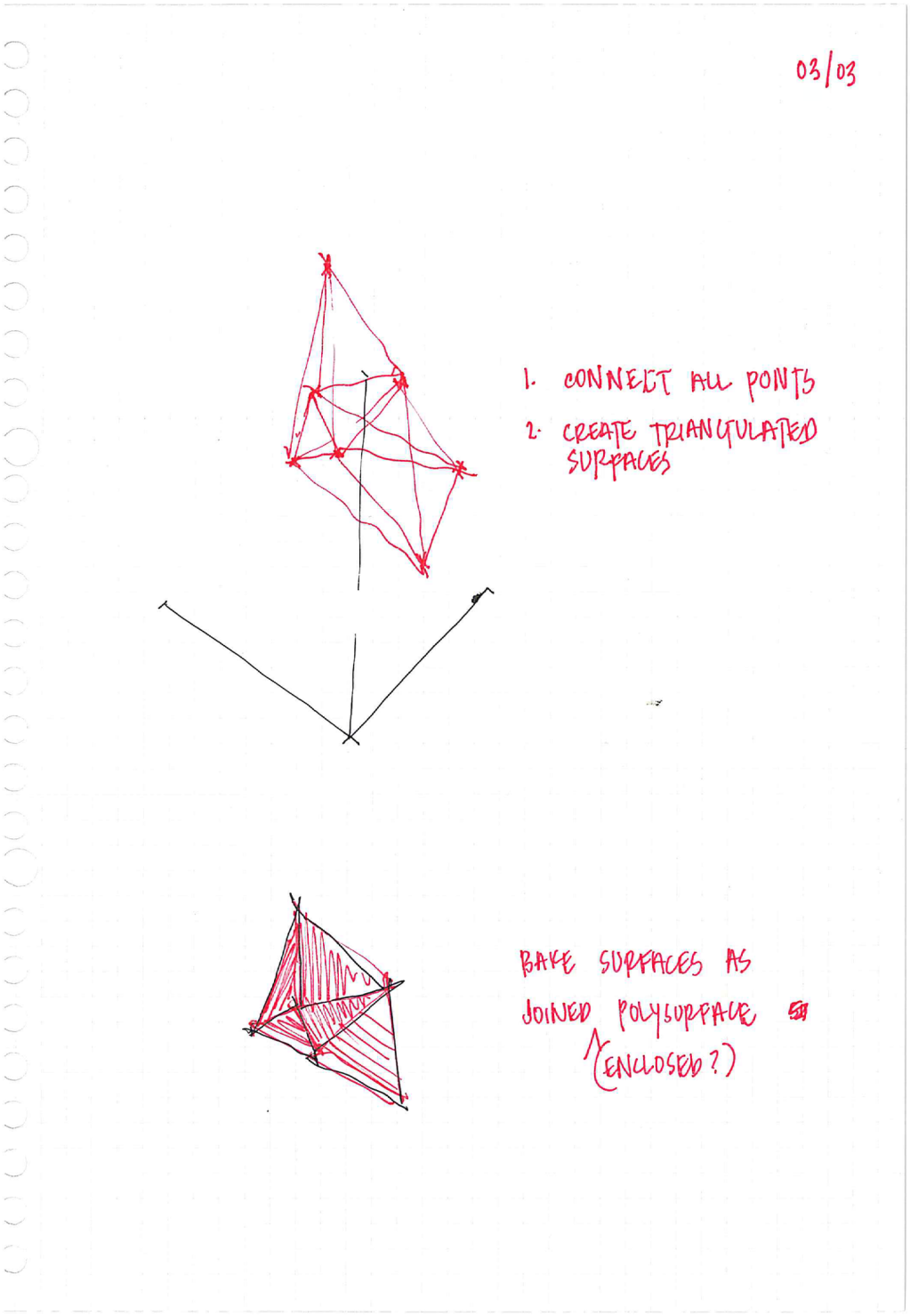

Image 10
Mr. Bergem's instructions for Mr. Lee indicating how the points in space connect to create a mass

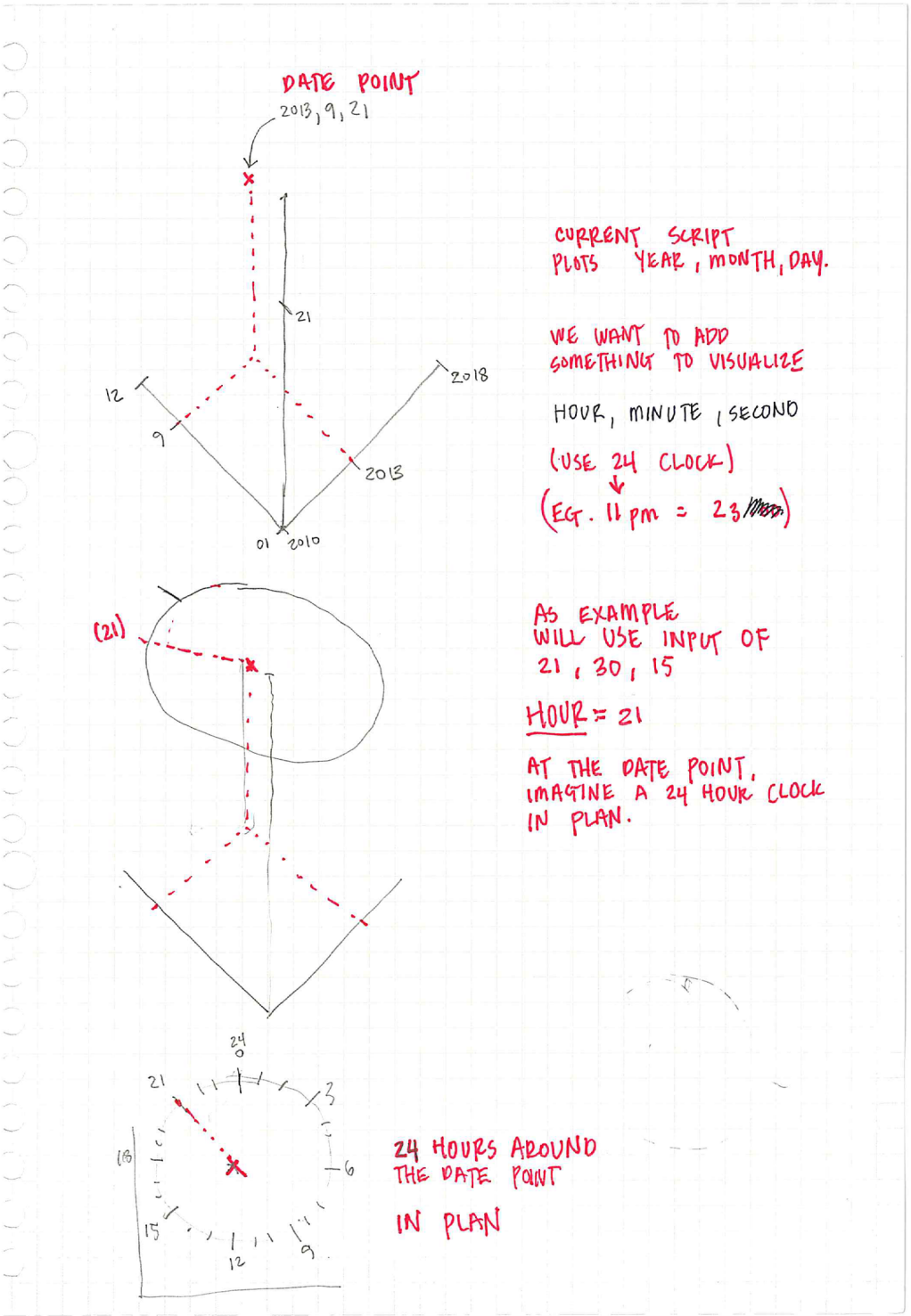

Image 11
Mr. Bergem's instructions for Mr. Lee indicating the operations to create the trajectory lines that indicate hour, minute, and seconds

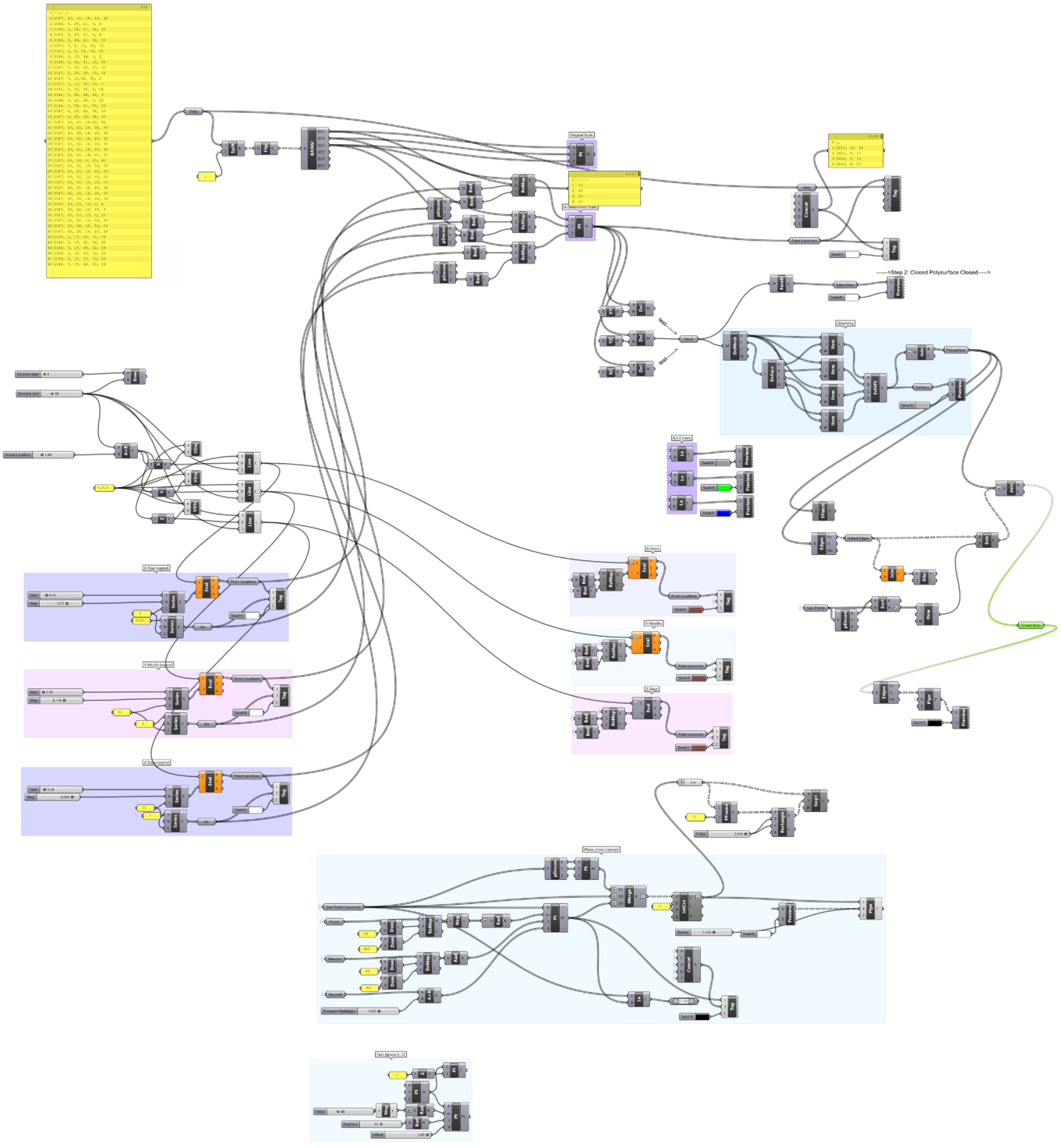

Image 12
The code aided by Mr. Lee using the application *Rhinoceros (Rhino)* with the *Grasshopper* plug-in. *Rhino* is a 3D modelling software and the plug-in, *Grasshopper*, is a visual programming language where components are connected to produce form

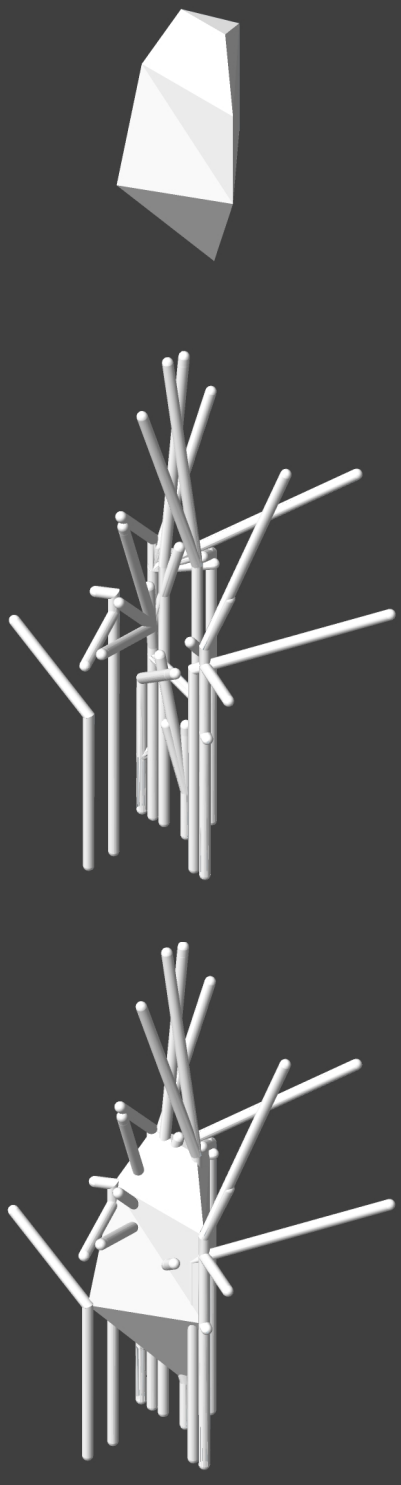

Image 13
Resulting digital model – HWILSDON (all digital models in the HWILSDON project aided by Mr. Bergem)



Image 14
HWILSDON 3D printed Reliquary



Image 15
HWILSDON Reliquary

Case Study 2

The Reliquary / Object

Computer programs like *Processing* are technologically egalitarian; if we have a computer with a monitor, keyboard, mouse, and internet access, we can create images meaningful to us, where we are the authors of our data visualization.[103] *Processing* is a downloadable open-source computer program that simplifies teaching the fundamentals of computer programming by applying it in a visual context. Several resources support learning; the website offer tutorials, free code is prolific online, and books and guides often have an online counterpart where you can see how the code shown in the text functions on screen. With *Processing*, graphic production simplifies the undertaking with a visual interface, expressly developed for non-programmers to be able to create their own images. Paolo Ciuccarelli, the director of the DensityDesign Lab, identifies this technological moment as "narrative visualization." Ciuccarelli states "[t]he awareness of the story behind the data is fundamental to having a real understanding of the phenomena … [and] visualization by using a narrative dimension."[104]

The HWILSDON project is a proposed measure against imminent permanent data deletion. Reiterating best practices offered by data scientists and researchers, my thesis saves data into multiple formats; code, digital model, and a material analogue. As historian and geographer David Lowenthal perspicaciously notes, "[t]hings thus differ from thoughts and words by their enduring physical existence. Written history demarcates past from present; verbal tense sets off now from then. But artifacts are simultaneously past and present."[105] My project's speculative object is modelled conceptually and pragmatically on the relics and reliquaries of (early) Christian practice. These historical objects,

[103] I used *Processing* as a component of a studio project in 2016 for Dr. Martha Ladly and an assignment in the mandatory IAMD course Issues in Critical Theory at OCAD University taught by Professor Jessica Wyman. For sources, I relied on were *Generative Design: Visualize, Program, and Create with Processing* (Hartmut Bohnacker et al eds., New York: Princeton Architectural Press, 2012), and its website *Generative Design* (http://www.generative-gestaltung.de/1/code), and *Processing: A Programming Handbook for Visual Designers and Artists* (Casey Reas and Ben Fry., Cambridge: MIT Press, 2014) and the website counterpart (https://processing.org).

[104] Paolo Ciuccarelli, "'Turning Visualisations into Stories and 'Big Pictures,'" in *Information Graphics*, ed. Julius Wiedemann, by Sandra Rendgen (Köln: Taschen, 2009), 80.

[105] David Lowenthal, *The Past Is Foreign Country-Revisited* (Cambridge, England: Cambridge University Press, 2015), 394.

starting-off points, are appropriate because both house ineffably precious content. Historians have long emphasized that relics were probably the most important treasure brought to the West from Constantinople as a result of the Fourth Crusade.[106] Here, HWILSDON, is the relic – a precious thing housed in an equally precious container. The reliquary of this thesis is meticulously designed and carefully crafted as were the historical precedents.[107] In his book, *Furta Sacra: The Thefts of Relics in the Central Middle Ages*, the author, professor and historian, Patrick Geary, imparts that some historians believe that relics had a fundamental part of Medieval life regardless if one was a peasant, a theologian, or a king.[108]

However, Geary has a different point of view that questions the importance of relics and reliquaries. He mentions that "[w]e [need to take into consideration] the nature of these objects. Although symbolic objects, they are of the most arbitrary kind, passively reflecting only exactly so much meaning as they were given by a particular community."[109] Geary goes further in his assessment that "[u]nlike a book or illustration a relic cannot itself transmit this perception from one community to another."[110] It is necessary to convey that the concept and purpose of HWILSDON is mindful of both, and substantively more. A strong counter argument can be provided by Dr. Laura Miller who notes the relevance of symbolic objects should not be dismissed because "the reliquary operates as an indexical structure, referencing a variety of ways that the relic can (or could) be seen and understood – sites of origin, ownership; as a fragment of something or someone else; as a powerful and useful thing."[111]

[106] Caroline Walker Bynum and Paula Gerson, "Body-Part Reliquaries and Body Parts in the Middle Ages," *The University of Chicago Press on behalf of the International Center of Medieval Art* 36, no. 1, Gesta (1997): 3–7, accessed May 2, 2020, https://www-jstororg.ocadu.idm.oclc.org/stable/pdf/767274.pdf?ab-segments=0%2FbasicSYC-5152%2Ftest&refreqid=search%3A9628007b41b619165fc3484a18badb6c.

[107] Barbara Drake Boehm, "Heibrunn Timeline of Art History: Relics and Reliquaries in Medieval Christianity," *The Metropolitan Museum of Art*, last modified February 2010, accessed July 10, 2019, https://www.metmuseum.org/toah/hd/relc/hd/-relc.htm.

[108] Patrick Geary, *Furta Sacra: Thefts of Relics in the Central Middle Ages* (Princeton: Princeton University Press, 1990), accessed May 2, 2020. 4 https://quod.lib.umich.edu/cgi/t/text/text-idx?c=acls;cc=acls;view=toc;idno=heb01055.0001.001.

[109] Geary, *Futura*, 5.

[110] Geary, 6.

[111] Dr. Laura Miller, *"On the ARTIFACT: Indexical Container"* (Daniels School of Architecture, Landscape, and Design Fall 2018). In Dr. Miller's course description for the seminar she mentions "[t]his seminar will examine some of the ways that cultural significance and value are negotiated, qualified, projected, and received through the material artifact."

Confronting permanent deletion, data retention, specifically personal data, accrues increasing importance the deeper we get into the era researchers identify as the "digital Dark Age." Traditionally, reliquaries are containers that store and display relics with sacred items purportedly from Christ or a saint.[112] They were usually body parts, like arms and fingers, or material items, like a crown of thorns, sanctified through contact with holy persons or places.[113] The beauty of a reliquary is intended to reflect the content's spiritual value. They were considered "more valuable than precious stones and to be more esteemed than gold."[114] They were made from the highest quality materials by extremely skilled goldsmiths.[115]

The HWILSDON Relic and Reliquary exemplify preservation practices. expressing the presumptions outlined by Lowenthal that "the past informs the present; that its relics are crucial to our identity; and that its cherished remains are fragile and dwindling assets, their loss sped by accelerating change that makes even the most recent past irrecoverably remote."[116] The "HWILSDON" USB's contents that represent graphic and physical visualization is determined by data, metadata, algorithm, and code.[117] The Relic is a prototype code made possible from specific instructions using the USB flash storage device's metadata.

The code generates the Reliquary, instead of two separate components, the content and the container, the code is contained in the form of the Reliquary. The Relic and Reliquary have an enmeshed relationship, the code can only be physically seen when it is translated into the object, and the Reliquary cannot be made without the Relic. There must be a mindfulness that a part of experimental preservation is reinforcing values that regardless of the content, as Dr. Miller expresses, the "[c]ultural significance relevance can be negotiated, qualified, projected, and received through the material object."[118] The architectural writer Kester Rattenbury, also argues that "[t]ools of representations are never neutral."[119]

[112] Bynum and Gerson, "Body Parts," 4. "By the late Middle Ages in the West we find shaped containers that contain not body parts at all, but contact relics such as shoes or bits of cloth. We find shaped containers that do not hold within what is represented without, and we also find body parts contained in non-shaped containers."

[113] The British Museum, "Treasures of Heaven: Saints, Relic and Devotion in Medieval Europe," *The British Museum*, last modified June 23, 2011, accessed July 10, 2019, https://www.britishmuseum.org/about_us/news_and_press/press_releases/2011/treasures_of_heaven.aspx.

[114] Barbara Drake Boehm, "Relics and Reliquaries in Medieval Christianity."

[115] The British Museum, "Treasures of Heaven: Saints, Relic and Devotion in Medieval Europe."

[116] Lowenthal, *The Past Is Foreign Country-Revisited*, 413.

[117] For my practice-led thesis project, HWILSDON, the term "data" follows the convention that it is inclusive of "metadata." The term "metadata" is exclusively data about data.

[118] Dr. Miller, *"On the ARTIFACT,"* Fall 2018.

[119] Kester Rattenbury, *This Is Not Architecture: Media Constructions* (London: Routledge, 2002), 3.

According to Rattenbury, the mechanism of representing – of translating – "underlie the conceptual elaboration of [design] projects and the whole process of the generation of form."[120] Like the craftspeople of old, expertise in making is required, specifically in design and programming. In lieu of luxurious materials, it is constructed with sophisticated digital fabrication equipment. The HWILSDON project celebrates the expression of a process in exchange for an artful composition.

[120] Rattenbury, *This Is Not Architecture: Media Constructions*, 3.

The material outcome of the digital fabrication is a lesson in disparities between what is imagined, drawn, and coded versus material production and existence. This should not be considered a shortfall because Dr. Miller mentions that "[t]he container may be encoded with information, so that one might be able to understand aspects of the enclosed artifact that are not evident: its varied and often contradictory associations, its assigned and received significances, how it is valued or interpreted, how it is classified and understood as a made thing."[121] There is a reassurance when working in pixels on a screen that is different from the surprise of powder from a 3D printer. The first bewilderment is the code's limitations. Accounting for every change in the files on "HWILSDON," in some instances, separated by less than 40 seconds, is not feasible for an analogue. On screen, the lines can be scaled in thickness to be filament thin. Still, these differences cannot be registered as a material object. Digital resolution is not possible to replicate with the fabrication media and technology available at the Daniels School of Architecture at the University of Toronto.

[121] Miller, "*On the ARTIFACT*."

The deficit of articulation does not compromise the integrity of the project. HWILSDON is a prototype for a possible, not a definite, preservation practice for a speculative object. The Reliquary represents a process, not precision. Fabrication technology and media determine the resolution of the material object. The result of the original HWILSDON Reliquary informs the subsequent design and material testing, explicitly testing abstraction through operations. The motive is to query how far an element is abstracted before its meaning collapses and is no longer a knowledge generator; instead, an aestheticized object. There is a series of three material operations: Extraction, Replication and Rotation, and Fragmentation.[122] (Images 16-18)

[122] The operations are a continuation of the HWILSDON digital model making process.

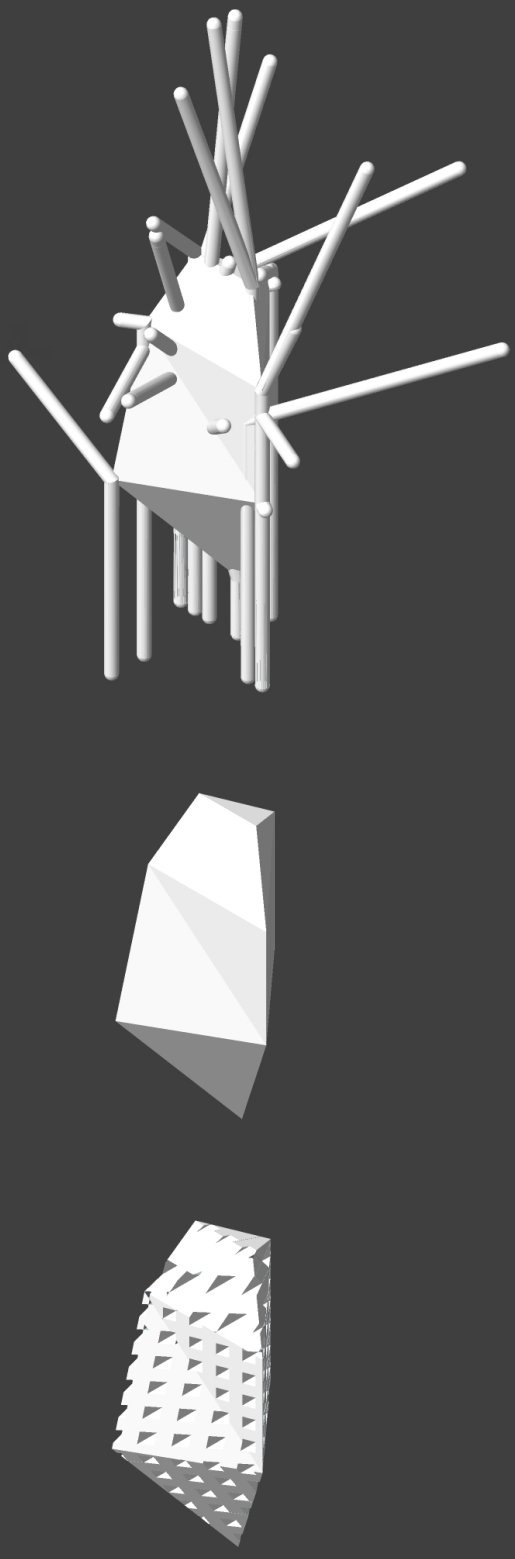

Image 16
Operation: Extraction
The Extraction operation isolates the mass (year/month/day) from the original reliquary, and because 3D printing is an additive process, tests the least amount of material required to retain legibility and not physically collapse in its fabrication.

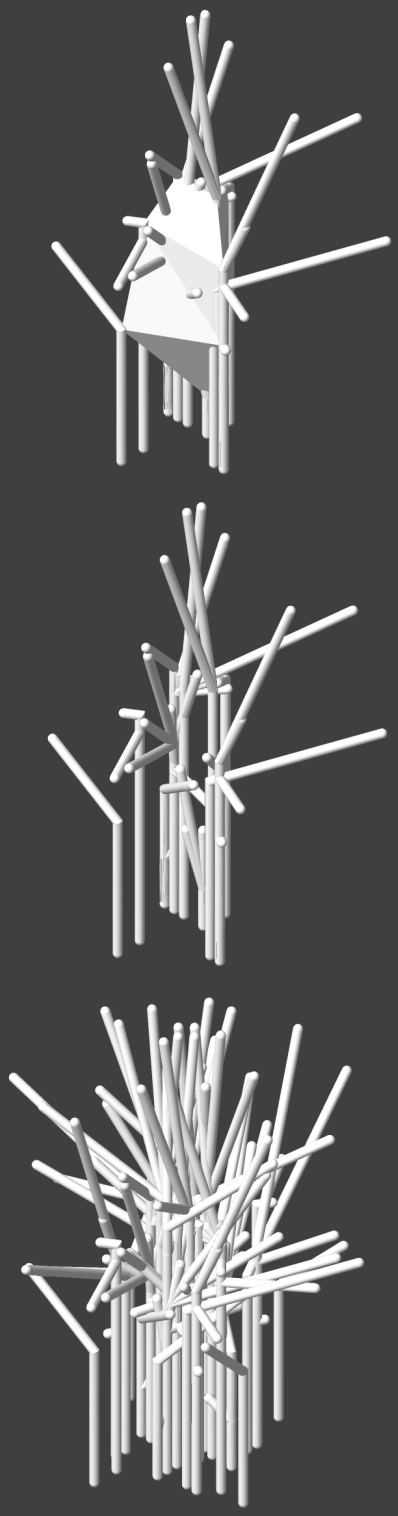

Image 17
Operations: Replication and Rotation
Replication and Rotation isolate the lines (hour/minute/day) and from a single pivot point, replicates and rotates the group four times, the maximum amount before the line groupings intersect and combine into each other. The scrutiny is how much a single element can be copied and arrayed before it is no longer perceived as multiples of itself but becomes an autonomous object.

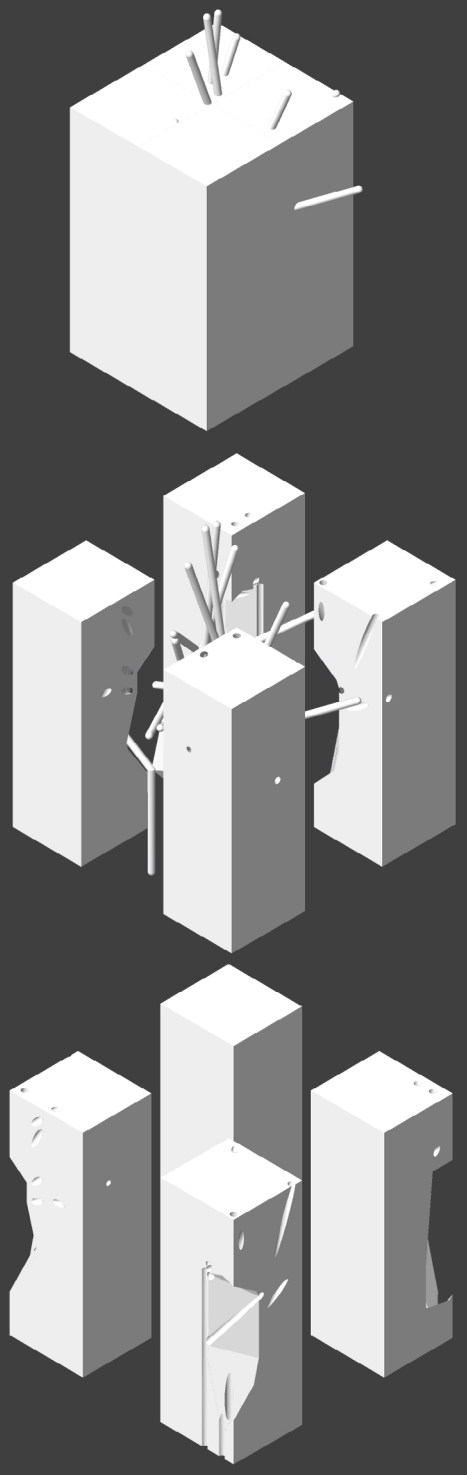

Image 18
Operation: Fragmentation
Fragmentation is an examination of mass and void, solid, and cavity. The reliquary is encased in a solid mass and subtracted. The residual cavity is revealed when the form is quartered and separated into equally sized fragments.



Image 19
HWILSDON Reliquary

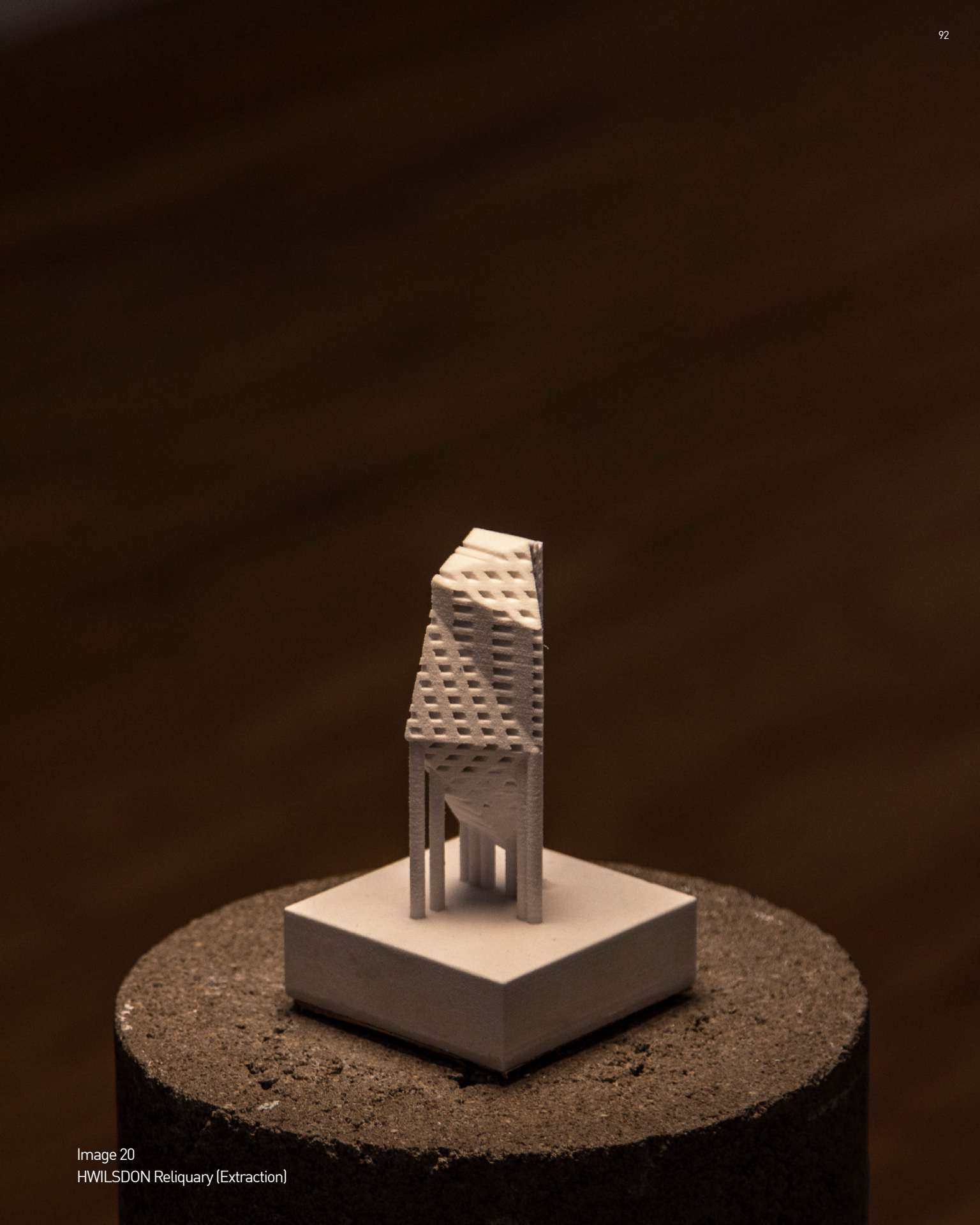

Image 20
HWILSDON Reliquary (Extraction)



Image 21
HWILSDON Reliquary (Repetition and Rotation)

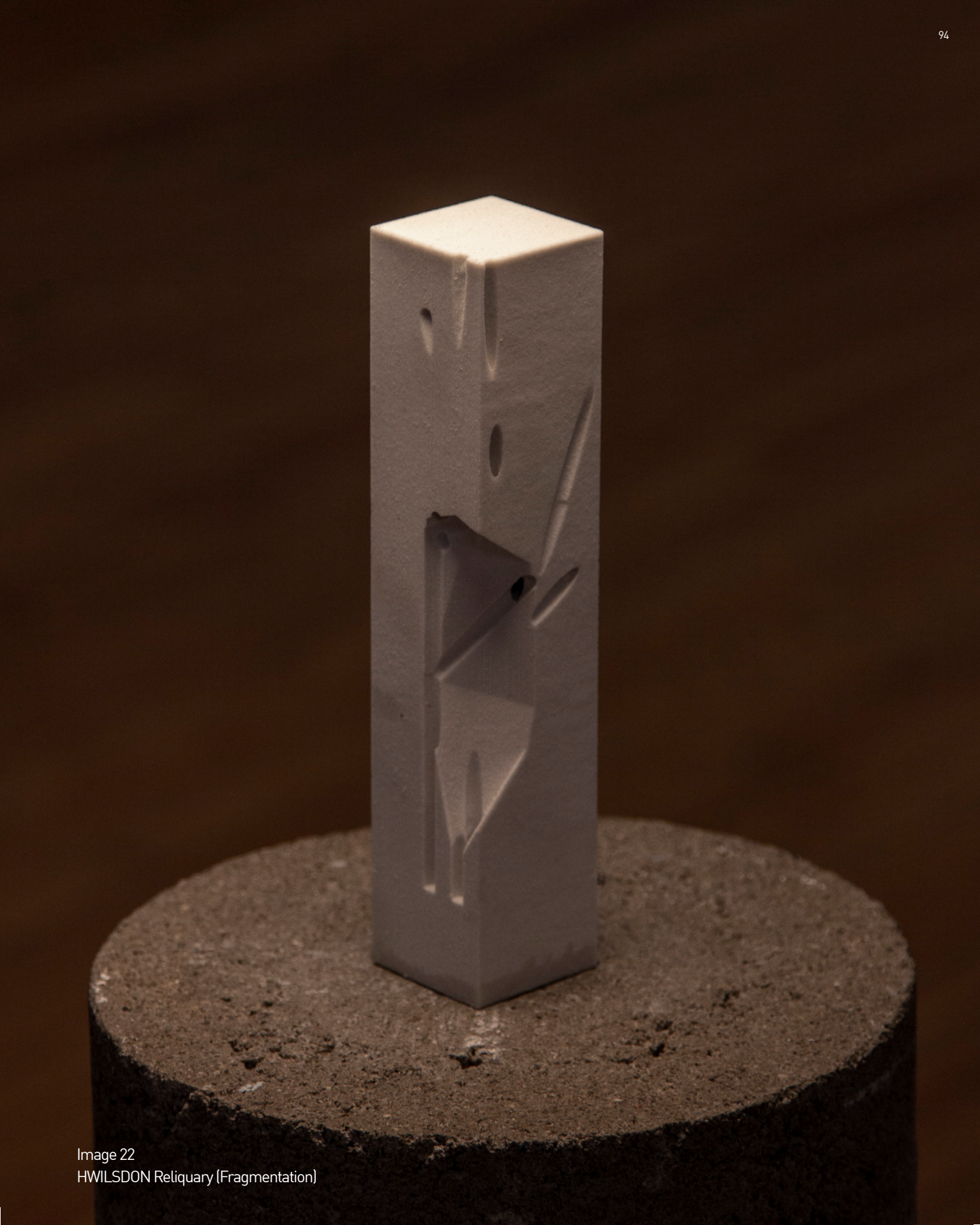

Image 22
HWILSDON Reliquary (Fragmentation)

Case Study 3

The Reliquarium / Architecture

In the book, *Visionary Architecture: Blueprints of the Modern Imagination*, architect and scholar Neil Spiller attests that "[t]he design of imaginary, conceptual or radical buildings is as old as the practice of architecture itself ... architects have for centuries drawn on their creative abilities to produce breathtaking works of imagination."[123] A building can be envisioned that does not function as familiar typologies like a data storage facility, fabrication lab, studio, or archive; rather, it can be like the Surrealist's game, cadavre exquis (exquisite corpse) a strange composite of heterogeneous parts. According to Geoff Manaugh, the author, curator, and creator of the influential BLDGBLOG "fictional proposals and architectural plans work extraordinarily well together in the imaginative rethinking of the world."[124] In HWILSDON, the Reliquarium is an example that architecture does not always have to be built to be a building.

For the Reliquarium, I experiment with new typologies for making and storing reliquaries; this includes the EMBALMERY (Embalming & Nursery), ALTICATOR (Altar & Fabricator), ARMATRY (Armatures & Foundry), and MAUSOTAPH (Mausoleum & Cenotaph). The EMBALMERY is the facility where USB Flash Storage Drives are first processed. A caretaker retrieves and inputs the data into the Relic code. The USB cases are inserted into a façade with a fleet of drones, creating a screen with swaths of colour gradients. (Images 23-24) At the ALTARCATOR, the outcome of the code is sent to digital fabricators that pour molten gold to create 3D printed reliquaries. (Images 25-26) Newly formed golden reliquaries are sent to the ARMATRY, where a specialized artisan creates unique display armatures. (Images 27-28) Finally, the reliquaries are placed and displayed on monoliths at the MAUSOTAPH. (Images 29-30)

[123] Neil Spiller, *Visionary Architecture: Blueprints of the Modern Imagination* (New York: Thames & Hudson, 2007), inside cover.

[124] Geoff Manaugh, *The BLDG BLOG Book* (San Francisco: Chronicle Books, 2009), 22.

Speculative data preservation from the immaterial Relic, to the material Reliquary, and culminating at the architectural Reliquarium, is a progression that is sensible for me as a designer. HWILSDON speculates how data can be preserved into multiple formats: the Relic, Reliquary, and Reliquarium. Uncertainty as a narrative and process can be a preservation practice. HWILSDON demonstrates data reveals moments of time in an individual's life specific to their experiences. They are accounted for in file types, the amount, and when each was first required and last needed. The Reliquarium is presented as "A Story of Memory in 4 Chapters," the imagined architecture offers a space where a person's history can be translated, cared for, and shown. Although the "HWILSDON" USB drive was left behind, its data is still worthy to save because according to the Buddhist monk, Bungen Oi, "having ceremonies … is deserving because [I believe] '[a]ll things have a soul.'"[125]

As an ode to the film *Blade Runner* and the anachronisms rife in its world, the depicted inhabitants used for the Reliquarium collages are sourced from several Edo period Japanese woodblock prints.[126] I saw the movie for the first time with my father when I was 10 years old. I was not able to completely comprehend the story, but the image of the geisha in an advertisement for a birth control pill indelibly seared into my memory. It was a portal into a fantastical world that had no precedent and will always be my point of reference when I think of the future.

[125] McCurry, "Robot Dogs." Bungen Oi is a Buddhist monk who conducts the funerary rites for the beloved and deceased AIBO dogs.

[126] All the woodblock prints are sourced from and available for public use from the Metropolitan Museum of Art's online gallery collection.

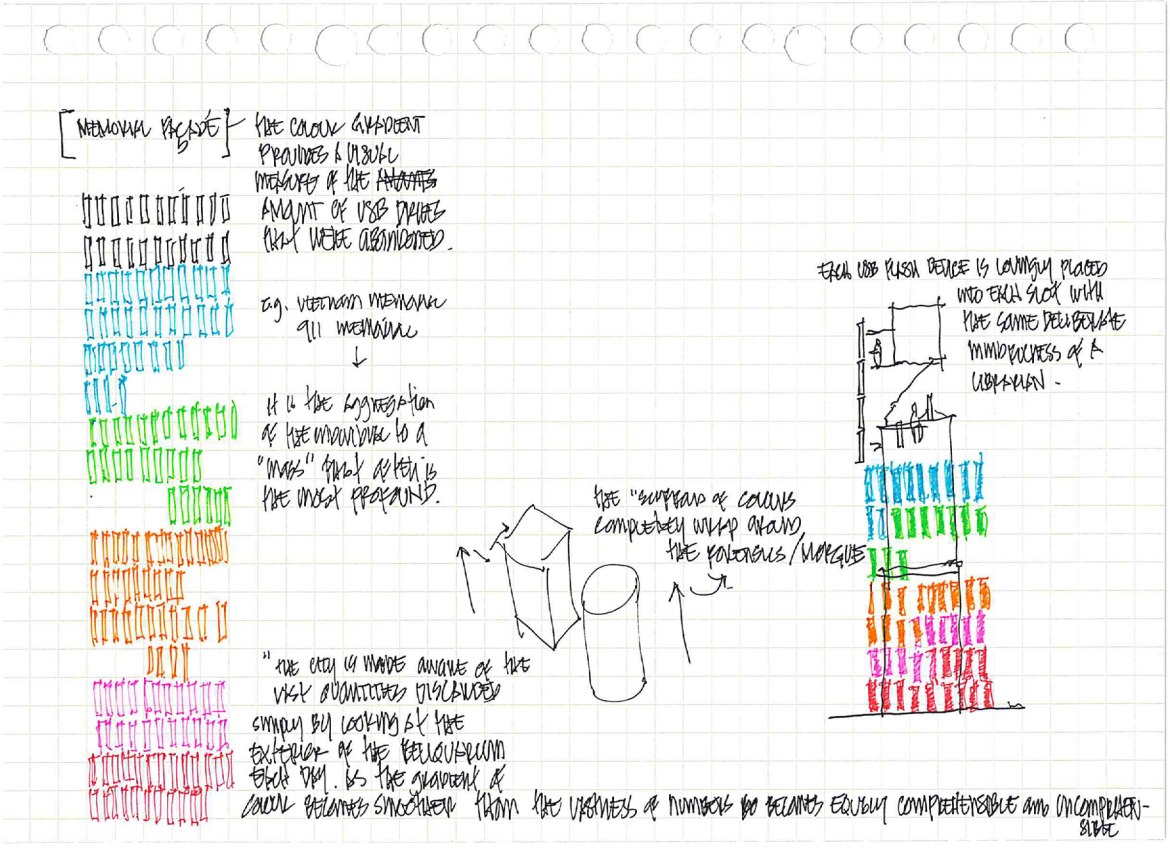

Image 23
Embalming & Nursery = EMBALMERY

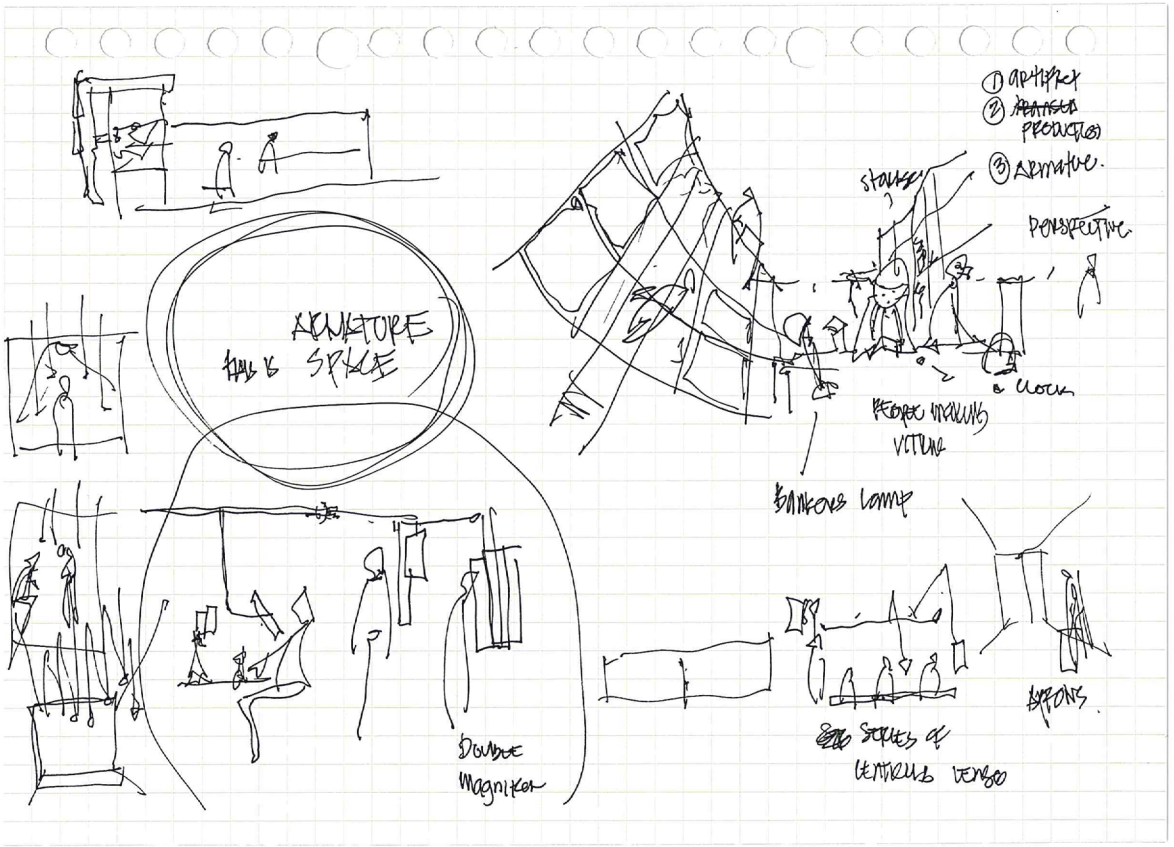

Image 24
The discarded or disposed USB flash drives are processed at this facility. A Caretaker accepts the device and separates them by colour. They are then assigned a position on the curved façade and placed with a fleet of drones. The cascade of USBs are always changing, creating swaths of various gradients.

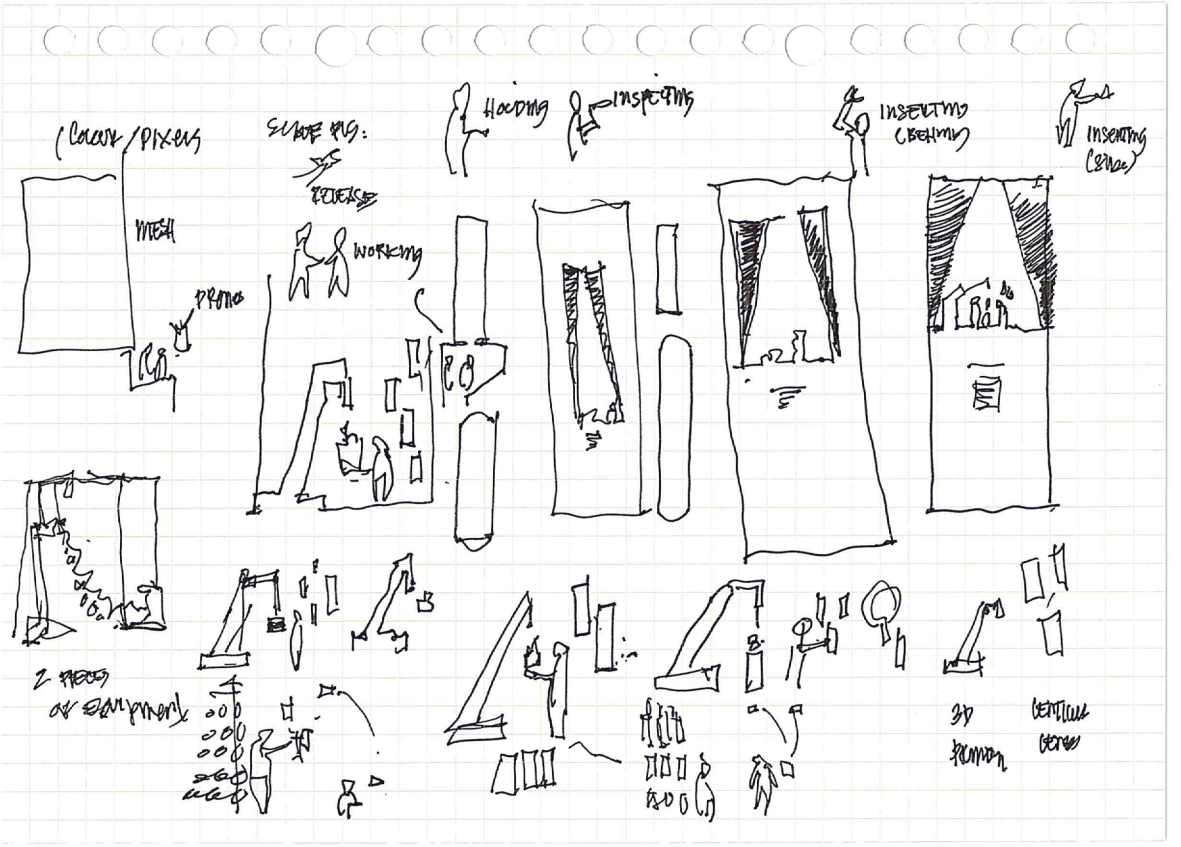

Image 25
Altar & Fabricator = ALTARCATOR

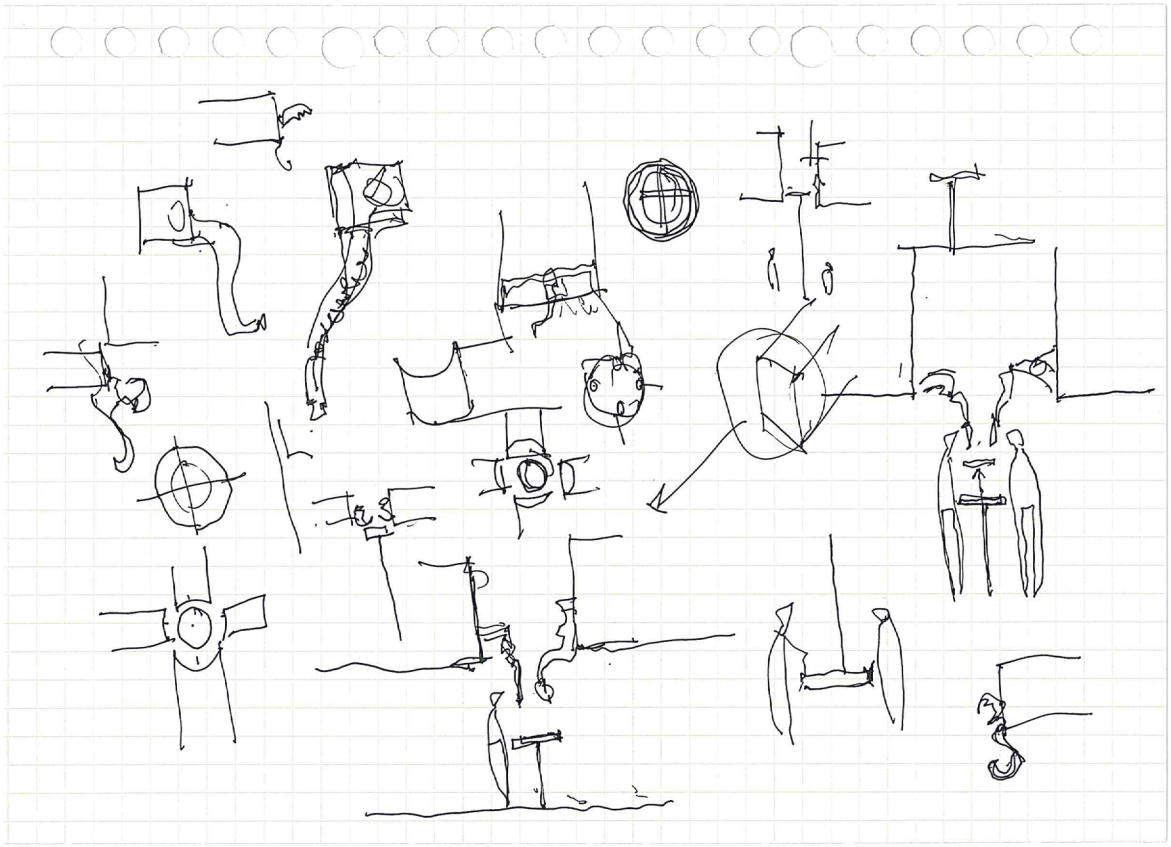

Image 26
The content from the USB flash drives is downloaded to one of several ALTARCATORS. These digital fabricators apply the code from the retrieved data and transforms them into Reliquaries. The substrate used is precious liquefied gold. The production is a spectacle with the glistening ornate print heard moving back and forth over a spinning central altar.

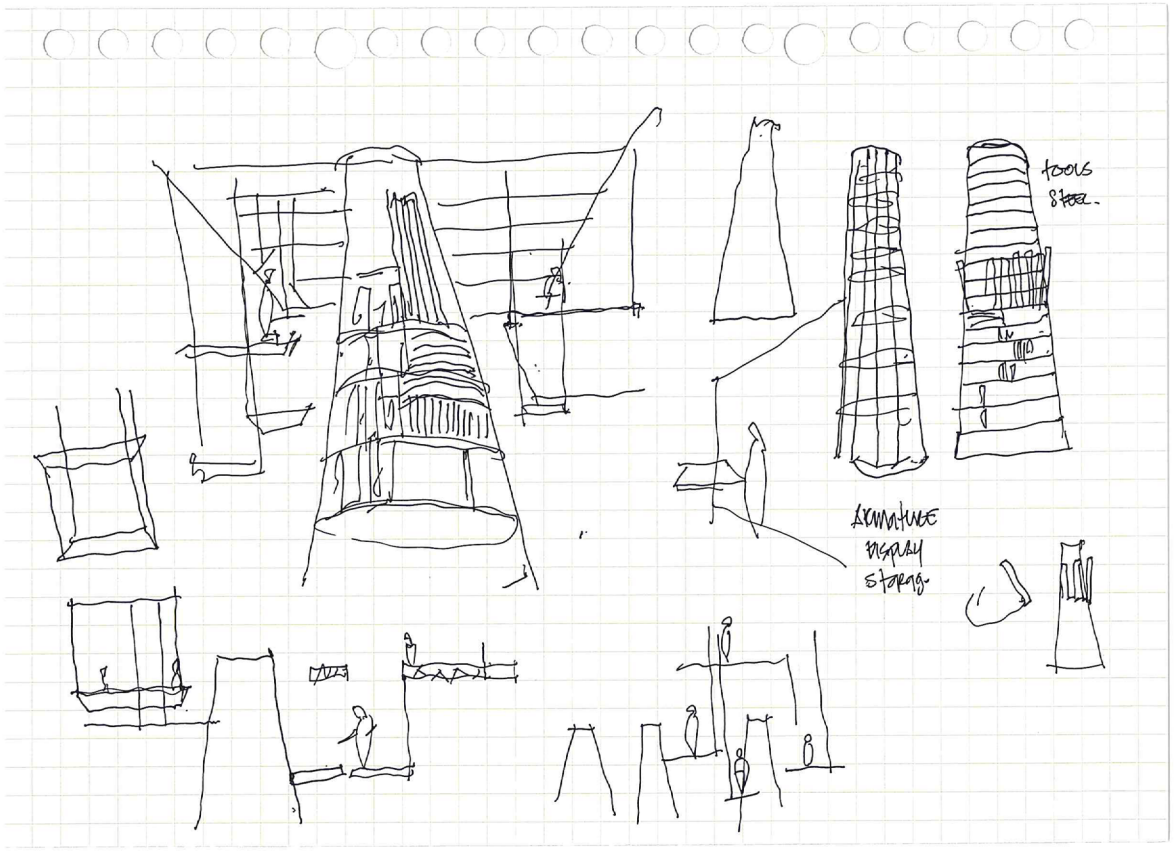

Image 27
Armatures & Foundry = ARMATRY

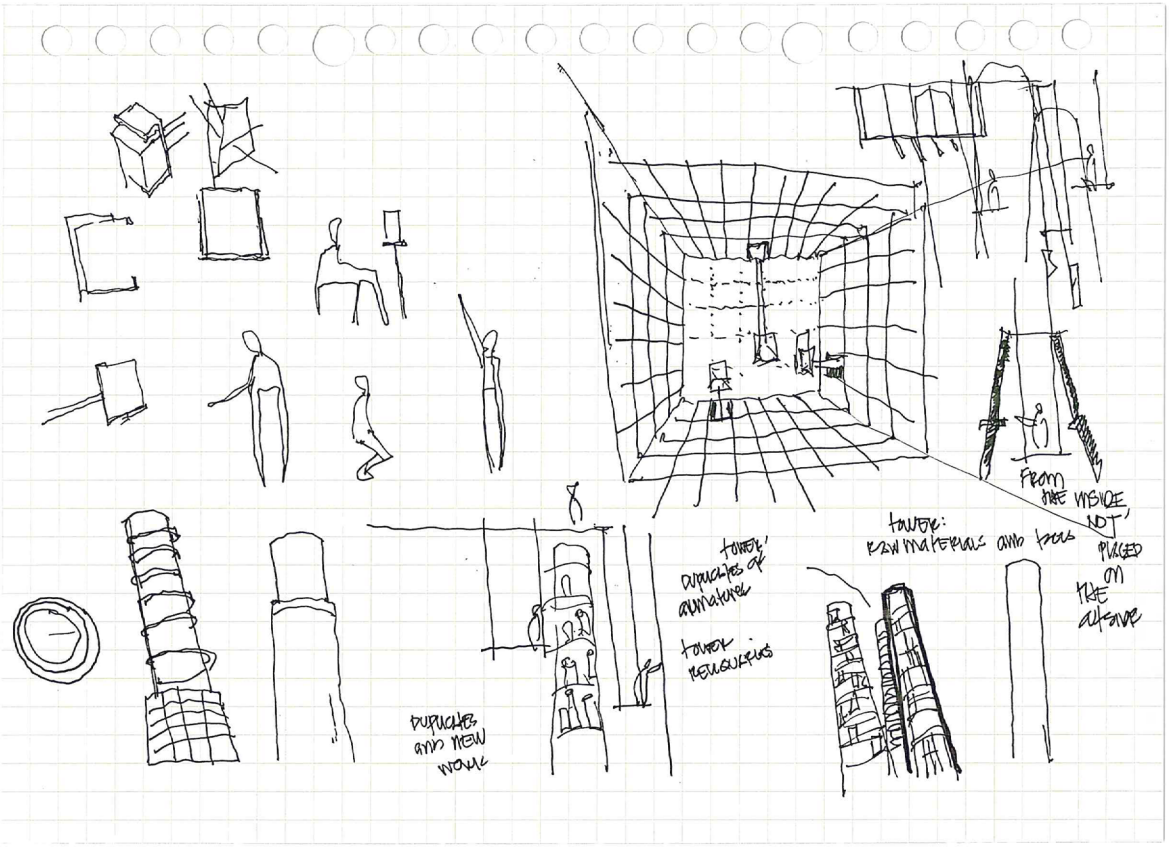

Image 28
Newly formed Reliquaries are introduced to a workshop overseen by a specialized crafter. The architecture is wrapped with horizontal work and storage surfaces accessible with the moving central platform. Rather than solid walls, the exterior is clad with every imaginable tool necessary to produce excruciatingly detailed armatures to hold the Reliquaries.

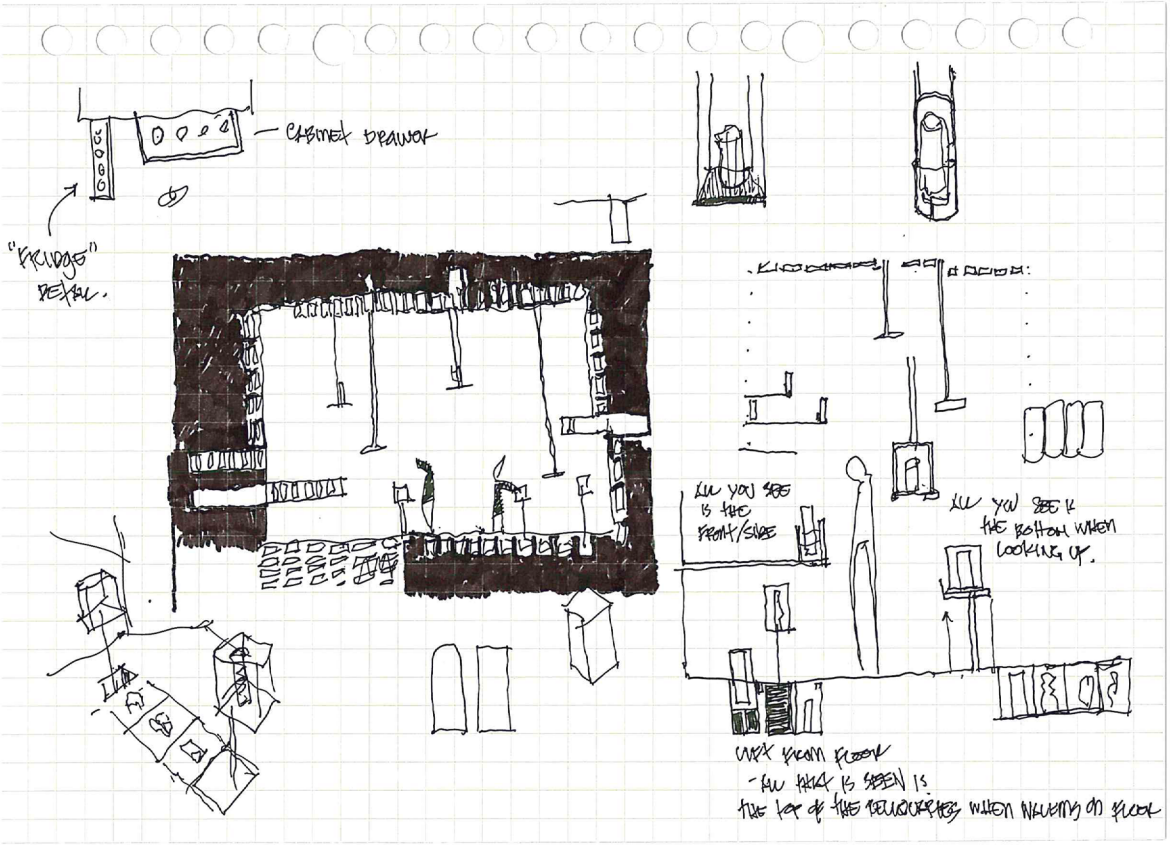

Image 29
Mausoleum & Cenotaph = MAUSOTAPH

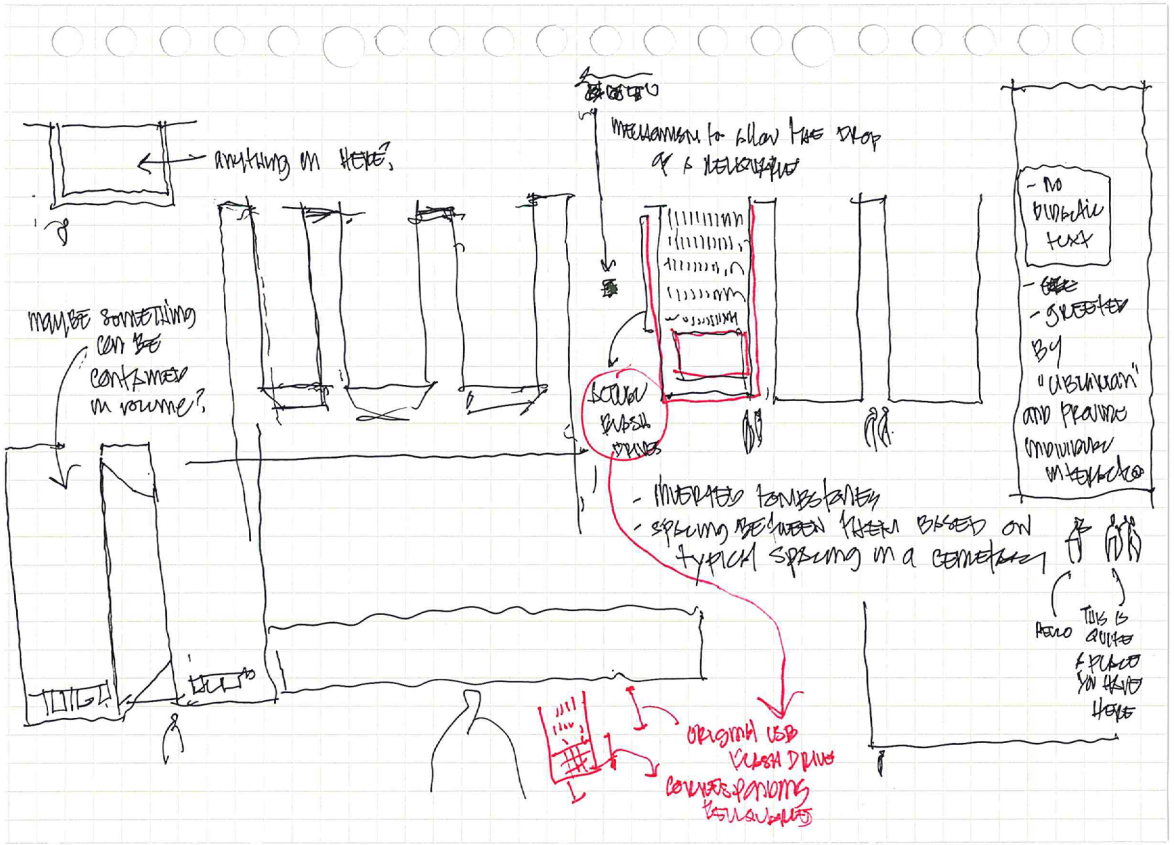

Image 30
The typology is derived from mausoleums and cenotaphs. A mausoleum is a free-standing enclosed internment space, and an empty structure that honours the deceased without containing the remains is a cenotaph. The MAUSOTAPH functions as both. Rows of monoliths display and store the fabricated Reliquaries and the physical source of the data is stored elsewhere.

The Reliquarium

A Story of Memory in 4 Chapters

Chapter 1

The EMBALMERY

Embalming & Nursery

The first stage of commemoration is the acceptance of the original USB flash storage device by a Caretaker who extracts the data and archives it into the server. The outside casings are separated and arrayed by colour. They are assigned a location within the syncopated rows and niches of the curved façade.

A flock of drones kept within the EMBALMERY's aviary dutifully insert, remove, and reposition the cases creating changing swaths of multiple gradients. The swirl of activity can be overwhelming, especially during an initial visit. Inevitably a wave of serenity gently quells the most apprehensive when one watches the facility's Caretaker taming the cacophony with solemnity, grace, and assuredness.

Like a music conductor's baton as it marks the tempos of a concerto, the drone's movements within the airspace are majestic inscriptions in the sky. The consistent rhythmic whirl of the propellers, a lilting sound rising and falling as they navigate within and outside the EMBALMERY, induces mild hypnosis. This sonorous score is only momentarily interrupted when the supernatural Tengu who, when lured by their curiosity and befuddled by confusion, collide into each other when they first encounter their flying brethren.

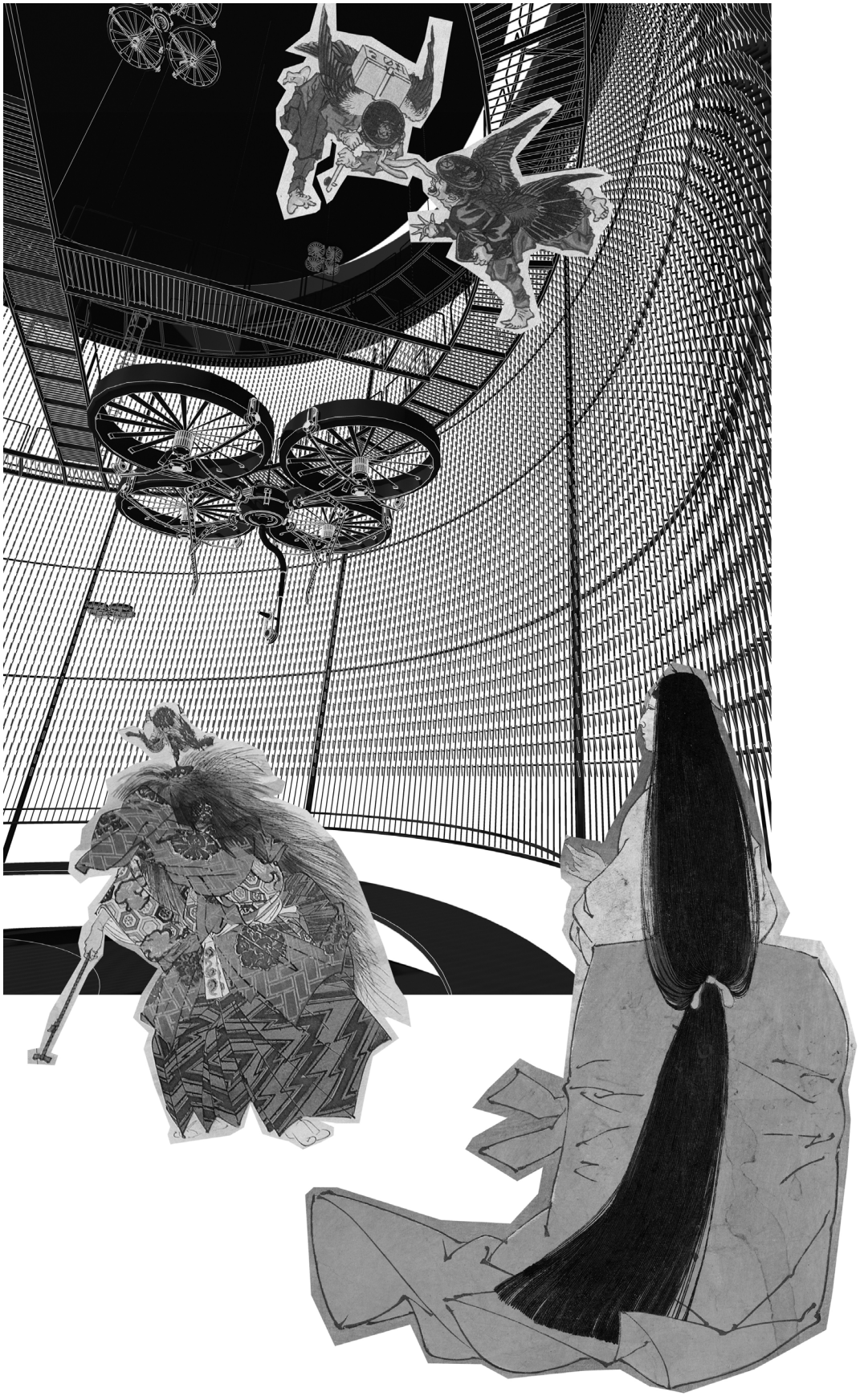

Image 31
The EMBALMERY

Chapter 2

The ALTARCATOR

Altar & Fabricator

The ALTARCATOR delivers data from USB flash storage devices into digitally fabricated RELIQUARIES. Every layer of precious metal is a coursing stream of zeros and ones. The chamfered edges of the adjacent architecture are a menagerie of gears, motors, and belts in the guise of anachronistic Classical Orders, where the Doric, Ionic, and Corinthian collide. A series of Baroque appendages gird the highly crafted nozzles that are fed with molten gold.

A print bed with the diameter of a familiar embrace, proudly asserts itself on the central daïs, waiting for the arrival of the first drop of liquid onto its surface. When the printing commences, it begins to spin, gaining momentum in gradual increments. The whirling performs like the Turkish Sufi Dervishes with palms to the sky and bodies in rotation. The only sound is whispers dissolving into the air like candy floss on a child's tongue.

The production and induction of the RELIQUARIES into the RELIQUARIUM is a celebratory event. The jubilation can be boisterous or as modest as a chorus of swallows dancing to three plucked strings of a shamisen.



Image 32
The ALTARCATOR

Chapter 3

The ARMATRY

Armatures & Foundry

Within the multi-storied, multiplication of stacked circles, resides a treasure so rare that only 100 exist within a bounty of 10 billion citizens. They are the recipients of the assignation “Preserver of the Ineffable,” and within the RELIQUARIUM resides an artist who possesses this designation: the Armatrist. Before the RELIQUARIES can be placed within the MAUSOTAPH, they must first be swaddled in finely sculpted armatures. The Armatrist’s métier demands the precision, patience, and virtuosity of an horologist.

The ARMATRY’s surface is an encyclopedic array of tools, esoteric instruments, jeweller’s loupes of every magnification, and metal rods bundled like sheaves of wheat from a fecund harvest. The central hydraulic lift is punctured with a central forge and wrapped by horizontal bands like a musical score. When the platform stops along its journey, the rings create self-defined workshops, each level a continuous table or shelves for models, prototypes, and drawings.

The interior of the ARMATRY is not accessible to the public; there are only two other sanctioned inhabitants. The first is the aerial gymnast who eludes gravity when tumbling, spinning, and orbiting the open volume as they restock the tools and materials. The second is the sentry who guards the Armatrist’s notebooks filled with the secrets of their artistry.



Image 33
The ARMATRY

Chapter 4

The MAUSOTAPH

Mausoleum & Cenotaph

The concluding chapter, and the apogee of spaces within the RELIQUARIUM, is the MAUSOTAPH. Acres of memories find repose by sitting proudly on caressing swathes of luminous white porcelain panels.

Rails trace contours of the open space with an outline of glistening steel. Dexterous robotic arms glide along these lengths and onto vertical tracks. They deposit the RELIQUARIES with punctilious certainty. The digitally fabricated objects look like handfuls of gold sitting on individual perches protruding from the walls. This is a tribute to the skills of the Armatrist; the metal casings are crafted like fine filaments cradling wisps of chiffon.

Characters of lore, superstition, and legend descend upon the MAUSOTAPH to pay their respects. A Kitsune shape-shifter, transmuting from fox to female, joins the retinue of Imperial cats. An avian carrier, transporting an enchanted samurai blade within its talons, diverts into the space along its journey. Within “A Story of Memory in 4 Chapters” is a series of spaces where dreams are burnished with the irrational, impossible, and transcendent.

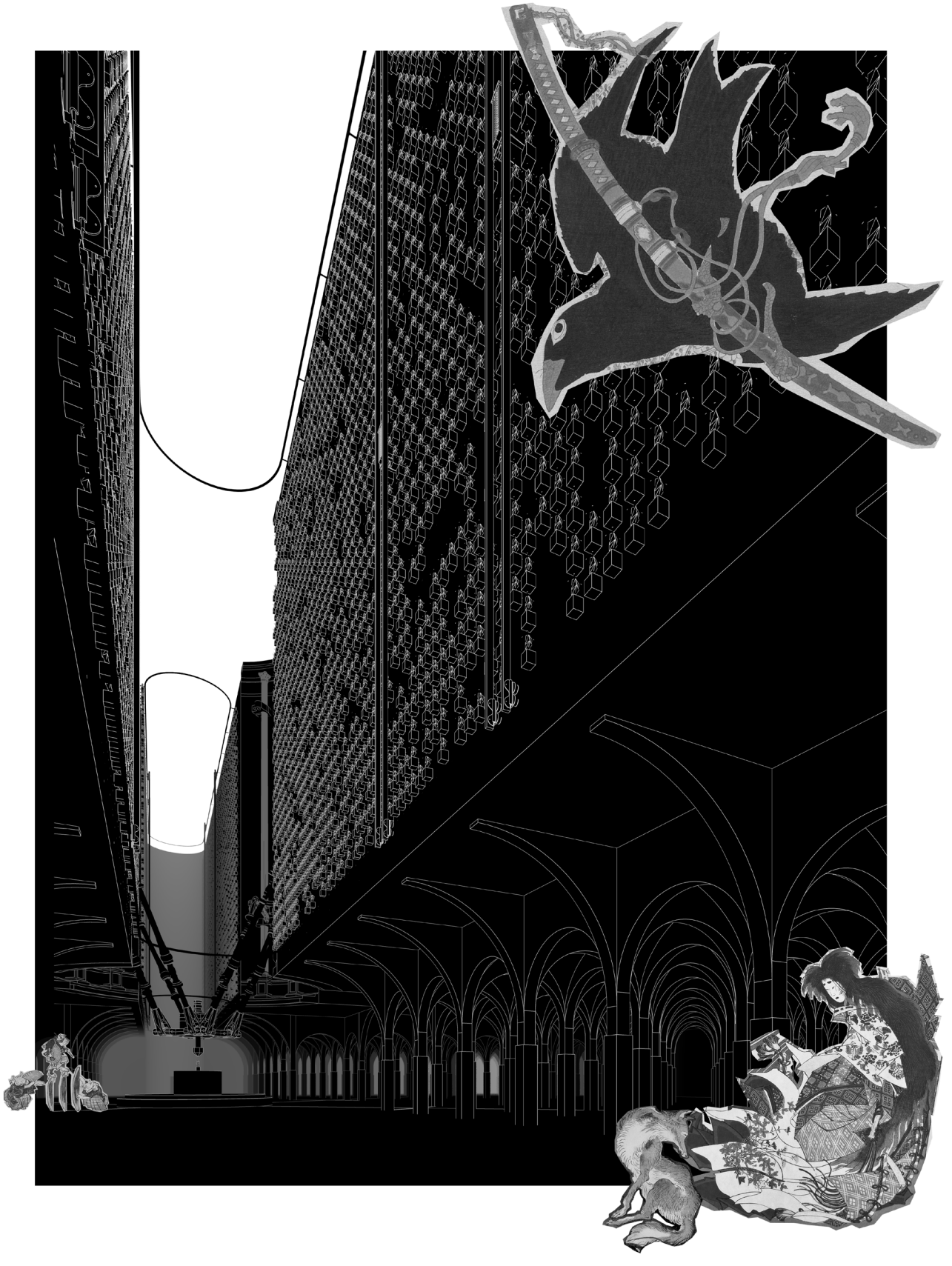

Image 34
The MAUSOTAPH

HWILSDON

Thesis Exhibition



HWILSDON

A Speculative Preservation Practice Visualizing Data as Code, Object, and Architecture.

Thom Jeffrey Garcia
Thesis Exhibition (MDes.)

Wednesday, February 05 - Saturday - February 08, 2020
OCAD University, 205 Richmond Street West
Graduate Gallery, Ground Floor
Reception on Thursday, February 06, 2020 from 6:00 p.m. - 9:00 p.m.

Process and work posted regularly
@tjeffreygarcia

Image 35
HWILSDON Exhibition Invitation



Image 36
Exhibition entrance (all photography by Brandon Bergem)

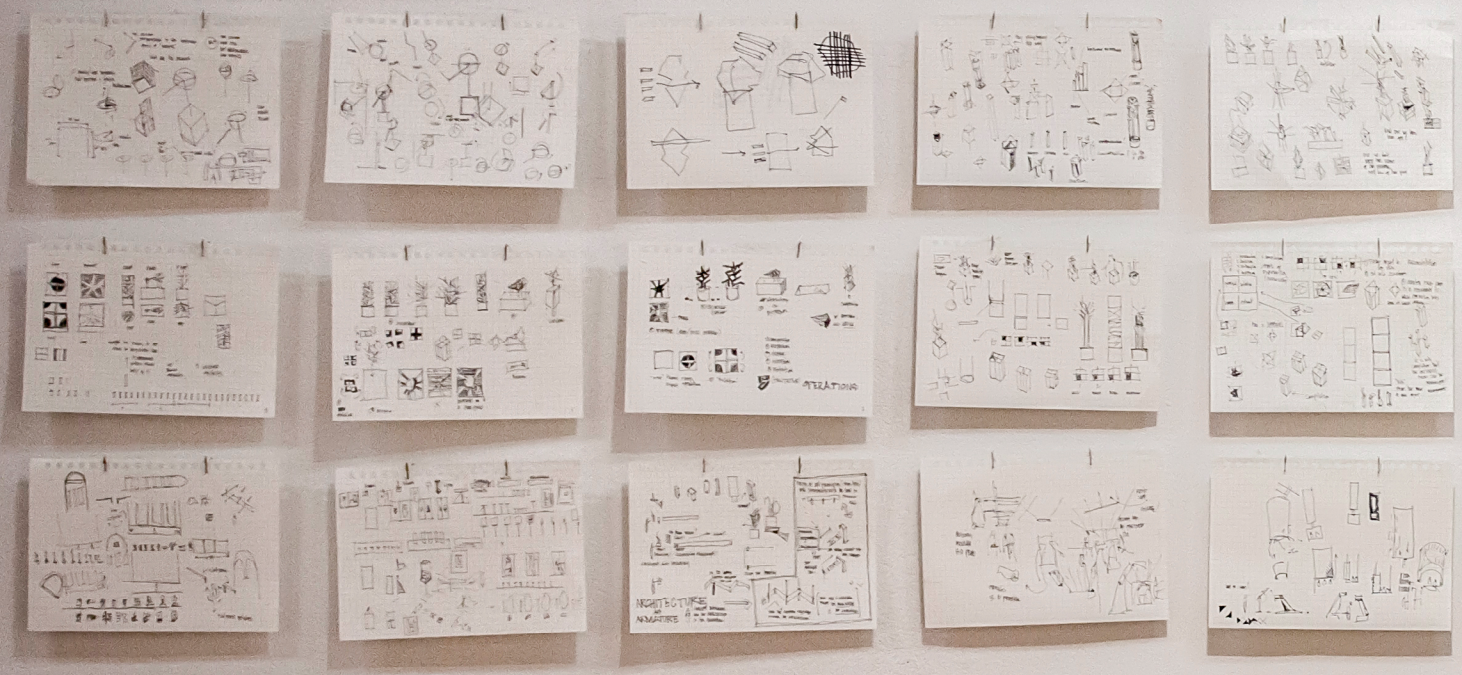

Image 37
Selection of over 80 hand-drawn sketches

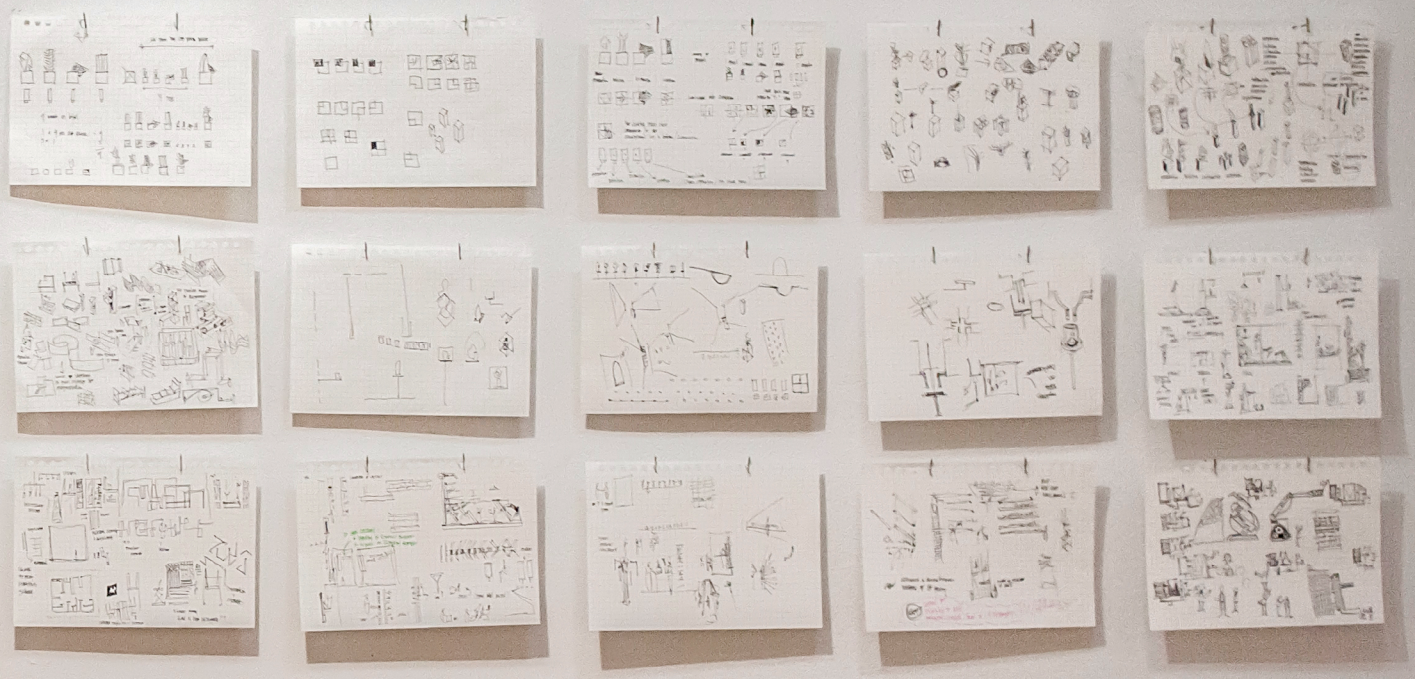



Image 38
Sketches

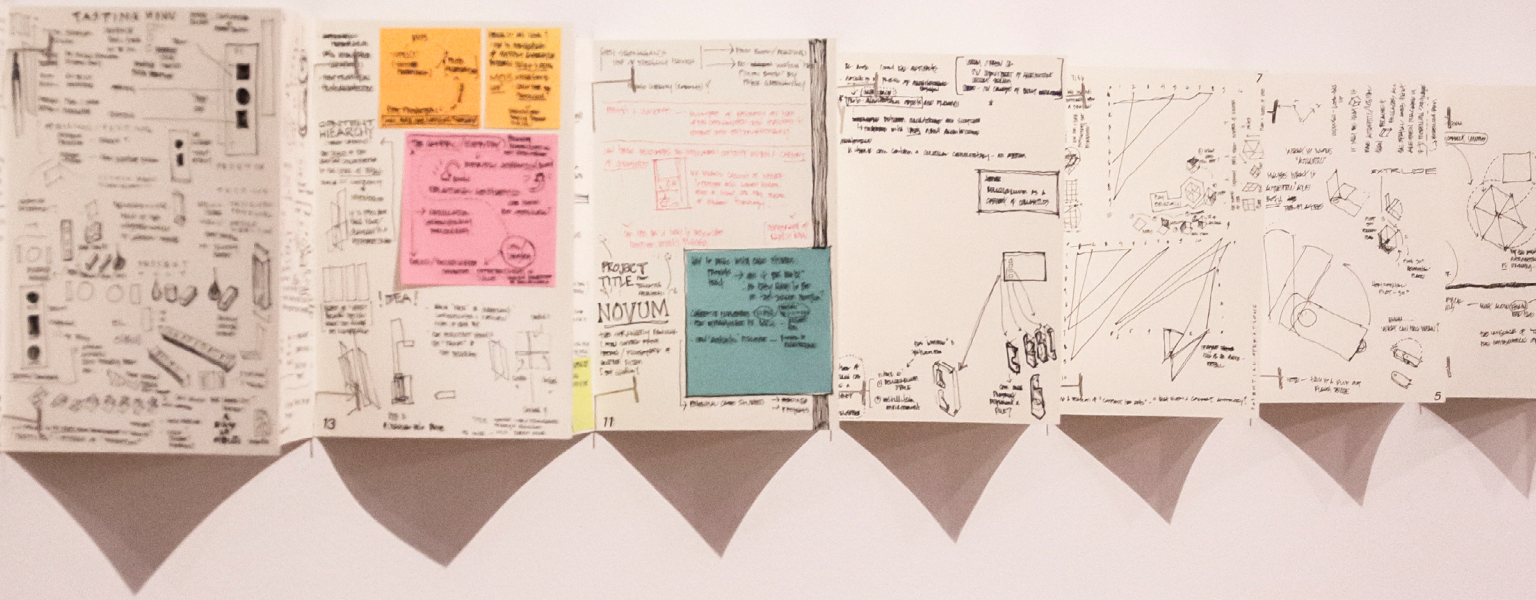

Image 39
Moleskine Japanese Accordion-Fold Sketchbook (9'-0")



Image 40
Installation view (Moleskine Notebook. HWILSDON metadata, script, digital renderings, 3D printed Reliquaries)





Image 41
Panoramic view of the HWILSDON exhibition in the Graduate Gallery


Case Study 1
HWILSDON Relic
Code
HWILSDON
An Experimental
Preservation Practice
Visualizing Data as Code,
Object & Architecture
Chapter 1
The ARMATRY
Armatures & Foundry



Image 42
3D printed Reliquaries and digital renderings





Image 43
HWILSDON Reliquary - installation view



Image 44
HWILSDON Reliquary (Extraction) - installation view



Image 45
HWILSDON Reliquary (Repitition and Rotation) - installation view



Image 46
HWILSDON Reliquary (Fragmentation) - installation view



Image 47
HWILSDON Reliquary - digital rendering in gold (detail)



Image 48
HWILSDON Reliquary (Extraction) - digital rendering in gold (detail)



Image 49
HWILSDON Reliquary (Repetition and Rotation) - digital rendering in gold (detail)



Image 50
HWILSDON Reliquary (Fragmentation) - digital rendering in gold



Image 51
3D printed Reliquaries and "A Story of Memory in 4 Chapters"


Chapter 3
The ARMATRY
Armatures & Foundry
Case Study 2
HWILSDON Reliqua
Object



Image 52
Chapter 1: The EMBALMERY



Image 53
Chapter 2: The ALTARCATOR



Image 54
Chapter 3: The ARMATRY



Image 55
Chapter 4: The MAUSOTAPH

Epilogue

Rem-arkably delirious

The most profound learning outcome from HWILSDON is identifying that design is a methodology for discursive inquiry. New knowledge is generated with an interdisciplinary education. Reinforced with my research, I am confident that speculation is not just a topic but a driver for learning. I entered the OCAD U graduate studies building at 205 Richmond Street, Toronto, as a conceptual designer and leave as a maker. My practice-led project taught me the necessity of testing ideas and there is a reward in discomfort.

My general response to the process and outcomes of HWILSDON?

I am *Rem-arkably delirious*!

Referencing the architect Rem Koolhaas's book *Delirious New York: A Retroactive Manifesto for Manhattan*, his version of history does not conclude definitively.[127] The appendix is a fictional conclusion proposing several imagined architectural projects that embody the principles he outlines in the text of his history of Manhattan. Contemporaneously, I see a parallel between this body of work and experimental preservation. Both speculate a future history from an interpreted past.

My partner and I have started a collaborative interdisciplinary research practice called *Office in Search Of* ... (*oISO* ...). We were recently invited by the program director at the University of Buffalo School of Architecture to apply for the Peter Reyner Banham Fellowship that includes a 1-year appointment as an associate professor that in tandem with pursuing research includes teaching seminars and studios.

Our proposal expands on the research I did for thesis and focuses on speculating, testing, and prescribing new architectural typologies for the history of the immediate future that can preserve, archive, and exhibit intangible content. The research focuses specifically on calamities like climate change and pandemics. Our desired outcome is a methodology for foregrounding indeterminacy and purposeful exploration in the design process.[128]

[127] Rem Koolhaas, *Delirious New York: A Retroactice Manifesto for Manhattan* (United States of America: The Monacelli Press, 1994).

[96] I included the proposal in Appendix A.

Akin to the appendix in *Delirious New York*, I do not have a definitive conclusion for the HWILSDON project because it continues to propel me forward. This epilogue exemplifies my thesis. It may signal the end of this project but - like any good narrative - it will not be the last.

HWILSDON

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HWILSDON

Appendix A: Architectural Typologies for the History of the Immediate Future

Office In Search Of. . .
Brandon Eli John Bergem
Thom Jeffrey Garcia

/ ARCHITECTURAL TYPOLOGIES FOR THE HISTORY OF THE IMMEDIATE FUTURE

A Collaborative Proposal to the 2020–21 Peter Reyner Banham Fellowship – University of Buffalo School of Architecture and Planning

/ PREFACE

This is a story of Dr. Kristy Duncan, a former medical geographer and currently Canada's first Minister of Health. While completing her dissertation she encountered disconcerting reports. She was perplexed that some virologists in their research in viral transmission were not adequately accounting for the repercussions of the global populations increased movement, and further that the origin and genetic sequence of the Spanish Flu remained mostly unknown.

Consequently, Dr. Duncan was determined to find fragmented remnants of the virus. After years of searching, she uncovered a Norwegian diary that reported in autumn, 1918, seven miners fell ill en route by ferry to the Arctic archipelago of Svalbard before succumbing to their illness in the island's hospital. With the sea beginning to freeze and no way to return the body's home, they were buried into the frozen permafrost, which would have preserved their bodies along with the virus that killed them. In 1998, after several years of planning and sorting logistics, her science expedition headed to the remote arctic tundra. The team had to be clad in biohazard suits and set up hazardous protection tents before exhuming the miners' bodies and extracting biological samples. However, Dr. Duncan's ambitions were confounded by numerous circumstances; one of them was the unanticipated effects of climate change. Although initial radar images suggested the coffins were intact within the permafrost, they were buried to a level where the bodies had repeatedly frozen and thawed, compromising her efforts.

Our research agenda is inspired by the challenges Dr. Duncan confronted – documenting and having a record of a virus and the unanticipated disruption of climate.

/ PROPOSAL

We are interested in how architecture can be implicated in representing the intangibility of calamity. National and international emergencies have punctuated the past century from climate change, contagions, to nuclear disaster. The seeming invisibility of rising average global temperatures, microscopic viruses, and radioactive contamination frequently undermines the necessity and scale of action required. The consequences of the Anthropocene have shown to upturn cities, environments, and geographies, and how we can visualize them materially is often dependent on the documentation of their physical consequences. Climate change can be shown with bleached coral reefs, petrified soil samples, and retreating glaciers. A viral pandemic can be envisioned with testing swabs, Personal Protective Equipment,

and stacks of front-page coverage from The New York Times. A nuclear fallout through wildlife with altered growth, and mutations of flora and fauna.

Our research questions what role architecture may have, not as a design problem to resolve, instead, to be a conduit that can register, archive, and index calamities. We anticipate this recalibration can begin to speculate new preservation typologies purposefully.

/ THEORY AND PEDAGOGY

Our research deliberately aligns with Peter Reyner Banham's characterization of history as not defined merely by the past, but also an "immediate future." We are inspired by his assessment that history both documents what transpired and guides us into the future.

Our research interest explores a speculative-centric research agenda that advances experimental preservation practices outlined by the artist, professor, and Director of Historic Preservation at Columbia Graduate School of Architecture, Planning, and Preservation (GSAPP), Jorge Otero-Pailos. As with Otero-Pailos, we believe that "history is a construction with a contemporary and future purpose."[1] We will adopt his proposal for framing preservation as a "future anterior," a circumstance where one has to anticipate the future when now is the past. As designers and architects, we need to forecast what future generations will need to know about our current milieu. The cultural critic, Frederic Jameson, states that "[t]o imagine the future … one had to establish some historiographical relation to it from the point of view of the present … [w]ithout its mooring in a historical present, the future [is] inconceivable."[2]

The research advocates for interdisciplinary non-delineation that is a junction, including art, architecture, engineering, history, data science, material science, philosophy. It is unnecessary to categorize ideas, disciplines, intentions, or outcomes. We imagine a provocative version of historical assessment, which does not merely seek to freeze objects in time but seeks to tell long narratives into their history and project them forward. Preservation is always understood as a radical act. Rem Koolhaas, in the Paul S. Byard lecture, presented Preservation at Columbia Graduate School of Preservation and Design (GSAPP) in 2014 titled "Preservation is overtaking us," he invokes Byard's legacy. Koolhaas claims, "preservation is a progressive art form, and intellectual and design challenge of the very highest level."[3] What constitutes a necessary architectural preservation practice can include demolition because taking care of a building might mean knocking a wall down and revealing something that was not seen before.

/ METHODOLOGY

Our proposed research will identify the potentials for innovative architectural preservation practices. The desired outcome is a methodology for foregrounding

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[1] Nickolaus Hirsh, review of *Experimental Preservation*, by Jorge Otero-Pailos, Erik Fenstad Langdalen, and Thordis Arrhenius, eds. (Zürich: Lars Müller Publishers, 2016), Back cover.

[2] Jorge Otero-Pailos, Erik Langdalen, and Thordis Arrhenius, eds., *Experimental Preservation* (Zürich: Lars Müller Publishers, 2016) 20.

[3] Rem Koolhaas and Jorge Otero-Pailos, *Preservation Is Overtaking Us*, Columbia Books on Architecture and the City (New York: Columbia University Press, 2016), 7.

indeterminacy and purposeful exploration in the design process. The project has a tripartite agenda: identify and evaluate precedents, collate and extrapolate content from current reportage, documentation, and research, and synthesize all the material to speculate, test, and prescribe new architectural typologies that can preserve, archive, and exhibit intangible content.

The University of Buffalo School of Architecture and Planning offers unique opportunities that can facilitate and advance our research proposal. The content of our project would be enhanced by having access to research from existing initiatives like adapting buildings for climate change. The school's practice driven research approach aligns with our ambitions to realize a project that demonstrates criticality with material outcomes. Our research necessitates an interdisciplinary pedagogy and multimedia fluency, including drawing and sketching, information visualization, digital and material model making, and graphic design. The speculative demeanour of our research and the inherent necessity for material testing would benefit from access to CAST. The new media and technologies would make the project objectives, outcomes, process more comprehensive and would bolster the legitimacy of the research topic.

/ RESEARCH QUESTIONS

The inquiries that guide the project are:

1. Rather than relying solely on precedent as typological models, how can speculative processes contribute to contemporary preservation practices?

2. Being cognizant that the research topics are potentially controversial, how does one move beyond dogmatic rhetoric and encourage a discursive practice?

3. Counter to the expectation to terminate in a resolution, how can indetermination be a relevant driver for architectural innovation?

/ TEACHING

The proposed seminars and studio curriculum will provide research and discourse into a topic referred to as speculative preservation. Negentropic Architecture: Spatiality of the Archive will explore classical and contemporary practices of archiving physical material in relation to the central paradox that the best practice to extend longevity is to make content physically inaccessible. Unfortunately, material preservation can potentially undermine the fundamental purpose of archiving.

Speculative Preservation, Difficult Histories, and Dark Tourism will examine difficult histories, the tourism industry, and anticipated calamities. The course will confront the precariousness of balancing economic and educational benefits against material deterioration and cultural exploitation.

The seminars, while not a prerequisite, supplement the research design studio, Journey to Churchill: Threshold of the Arctic – Speculative Preservation and the Sublime will study the community of Churchill in northern Manitoba, Canada. There, the remnants of a layered history of human activity are challenging the economy in a location exacerbated by climate change. Students will collaboratively research the site and propose projects which engage both the intersection of industry and ecology and the imperative to archive for the future.

COURSE SYLLABUS 1

NEGENTROPIC ARCHITECTURE: SPATIALITY OF THE ARCHIVE



Secret government warehouse, Indiana Jones and the Radiers of the Lost Ark (1981)

> *"There are five shelves for each of the hexagon's walls; each shelf contains thirty-five books of uniform format; each book is of four hundred and ten pages; each page, of forty lines, each line, of some eighty letters which are black in color. There are also letters on the spine of each book; these letters do not indicate or prefigure what the pages will say. I know that this incoherence at one time seemed mysterious."*
>
> –The Library of Babel – Jorge Luis Borges (1941)

> *"Here at the centre of the United States, where the land looks as if it had been ironed flat, sits the world's largest warehouse. It is 650 feet below the surface of the Earth… a clean white city beneath a city, where the temperature never varies… where the space is just about limitless."* [4]

/ PREMISE

This course will explore the relationship between forms of knowledge and their spatial forms. From "Shadow Libraries" to underground repositories, Herbariums to Seed Vaults, the Mundaneum to Automated Retrieval Systems, archives are meant to encapsulate cultural memory against the forces of entropy. We will consider historic and emergent forms of archival practices, from inventions and innovations to politics and power relationships.

By studying the spatialization of archived knowledge might in turn allow us to understand that knowledge in new ways. By considering their logistics, protocols, and organizations we may begin

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[4] David Larsen, "Back to the Salt Mines: The World's Biggest Chamber of Commerce," *The Washington Post, Times Herald*, Apr 08, 1973. http://myaccess.library.utoronto.ca/login?url=https://search-proquest-com.myaccess.library.utoronto.ca/docview/148430263?accountid=14771.

to understand how transformations in the modes of organizing modes of knowledge have determined or been determined by architecture.

The structure of the course will be twofold. The first will be a series of seminar lectures including weekly readings and discussions. In the second part students will partake in drawing-based research which seeks to reveal the logistics and tectonics in a selected form of archival architecture.

/ METHOD OF INSTRUCTION AND PROJECT OUTCOMES

The course is intended to students understand how forms of knowledge are organized. Readings will be employed for facilitating discussions, presentations for synthesis of material and a series of analytical drawings as a means of research.

/ COURSE OBJECTIVES

+ To develop skills of critical and creative thinking.
+ To be aware of the sociological and cultural impact of design.
+ To nurture a culture of engagement, sharing, and generosity in a collaborative environment.
+ To develop a learning pedagogy that is informed by inquiry, exploration, and synthesis.
+ To respectfully discuss contentious content in an explicitly inclusive and non-partisan academic setting.
+ To find enrichment through interaction, discussion, and production.

COURSE SYLLABUS 2

SPECULATIVE PRESERVATION, DIFFICULT HISTORIES, AND DARK TOURISM: PREDICTED CALAMITIES FROM THE CORONAVIRUS TO CLIMATE CHANGE



"Saint Rosalie Interceding for the Plague-stricken of Palermo" (1624) by Anthony van Dyck
From left to right: "Saint Rosalie Interceding for the Plague-stricken of Palermo," detail of putti holding a human skull, putti bearing roses in tribute (Images from the MET online gallery).

"We've just got this cultural fascination with the darker side of history; most history is dark."[5]

"[W]e are turning to the visitor economy to remember aspects of death and dying and disaster."[6]

"For Immanuel Kant, and the Romantics, [horror] was an element of the sublime, experienced for spiritual and didactic benefits – a mode of feeling that would skirt rationality and speak directly to our inner nature. The terrible was one form of sublimity, alongside the noble and the splendid."[7]

"[Horror] might be called a type of 'experimental subject,' a mode of being that articulates human experience under shifting circumstances."[8]

/ PREMISE

On June 25, 1624, the viceroy of Sicily, Emanuel Filibert of Savoy, announced a state of emergency because the first cases of the plague were reported. The artist, Anthony van

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[5] Hannah Sampson, "Dark Tourism, Explained: Why Visitors Flock to Sites of Tragedy," *The Washington Post*, last modified November 13, 2019, accessed March 27, 2020, https://www.washingtonpost.com/graphics/2019/travel/dark-tourism-explainer/.

[6] Sampson. "Dark Tourism."

[7] Joshua Comaroff and Ong Ker-Shing, *Horror in Architecture* (China: ORO Editions, 2013), 8.

[8] Comaroff and Ker-Shong, *Horror*, 27.

Dyck, was in Palermo because he was invited to the city to paint a portrait of Filibert. While quarantined, van Dyck witnessed the port and city shut down, hospitals overrun with the sick, and afflicted people strewn in the streets[9] Allegedly during this time, an apparition of Saint Rosalia appears and orders her bones to be unearthed and paraded in a procession through the city. After heeding her instructions, the epidemic abated, and the plague was expunged. Inspired by this miracle, van Dyck painted a portrait of her as the new protectress and patron saint of Palermo.[10] Fast forward several centuries and a novel virus is rife across the globe. In early March 2020, the death toll in Sicily due to the coronavirus is over 100 people. Residents of Palermo are now once again praying for another miracle from Saint Rosalia.[11]

Palermo's economy is reliant on money generated by tourism. The seminar posits the possibility that once people can freely travel post-coronavirus pandemic, the economy of a city devastated by the calamity can be revitalized. Specifically, because a site was ravaged by misfortune, it can be an attraction for the dark tourism industry.[12] For example, after the HBO miniseries "Chernobyl" aired in 2019, the increase in visitors rose 30 to 40 percent. Despite the lingering radiation, the Ukrainian government has declared the intention for the Chernobyl Exclusion Zone to be designated an official tourist spot.[13]

In the seminar, students will be asked to speculate dark history and tourism as a consequential and relevant cultural preservation practice.

The seminar will address pertinent inquiries regarding intention and effect. Researchers like J. John Lemmon, a professor of tourism at Glasgow Caledonian University in Scotland, Philip Stone of the Institute of Dark Tourism Research at the University of Central Lancashire in England, and Mary Margaret Kerr, a professor of education and psychiatry at the University of Pittsburgh do not condemn dark tourism because they identify the educational potential.[14] However, it is not unusual for the solemnity of these sites to be diminished by visitors who take selfies and playful photographs at memorials and concentration camps.

The seminar will discuss issues of relevance, voyeurism, and potential exploitation of ongoing or recent tragedies. Although the research advocates for experimenting with tourism as a potential preservation practice, the toll of material deterioration on tourist sites must be considered, in addition to what compromises are acceptable when the frequency of visitors impacts a community.

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[9] Jason Farago, "The Saint Who Stopped an Epidemic Is on Lockdown at the Met," *The New York Times*, last modified March 27, 2020, accessed March 26, 2020, https://www.nytimes.com/2020/03/26/arts/design/van-dyck-metropolitan-museum-virus.html.

[10] Farago, "The Saint Who Stopped an Epidemic."

[11] Lorenzo Tondo, "Palermo Pins Hopes on Patron Saint to Rid Italy of Coronavirus," *The Guardian*, last modified March 13, 2020, accessed March 26, 2020, https://www.theguardian.com/world/2020/mar/13/palermo-pins-hopes-patron-saint-rosalia-rid-italy-coronavirus.

[12] Dark tourists visit places of violence and disasters, like the Colosseum in Rome,Italy, Chernobyl near Pripyat, Russia, the 9-11 Memorial in New York City, USA, and Auschwitz in Oświęcim, Poland.

[13] Sampson. "Dark Tourism."

[14] Ibid.

/ METHOD OF INSTRUCTION AND PROJECT OUTCOMES

The course considers architecture and design as discursive practices. The research component will be delivered in a series of lectures and seminars. The practice-based aspect will be multimedia mapping/information visualization that will visualize the inextricable relationships between historicism, site, and culture.

The primary case studies for the seminar will be two predicted calamities: the spread of the coronavirus in the United States of America and the global impact of climate change. The intention is for students to synthesize their individual research agendas to select and substantiate a site and tragedy. They will be confronting difficult histories that are critical, contentious, and often disagreeable.

/ COURSE OBJECTIVES

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+ To respectfully discuss contentious content in an explicitly inclusive and non-partisan academic setting.
+ To find enrichment through interaction, discussion, and production.

STUDIO SYLLABUS

JOURNEY TO CHURCHILL – THRESHOLD OF THE ARCTIC
SPECULATIVE PRESERVATION AND THE SUBLIME



Abandoned Radar Station in Churchill. An old military station outside of Churchill. When the military withdrew from the region they left behind many structures and facilities, which have now continued to decay. From the Wikimedia Commons

/ PREMISE

This studio will endeavour to visit the community of Churchill, Manitoba, Canada. A remote, isolated settlement without a road connecting it to the rest of the country and is only accessible by air, rail, sea. At the threshold of a tripartite set of biomes, tundra, boreal, and marine, the Port of Churchill is Canada's only deep-water Arctic port connecting otherwise landlocked prairie grain to Northern European markets via what is known as the Arctic Bridge. Churchill's Rocket Range was once Canada's foremost upper atmosphere research centre. Abandoned and new Technology sit in barren landscape. From a site of the early fur trade to the Strategic Air Command (SAC) military and radar operations of WWII, Rocket Range was once Canada's foremost upper atmosphere research centre. Currently under construction is the future Churchill Marine Observatory, a scientific laboratory for studying the relationship between oil spills and other contaminants with ice-covered sea waters.

The resilience of this community is challenged as the Port undergoes lapses in operation as ownership trades hands meanwhile on one front Climate Change has opened up longer shipping seasons by stalling the freezing of the Hudson Bay, it is simultaneously collapsing rail line services running over muskeg tundra that provide necessary provisions.

Amongst this strange mixture of industry and scientific inquiry, tourists venture into the landscape branded as the Polar Bear Capital of the world in specially outfitted Tundra Buggies. They are hopeful for the opportunity to encounter creatures in the frontier of their habitat under the spectacle of the Northern Lights.



Port of Churchill viewed from Helicopter. From the Wikimedia Commons

In this strange clash of eco-tourism, climate-research, international-trade, post-history, and vast-landscapes students, will develop a collaborative research approach to conducting field study and uncovering archival research through representation, mapping, and cartography. Students will act as researchers and archeologists and study the archipelago from a distance and across several different scales to present an interdisciplinary reading of the Churchill territory.

Following the intensive research exercise, students will propose architectural projects that endeavour to combine speculative preservation and cultural tourism. Projects should ambition to explore the intersections between industry and ecology. Students will be encouraged to propose new opportunities for how the landscape can be inhabited.

/ COURSE OBJECTIVES

+ To develop skills of critical and creative thinking.
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+ To nurture a culture of engagement, sharing, and generosity in a collaborative environment.
+ To develop a learning pedagogy that is informed by inquiry, exploration, and synthesis.
+ To respectfully discuss contentious content in an explicitly inclusive and non-partisan academic setting.
+ To find enrichment through interaction, discussion, and production.

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Fin ... for now