Small
Data
Industries

Something Old, Something New

Art | National Digital Stewardship Residency

Born-digital artists' materials in the archive and studio

Rachel M. Ward

A B S T R A C T

This report extracts the meaning, nuances and implications of the project Something Old, Something New: Born-Digital Artists' Materials in the Archive and Studio, as founded in the research of Rachel Ward, National Digital Stewardship (NDSR Art) resident (2018-19). Through the completion of this project, the significance of "old" and "new" emerged as a conceptual and methodological fusion in the preservation of past, present and future artistic legacies. This investigation hinged on the adage of 'learning from past mistakes' to galvanize and innovate emerging archival practices — particularly when dealing with the complexities of time-based media art (TBMA). Metaphorically and structurally, this report traces this old-to-knew temporal trajectory, commencing with work in two aging media archives followed by interview-based analysis in contemporary art spaces. Through a year-long exploration of these two project streams via this NDSR Art residency, the intention was to tease out the synthesis of old archives and emerging TBMA conservation to establish major takeaways and future recommendations. The results of this research lead to the point where these bifurcating "old" and "new" streams reemerge in unison with a mutual recommendation for preemptive conservation. From a personal, collaborative and openhanded perspective, the motive in writing this report is to proffer an open-access resource that is approachable to non-specialists and artists without institutional backing or funding to safeguard their legacy. By sharing practical approaches via real-life case studies, the hope is that it will aid in the preservation of art and voices that exist in the periphery of the established archival record.

Rachel M. Ward
NDSR Art Resident 2018-19 at Small Data Industries

T A B L E O F C O N T E N T S

OVERVIEW

Small Data Industries is a lab in Brooklyn whose mission is to support and empower people to safeguard the permanence and integrity of the world's artistic record. From 2018-19, they hosted resident Rachel Ward, to train for one year the hands-on conservation of time-based media art (TBMA)[1]. This training encompassed media from the obsolete to the contemporary, such as from art data stored on floppy disks to contemporary pieces created in virtual reality (VR). This represented an initiatory immersion for the resident in hands-on media art conservation via two applied projects streams — the "old" and the "new — that is, 1) the inventorying and stabilization of an "old" archive of TBMA; 2) an even older media artist's archive, and; 2) the "new" being research about the ecosystem of contemporary media art today.

Within the context of this report, the term "born-digital" in the NDSR Art project title *Something Old, Something New: Born-digital Artists' Materials in the Archive and Studio*, will refer to content (such as texts, recordings or photos) that are produced in digital form, rather than having been converted from print or analog equivalents. Quoting the Society of American Archivists, "born-digital information is distinguished from digitized, the latter describing a document created on paper that has been scanned [where] a document created using a word processor may be described as born-digital."[2] Not only are aging born-digital materials highly at risk for obsolescence based on their physical precarity (materials and construction), but equally due to the diminishing ability of contemporary computers to handle these formats. Thus, the for the stabilization (for instance, digitization, migration, software and physical and digital storage) time is of the essence.

Within the context of the NDSR Art project objectives, the overarching objective was to develop a strategy for the critical stabilization of two at-risk archives: Eyebeam (a renowned non-profit arts organization) and Laurie Spiegel (who utilized early technology in her groundbreaking electronic music over the past few decades). As such, developing parallel strategies that simultaneously employed physical and intellectual control was of paramount importance and became the foundation that directed the course of the work. As such, the delimitation of sections (**bolded**) in this report maps the logical trajectory of the project over the course of the year:

The umbrella **Old** stream represents the at-risk archives (Laurie Spiegel and Eyebeam) whereby both archives shared a homologous **Methodology**. This strategy pivots on **Intellectual** and **Physical Control** via inventorying and in-lab stabilization of these born-digital materials in order to develop a plan for their long-term **Preservation** and **Stewardship**. In the case of Eyebeam, this involved **Regaining** control, whereas Laurie's archive required **Inaugurating** Control from the ground-up. Harnessing the **Synthesis** of theory, methodology and insights from the work in the two older at-risk archives informed the "new" stream of this

[1] "Contemporary artworks that include video, film, slide, audio, or computer technologies are referred to as time-based media works because they have duration as a dimension and unfold to the viewer over time". Source: "Time-Based Media." 2015. Guggenheim (blog). November 9, 2015. https://www.guggenheim.org/conservation/time-based-media.
[2] Born Digital | Society of American Archivists." n.d. Accessed July 23, 2019. https://www2.archivists.org/glossary/terms/b/born-digital.

project, which was founded in **Stakeholder Interviews** regarding the **New Ecosystem** of **TBMA "In the Wild"** — meaning within the contemporary New York City art gallery market rather than within the walls of institutions. With each stakeholder (artists, gallery owners and private collectors) the objective was to understand obstacles they grappled with in delivering, exhibiting and acquiring the artwork. The intent of this project stream was to illustrate a comprehensive ecosystem straited with various TBMA paths to identify problems it encounters, inclusive of liminal spaces, on its journey.

The design of these two applied project streams — one hands-on and one research-based — was to synthesize the *practical* and the *theoretical* through the development of a shared *methodology*. In other words, the objective was not only quantifiable item-level preservation but high-level analyses and research — encompassing bespoke methodological approaches and holistic perspectives regarding the nature of the archives. This allowed for a more thorough exploration of the constantly-evolving needs and gaps that lead to new conservation technologies — essential for publication, access, replicability and best practices.

The unpacking, writing and distribution of this research — via this report — may allow for the translation of these insights to a larger audience of conservators, museums, non-profits, artists and DIY archivists. The latter three may find particular use of this report as founded on research conducted by resident-in-training and a non-archivist. In other words, the terminology, processes and recommendations may be more accessible to a beginner audience. The hope is that it could serve as a replicable model that individuals (without institutional backing) can refer to when facing similar issues with their own collection.

archivists and non-specialists can refer to when encountering similar complex and aging collections. In terms of readability, rather than skipping forward to the *New* section, those who work in contemporary art may find value to follow the report's framed trajectory (i.e. in the repeated trope: 'learning from old mistakes in order to inform the new'). In other words, this work demonstrated the importance of documenting and sharing difficulties in past preservation projects as a methodology in generating new insights for the sustainable preservation of emerging artist archives within the contemporary art ecosystem. Further, the "old", particularly the *Methodology* section, may serve as an accessible "DIY" template — again, as written by someone attempting this work for the first time — for unrepresented artists who are facing their own urgently at-risk media or want to begin archiving their work with best practices from the start. In either case, whether "new" or "old," inevitable obsolescence and physical decay will always threaten the preservation of artists' work and legacy unless preemptive work is taken *now*.

THE "OLD" ARCHIVES

Within the first subdivision of the "something old, something new" streams, the "old" comprises Eyebeam and Laurie Spiegel's media archives, containing about 1,270 and 2,000 obsolescing media items, respectively. Both of these "old" archives required similar strategies in an effort to attain intellectual and physical control. In the case of Eyebeam, this required **regaining** control, whereas with Laurie's it was **inaugurating** control in an unprocessed archive. While unique in terms of age, contents and formats, both required the development of a plan — immediate and long-term — including an overview and inventory of the contents, item-level stabilization via disk imaging, safe (physical and digital) storage and, importantly, long-term stewardship.

EYEBEAM'S ARCHIVE (1)

Eyebeam is a prestigious artist-in-residency program in Brooklyn that supports artists who work in technology on projects related to social justice. Their archive represents the artists' work produced in the residencies from their establishment in 1997 through today. The contents of this archive contain culturally important, highly at-risk data, such as original residents' artwork, performance videos, interviews, documentation, files and software. This media is now threated with the potential for complete and permanent digital obsolescence — early work is stored on aging analog and digital-born carriers that are no longer readable on contemporary machines or, as will be described below, too damaged to digitize. The residents' work from 2002 on now lives, for the most part, on their current servers but also requires an overhaul of organization structure and associated documentation. The archive's looming preservation risks are a result of physical and intellectual control being lost over the years, with the added (extraordinary) impact of the damage it incurred as a result of Hurricane Sandy.

Problem

At their inception, Eyebeam was based in Chelsea, thus when hurricane Sandy hit in 2012, the majority of the archive was severely damaged. Significant recovery efforts were immediately enacted, saving the archive from complete loss. Over the years, numerous inventories have been made:

1. **Hurricane** Inventory (2012) made on-site in the immediate recovery effort;
2. **Prioritization** Inventory (2012) immediately followed to select the most important items for costly digitization; and,
3. **Final** inventory (Jonathan Minard, 2014) created once the digitized items were returned.

After the items that were digitized (about 20% of the archive) were returned, little work was done until Jonathan Minard (Eyebeam Resident 2013-14) focused on reviving the archive as his residency project. In doing so he created the most up-to-date inventory that exists today. Yet in the years to follow (2014-18), frequent shifts as a result finite residencies, internships and staff turnover have led to serious complexities in understanding the current state of the archive — particularly in terms of the multiple inventories.

Specifically, deciphering the first two spreadsheets — systemically (within one spreadsheet) and comorbidly (in relation to the final inventory and physical materials) — was not possible in their current state. Three (3) unique identifiers schemas have been assigned over the years and multiple ID stickers overlap on individual items (and/or have simply fallen off due to wear and tear). Further, there is no clear understanding of where the digitized files live or if they were uploaded to the server upon return shipment from the digitization vendors.

At this juncture — due to this combination of *physical* (Hurricane Sandy) and *intellectual* disarray — the archive lacks significant order and understanding. Since the move from the hurricane-damaged location Chelsea, the archive has lived and traveled for many years in boxes and filing cabinets; its most recent landing being at Eyebeam's current Brooklyn headquarters. Small Data Industries, aware of the state of the archive, acknowledged that it would require a new, overhauled inventory, physical identification and organization, and a comprehensive plan for long-term preservation and access. Due to the legacy value of this irreplaceable content, Small Data sought out grant and fellowship programs, including NDSR Art, in an effort to provide pro-bono assistance in a shared effort to save this irreplaceable artifact in media art history.

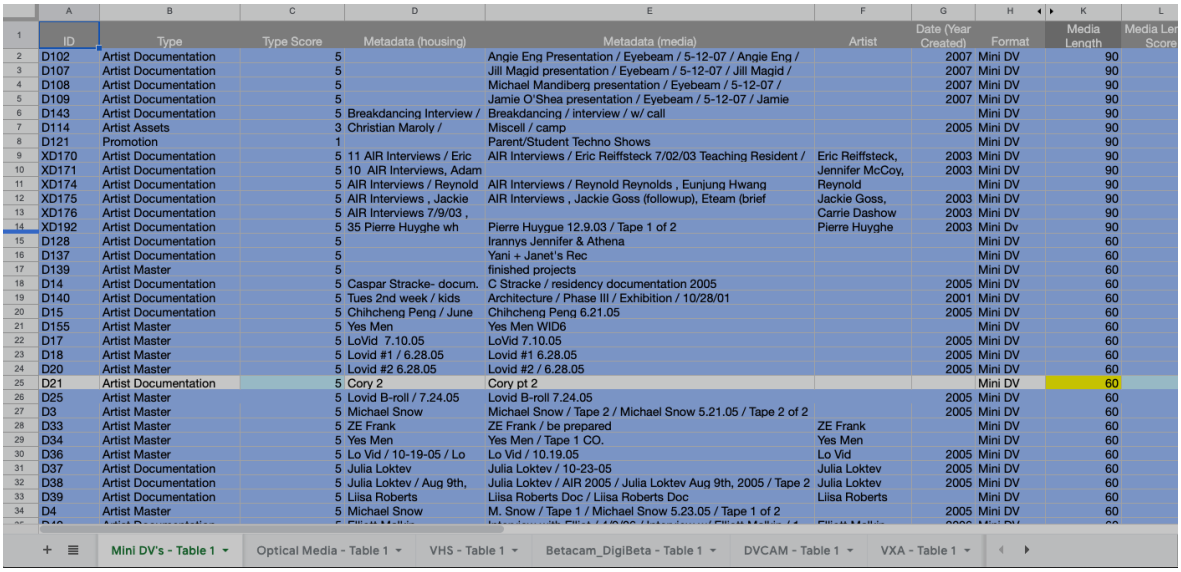
Figure 1. Eyebeam's archive has been stored in boxes and filing cabinets since Hurricane Sandy (2012)

In 2018, Small Data Industries was selected to receive a postgraduate fellow, Rachel Ward, from the National Digital Stewardship Residency (NDSR) Art program. This grant-funded opportunity allowed for the project to move forward and the work commenced in August 2018 with a team meeting at Eyebeam that provided an overview of the collection, locations and stabilization needs. At that time, the items were stored in an array of unsafe, non-archival receptacles, including boxes and filing cabinets. A truck was rented and the items were safely packaged and transported to the Small Data Industries Lab that month. The goal of this NDSR Art-funded portion of the project was to leave the archive in a better state with a new centralized inventory, one unique identifier system, archival housing and digitized files through in-lab media stabilization. Crucially, to maintain this improved state of the archive, it was required to create associated documentation and best-practice suggestions (in the form of this NDSR Art final report).

Contents

As mentioned, Jonathan Minard created the most recent inventory of the archive during his residency with counts of media (about 1,310 items) by format. In terms of content, according his 2014 report, some of these obsolescing items contain works by the renowned artists Carolee Schneemann, Char Davies, Mariko Mori, Shirin Nishat, Isaac Julien, Christian Marclay, Golan Levin, Zach Lieberman, Evan Roth and James Powderly, Cory Arcangel, Jacob Ciocci, The Yes Men, Trevor Paglen. In other words, these important

original works of art were, for the most part, damaged and/or decaying within these filing cabinets and boxes with no immediate plan for their preservation.



	ID	Type	Type Score	Metadata (housing)	Metadata (media)	Artist	Date (Year Created)	Format	Media Length	Media Len Score
2	D102	Artist Documentation	5		Angie Eng Presentation / Eyebeam / 5-12-07 / Angie Eng /		2007	Mini DV	90	
3	D107	Artist Documentation	5		Jill Magid presentation / Eyebeam / 5-12-07 / Jill Magid /		2007	Mini DV	90	
4	D108	Artist Documentation	5		Michael Mandiberg presentation / Eyebeam / 5-12-07 /		2007	Mini DV	90	
5	D109	Artist Documentation	5		Jamie O'Shea presentation / Eyebeam / 5-12-07 / Jamie		2007	Mini DV	90	
6	D143	Artist Documentation	5	Breakdancing Interview /	Breakdancing / interview / w/ call			Mini DV	90	
7	D114	Artist Assets	3	Christian Maroly /	Miscell / camp		2005	Mini DV	90	
8	D121	Promotion	1		Parent/Student Techno Shows			Mini DV	90	
9	XD170	Artist Documentation	5	11 AIR Interviews / Eric	AIR Interviews / Eric Reiffsteck 7/02/03 Teaching Resident /	Eric Reiffsteck,	2003	Mini DV	90	
10	XD171	Artist Documentation	5	10 AIR Interviews, Adam		Jennifer McCoy,	2003	Mini DV	90	
11	XD174	Artist Documentation	5	AIR Interviews / Reynold	AIR Interviews / Reynold Reynolds , Eunjung Hwang	Reynold		Mini DV	90	
12	XD175	Artist Documentation	5	AIR Interviews , Jackie	AIR Interviews , Jackie Goss (followup), Eteam (brief	Jackie Goss,	2003	Mini DV	90	
13	XD176	Artist Documentation	5	AIR Interviews 7/9/03 ,		Carrie Dashow	2003	Mini DV	90	
14	XD192	Artist Documentation	5	35 Pierre Huyghe wh	Pierre Huygue 12.9.03 / Tape 1 of 2	Pierre Huyghe	2003	Mini Dv	90	
15	D128	Artist Documentation	5		Irannys Jennifer & Athena			Mini DV	60	
16	D137	Artist Documentation	5		Yani + Janet's Rec			Mini DV	60	
17	D139	Artist Master	5		finished projects			Mini DV	60	
18	D14	Artist Documentation	5	Caspar Stracke- docum.	C Stracke / residency documentation 2005		2005	Mini DV	60	
19	D140	Artist Documentation	5	Tues 2nd week / kids	Architecture / Phase III / Exhibition / 10/28/01		2001	Mini DV	60	
20	D15	Artist Documentation	5	Chihcheng Peng / June	Chihcheng Peng 6.21.05		2005	Mini DV	60	
21	D155	Artist Master	5	Yes Men	Yes Men WID6			Mini DV	60	
22	D17	Artist Master	5	LoVid 7.10.05	LoVid 7.10.05		2005	Mini DV	60	
23	D18	Artist Master	5	Lovid #1 / 6.28.05	Lovid #1 6.28.05		2005	Mini DV	60	
24	D20	Artist Master	5	Lovid #2 6.28.05	Lovid #2 / 6.28.05		2005	Mini DV	60	
25	D21	Artist Documentation	5	Cory 2	Cory pt 2			Mini DV	60	
26	D25	Artist Master	5	Lovid B-roll / 7.24.05	Lovid B-roll 7.24.05		2005	Mini DV	60	
27	D3	Artist Master	5	Michael Snow	Michael Snow / Tape 2 / Michael Snow 5.21.05 / Tape 2 of 2		2005	Mini DV	60	
28	D33	Artist Master	5	ZE Frank	ZE Frank / be prepared	ZE Frank		Mini DV	60	
29	D34	Artist Master	5	Yes Men	Yes Men / Tape 1 CO.	Yes Men		Mini DV	60	
30	D36	Artist Master	5	Lo Vid / 10-19-05 / Lo	Lo Vid / 10.19.05	Lo Vid	2005	Mini DV	60	
31	D37	Artist Documentation	5	Julia Loktev	Julia Loktev / 10-23-05	Julia Loktev	2005	Mini DV	60	
32	D38	Artist Documentation	5	Julia Loktev / Aug 9th,	Julia Loktev / AIR 2005 / Julia Loktev Aug 9th, 2005 / Tape 2	Julia Loktev	2005	Mini DV	60	
33	D39	Artist Documentation	5	Liisa Roberts	Liisa Roberts Doc / Liisa Roberts Doc	Liisa Roberts		Mini DV	60	
34	D4	Artist Master	5	Michael Snow	M. Snow / Tape 1 / Michael Snow 5.23.05 / Tape 1 of 2		2005	Mini DV	60	

Mini DV's - Table 1 | Optical Media - Table 1 | VHS - Table 1 | Betacam_DigiBeta - Table 1 | DVCAM - Table 1 | VXA - Table 1

Figure 2. Screenshot of Jonathan Minard's (2014) inventory with individual tabs sorted by format

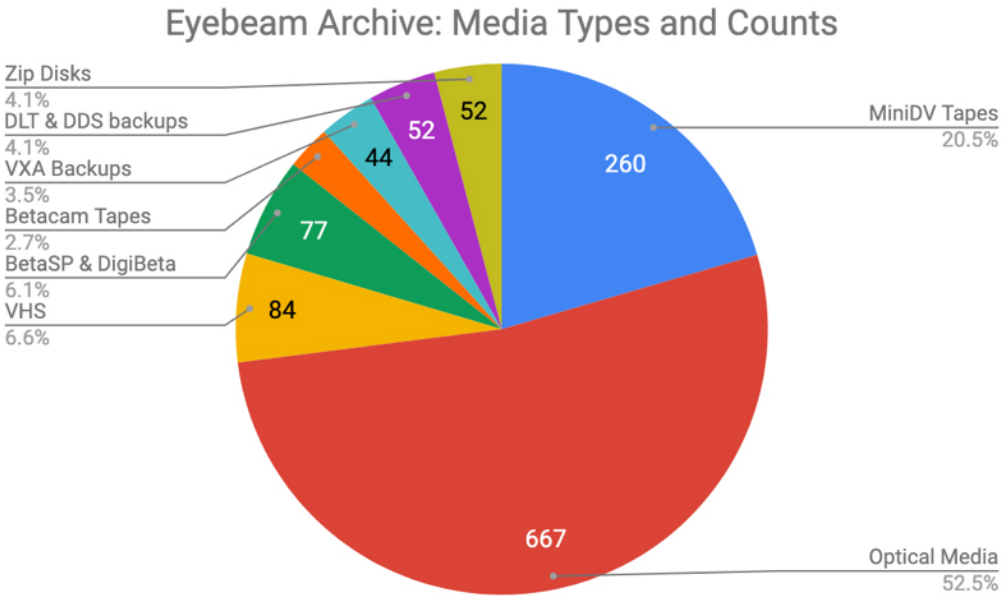


Figure 3. Breakdown of Eyebeam's archive contents by format

As indicated, Jonathan's inventory contains compiled and incorporated new information from the (1) Hurricane inventory (2012) and the (2) Prioritization Inventory that was developed prior to shipping for digitization. What initially appeared to be a straightforward process quickly became quite complex as it was realized that there was no apparent overlap between the three (3) inventories, nor with the physical items. For instance, the counts by format do not align with the article contents of the archive (see *Footnote*, below) and it is unclear where those missing physical items may be.

Regaining Control

Once the archive was brought to the Small Data lab, the initial strategy was to avoid a manual re-inventorying process — that is, with each media piece in hand at the computer — to manually create a new inventory. As will be described below, after troubleshooting various automated attempts, this type of manual process was ultimately deemed the most logical approach. Through this undertaking, the goal is to remedy these contradictions in a new, ultimate inventory (2019). This will universalize the identifier system, misidentifications (e.g., formats) and/or typos. Although it is unclear at this time how these discrepancies originated, it may become more apparent as this manual inventory is created. It is possible that many could be due to something as simple as accidental deletions or copy/paste errors.

19-06-12 Physical Cross-Reference

File Edit View Insert Format Data Tools Add-ons Help Last edit was 8 days ago

	ID	Hurricane Inventory ID	Physical Item Found	Sticker reads	Correct Physical Sticker?	J Format	Small Data Notes (2019)	Prior ID No. (recovery #)	J Metadata (housing)	J Metadata (media)
2	E12		N			BetaSP		Q61		
3	E13		N			BetaSP		Q52		
4	E14		N			BetaSP		Q53		
5	E16		N			BetaSP		Q59		
6	E17		N			BetaSP		I2		
7	E20		N			BetaSP		Q36		
8	E21		Y	E21 / P-40		BetaSP		P40	Maureen McMurray / Side Anç	Side Angle Side by Ma
9	E22	G287	Y	G287	N	BetaSP	Also has another label that sa	L6		Carson Cattle Co. "Witl
10	E23		N			BetaSP		L5	Beta Test Tape for Writing	Beta Test Tape for Writ
11	E24	none?	Y	E24 / L3 / L4	Y?	BetaSP	Has two more labels "L3" and	L3	Nick Digital / Face Pilot - 1/25/	Nick Digital / Face Pilot
12	E26		N			BetaSP		Q14	Digital Day Camp 2001 / Mast	DDC 2001 Master
13	XE46	G313	Y	G313	N	BetaSP	Mis-inventoried DigiBeta			My Baby's Daddy "Cas
14	XE51	none?	Y	XE51 + A-13	Y	BetaSP	XE51 has no writing on media	A-13		
15	XE52		N			BetaSP		A-19		Dove (reference)
16	XE61		Y	XE61	Y	BetaSP	Mis-inventoried DigiBeta		EyeBeam Moving Image Divis	EyeBeam Moving Imag
17	XE64	G290	Y	G290	N	BetaSP	Mis-inventoried DigiBeta			Isaac Julien Baltimore
18	XE66		N			BetaSP			External Sunshine of the Spotless Mind Editorial / FX
19	A100					CD		NA		SCANNER / FUNK WA
20	A102					CD		K24		Prix Ars Electronica 92
21	A112					CD		NA	HUMANOID FRACTAL REMIX	[label unreadable]
22	A129					CD		NA		Pro Sessions Sound +
23	A131					CD		NA		GUM / vinyl anthology

Physical Inventory | Notes

Figure 4. Spreadsheet depicting the in-progress work of the manual cross-reference of each media item

Identifier Problem

The preliminary step in resolving the identifier problem (now up to three ID stickers on each item) was to find their link amongst the three (3) inconsistent inventories that were inherited at the commencement of the project. To reiterate, the process began with the initial Hurricane inventory created in 2012, basically in the flood waters and was the **first** time the media was labeled with ID stickers. Shortly thereafter, a second inventory was made before items were shipped to vendors for digitization. These were then given a new ID and a **second** sticker. These two stickers now, somehow, appear to have no correlation in the spreadsheet[3]. Two years later, in 2014, Jonathan's inventory was created, and some were assigned a **third** ID, after digitized items were shipped back[4]. It's possible that others worked on Jonathan's spreadsheet —many interns and even high school students passed through to help with the archive — but none kept any record of their work. Initially it seemed logical that there was a missing spreadsheet or a key that would remedy this disconnect between the various IDs. If one does exist, it was still not possible to obtain it after a range of inquiries were circulated by Rachel Ward and searches conducted by past and current Eyebeam staff and interns.

Figure 5. Many items had multiple labels that were added throughout the years as new inventories were created

Left a standstill, the next clue in excavating meaning from the indecipherable IDs was the inventories' metadata, which was recorded and compared. Not only did the three (3) inventories not have a matching metadata schema, but many of the spreadsheets had practical, potentially human-error issues (that could have originated in the emergency Hurricane recovery effort) as well: mis-identified formats and in some instances there were full metadata columns missing. The goal was now to universalize the metadata so that the three (3) inventories could be collated into one (1) spreadsheet. The idea in doing so was that it may allow for an alignment of identifiers Although this was not successful, this final metadata schema will be used in this fourth (2019) inventory that will be handed over to Eyebeam alongside the archive. All steps in

[3] This was confirmed by Jonathan Minard and Kara van Malssen in August 2018 in multiple email correspondences.
[4] These items that were digitized also came with four (4) spreadsheets from two third-party digitization vendors but it isn't clear where these digital files are stored.

the process of creating this new spreadsheet were recorded in a tab aptly titled "Why this spreadsheet exists. Based on past issues, it seems this type of meticulous documentation, almost to the point of a step-by-step narrative (such as in this report), will be an important component of sustainable intellectual control as Eyebeam staff, artists, researchers or students interact with the archive in the years to come (particularly if the fourth inventory created in this process would become misplaced or lost).

Following the universalization of each spreadsheets' metadata (i.e. making the column/category structure uniform), a python script was written to automate the pairing of the mismatching identifiers. Unfortunately, even the script was not able to find any correlation within the spreadsheets. At that point it was decided that a manual cross-reference is the only way to move forward. This entails bringing individual items to the computer and searching (Ctrl + F) in the inventory for the sticker ID(s) or for a telling word on the handwritten media labels (that is, if the sticker's ID does not exist in any of the spreadsheets). Metadata information, such as label details, other stickers, or missing stickers can then be manually entered into new (2019) columns created in the spreadsheet. An additional 'Investigator Notes' column will include indications of mis-identified formats, typos, stickers have fallen off after many years, as well as hesitance about their own identification.

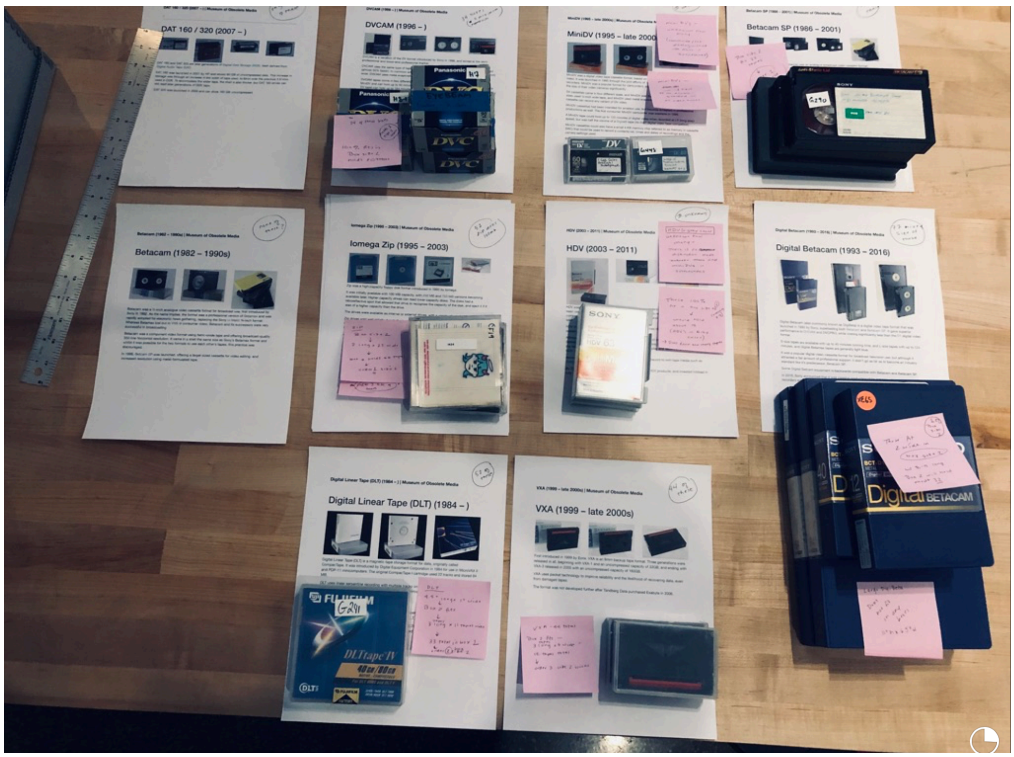


Figure 6. Identifying the formats and recording dimensions prior to ordering archival boxes

Prior Digitization

Following Kara van Malssen's second (prioritization) inventory, where the items were rated on a numerical (importance) scale. The highest-ranking items in four (4) formats were shipped to the digitization vendors George Blood (MiniDV's and Optical) and Media Preserve (VHS and Beta). These items, representing about 20% of the archive, were digitized and shipped back to Eyebeam. The remaining items that still require digitization (along with additional hard drives that are not yet inventoried) are now stored in the Small Data lab in Sunset Park, Brooklyn. Through Summer 2019, the digitization process will continue for the items that can be stabilized in-lab.

Small Data Formats *for in-lab stabilization*	**Third-Party Formats** *for outsourcing to*
Zip Disks	Mini-DV tapes: standard and high def
Optical Media	VHS tapes
VXA computer backups	BetaSP and DigitBeta Tapes
Hard Drives & USB's	Betacam tapes
	DLT and DDS computer backups

If time permits, it may be possible to address the items that were not successfully digitized in the previous attempt. According to Jonathan Minard's 2014 report:

> *Media Preserve estimated $2,000 for recovery of **80 VHS and BETA** tapes. The migration process took approximately 2 months, and they had a **100% success rate** […] George Blood associates initially estimated $6,650 for recovery of **100 Mini-DVs and 100 CDs /DVDs**. Many of the discs have water damage, severe scratching or even are cracked […] The **total recovery** so far, for 280 items in the collection, will have cost $9,900 This set of files represents **20% of the media** from the existing archive."*

As a whole, cross-referencing the returned vendors' digitization reports and the prior three (3) inventories allowed for a basic understanding of the nature and quantity of media in the archive — that is, what has been accounted for, what has been digitized (or too damaged to do so), and where original artist materials may exist. In addition to the archive inventories, the understanding of the physical/damaged state of the media (such as George Blood's experience with 'irrecoverable' media), indicate what may or may not be achievable for the stabilization of the full archive in the immediate and long-term future.

Current Stabilization

Prior to any stabilization, unique identifiers will be assigned according to this new inventory, including items that have never been inventoried before (e.g., hard drives). Based on this inventory, it will allow for **physical control** — items will be physically arranged in this final order, with all labels matching this one central spreadsheet. The goal is to make it so that items can easily be pulled from the shelf based on this final spreadsheet. The inventorying and **stabilization** process will continue through the summer (2019). To begin the stabilization process, the first step, clearly, is to make sure to leave out items that have been digitized in the past. It will be ensured that the new central inventory clearly indicates all items that had been previously digitized (or attempted) by cross-referencing the digitization output spreadsheets returned from George Blood and AV Preserve alongside the digital files. This will be indicated in the final inventory.

To begin, the intent is to select media for immediate in-lab digitization based on 1) expressed requests from Eyebeam; 2) original artworks; and, 3) items that are highly at risk for obsolescence. Generally, the process will prioritize original artworks that either had not been digitized previously, or where digitization was unsuccessful. These could also be on Eyebeam's old (or current) server. This step will provide the opportunity to explore the contents of items that have never been looked at before, inclusive of the old server and hard drives. The items that cannot completed will be indicated in the inventory, as well as those formats (namely analog) that cannot be completed in the Small Data lab and that will need to be outsourced. Thus, the focus is on the born-digital materials that can be stabilized in-house at the Small Data lab — this includes the Optical Media, Zip Disks, USB Drives 2.0 and 3.0, Firewire 400 and 800, and HDD interfaces. If it is not possible for an item-level stabilization of these formats, the overall process of this work will offer a template and recommendations for the remainder of the archive (outlined in the *Methodology* section, below).

LAURIE SPIEGEL'S ARCHIVE (2)

The second "old" is that of Laurie Spiegel's. Here, the focus was on the inventorying and stabilization of her at-risk media archive, all of which is currently housed in her loft in Soho. The thousands of media items in her home represent her life's work beginning in the 1960's as a musician, computer scientist, composer and electronic music pioneer, some of which was included on the Voyager Golden Record (1977) that was sent into outer space. Her algorithmic music composition software, Music Mouse (1986), is still in use today. More recently, she composed a symphony the BBC Prom Concert Series (2018) and in 2019, she was inducted into the Women's hall of fame.

There has been significant institutional interest in acquiring her archive, but none are equipped to accept it as a single entity (papers, analog and digital media items generally end up in different specialized repositories). In the meantime, her important original media items (about 2,000) are becoming exponentially at-risk for irrecoverable obsolescence. Through the work in Laurie's loft, the goal was to develop a customized Work Plan for her (which she received in April 2019) in preparation for long-term preservation in the form of physical and digital stewardship of her archive.

Problem

Small Data Industries' conversation with Laurie began in 2016 to discuss options for her archive. At that time, she had been amassing a collection of her work — continually growing — and kept in original order in her home loft. Laurie desires to keep everything together and protected in her loft until she can find an ideal institutional home for it (as a whole). Discussions followed as to what was feasible in consideration of her priorities and goals. In 2018, Small Data Industries was selected to receive a postgraduate researcher, Rachel Ward, from the National Digital Stewardship Residency (NDSR) Art program. In conjunction with Eyebeam, it was decided to use this opportunity to provide this assistance to Laurie, also on a pro-bono basis.

The NDSR Art-funded work commenced in August 2018 with a team meeting (Laurie Spiegel, Ben Fino-Radin, Rachel Ward and Tommy McCutchon). Two visits followed to conduct high-level counts and locations of media types to develop an overview of the collection and stabilization needs. These rough estimates include 800 analog media items, 24 computers and 1,145 floppy disks. The contents of these items contain culturally important data, such as Laurie's original audio recordings, performance videos, files and software. This media is highly at-risk for digital obsolescence — for instance, floppy disks may not be readable, hence salvageable, in another 10 years[5].

[5] "Floppy Disks: It's Too Late." 2011. ASCII by Jason Scott (blog). July 12, 2011. http://ascii.textfiles.com/archives/3191.

The archive contains a wide array of analog and digital materials, spanning from Laurie's childhood audio reels to computers still in use today. The majority of items in the bedroom are analog materials whereas the loft area contains most of the digital-born items (computers, hard drives and obsolete digital media carriers). This section provides a comprehensive overview of loft items that are within the scope of the project, ignoring items that were out of scope (non-media items such as books, objects and paper scores).

Following the high-level counts, preliminary inventories were made, categorized into Bedroom Shelf (Analog Materials) and Loft (Born-digital Materials). The **analog** materials were compiled into a Phase 1 inventory, containing **768 items** and 12 unique media types[6]. Although the inventories are named by location (Loft versus Bedroom), it should be noted that there is some crossover between the two areas. For instance, the loft area has some analog materials (about 30-50 items) that Laurie has removed for immediate digitization (that she is undertaking on her own) based on external requests. Although displaced from their original location, they were included (with notations of such) in the inventory.

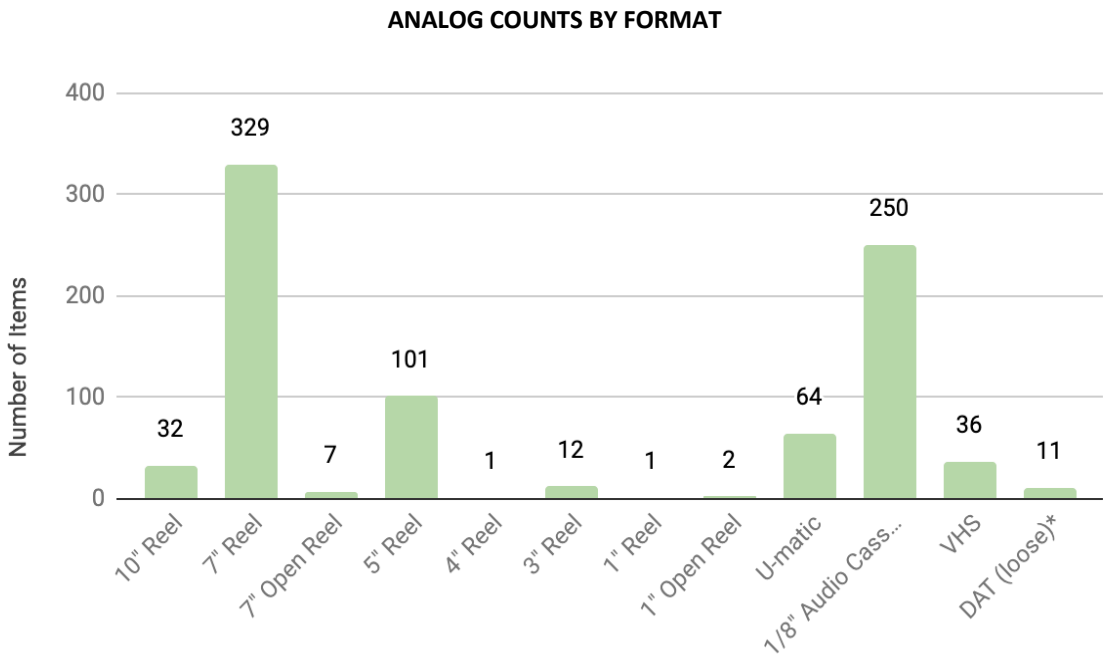


Figure 7. The high-level format count of items on the bedroom shelf (768 items and predominantly analog)

[6] Some full boxes and bags were not opened for an item-level count. This includes 22 boxes of ⅛" Audio Cassettes, 16 boxes of DATs and one box containing **previously digitized** items (although Laurie was unsure as to the quality). The total count may contain at least 100 additional items and these will need to be individually reviewed and counted in preparation for stabilization.

The **second inventory** focused on the **born-digital** materials in Laurie's loft — 3.5" floppy disks, 5.25" floppies, MiniDV tapes, Optical Media and MacLeyvier disks. The majority of the items were the **floppy disks**, with a total count of **1,145**. The full breakdown of disk types and locations were compiled into a Phase II: Born-Digital Inventory. Although not precise at the item-level, these rapid in-loft inventories allowed for a basic understanding of the nature and quantity of media in the archive, such as analog versus digital, born-digital versus digitized, and regular versus high-density storage. Simultaneously, it allowed for a preliminary physical analysis of the media and the looming preservation risks associated with each format based on the physical materials and the obsolescing software that is used to read them.

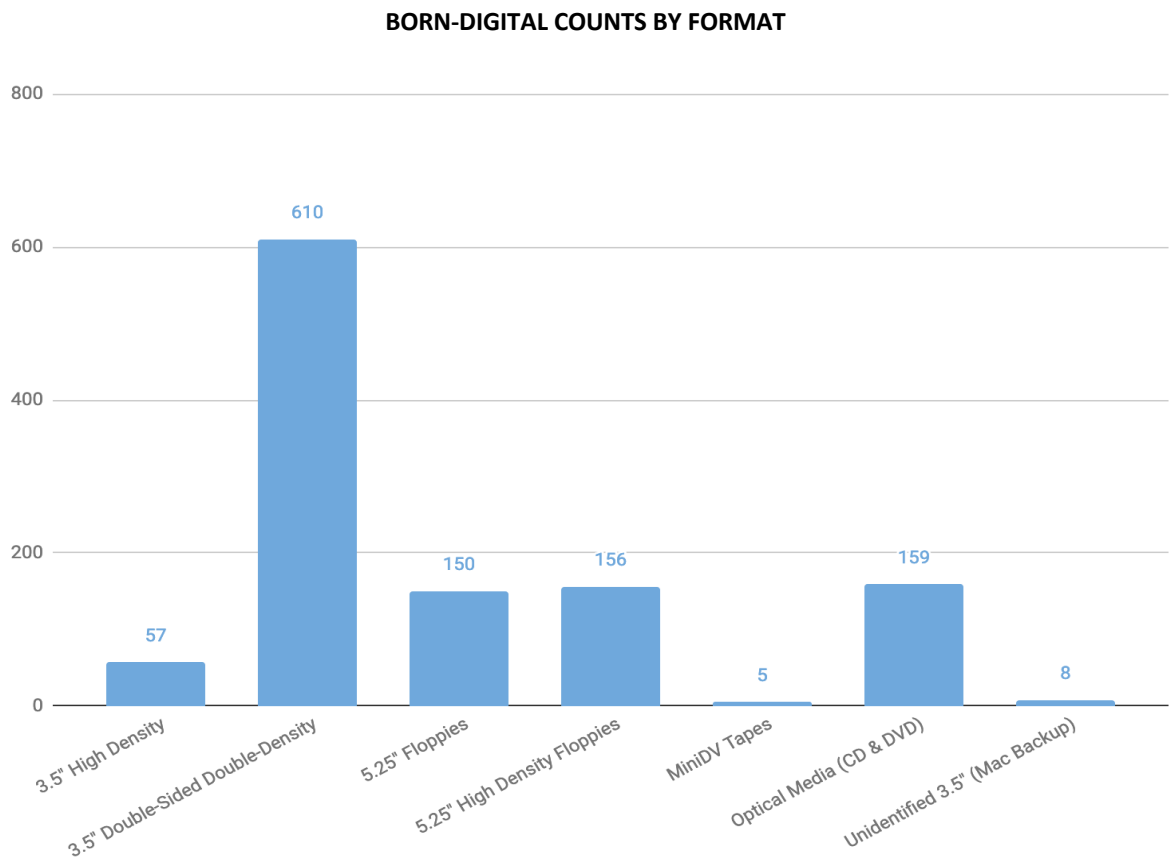


Figure 8. Counts from the Phase II: Born-Digital rapid inventory in the loft area

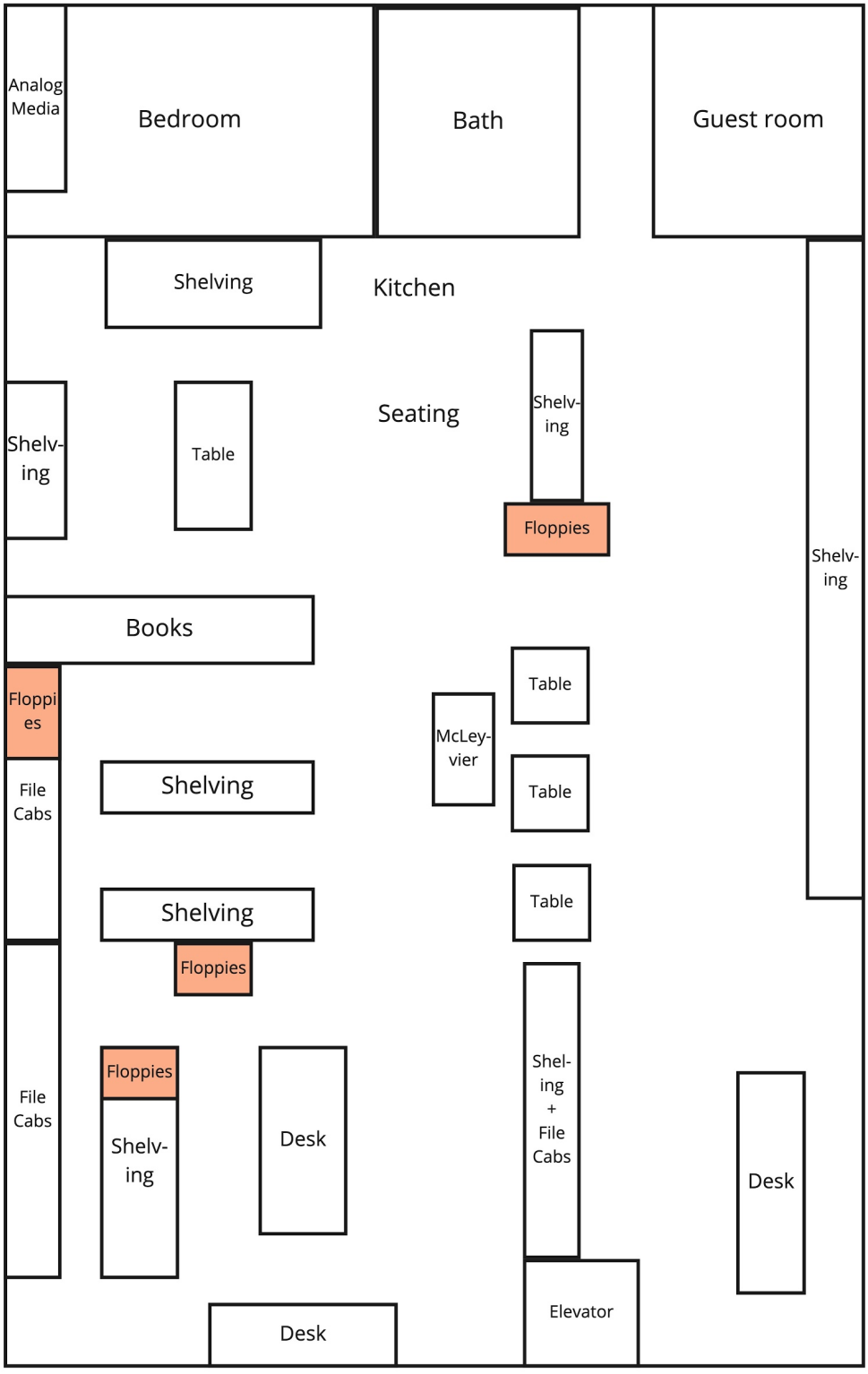


Figure 9. Floor plan of Laurie's loft indicating areas where floppy disks are stored

Like Eyebeam, objective with Laurie's archive was to inventory, stabilize (disk imaging) and store the physical items and digital files for long-term preservation and access. Focus was centered on the born-digital materials, as those can be stabilized in the Small Data Industries lab (analog items will need to be outsourced). Specific to Laurie's archive, this includes the floppy disks, MiniDV, USB Drives 2.0 and 3.0, Firewire 400 and 800 and HDD interfaces. The initial focus will be on prioritized items, such as original artwork. The first batch of ninety (90) prioritized floppy disks (original artworks selected by Laurie) was picked up in April 2019. It was suggested to select media for digitization based on 1) Laurie's current external requests for digitization, 2) her original artworks, and 3) items that are highly at risk for obsolescence. As indicated, floppy disks are highly at-risk for digital obsolescence based on their physical precarity (materials and construction) and the diminishing ability of contemporary computers to handle this format. Thus, it was agreed that these should be prioritized for immediate stabilization.

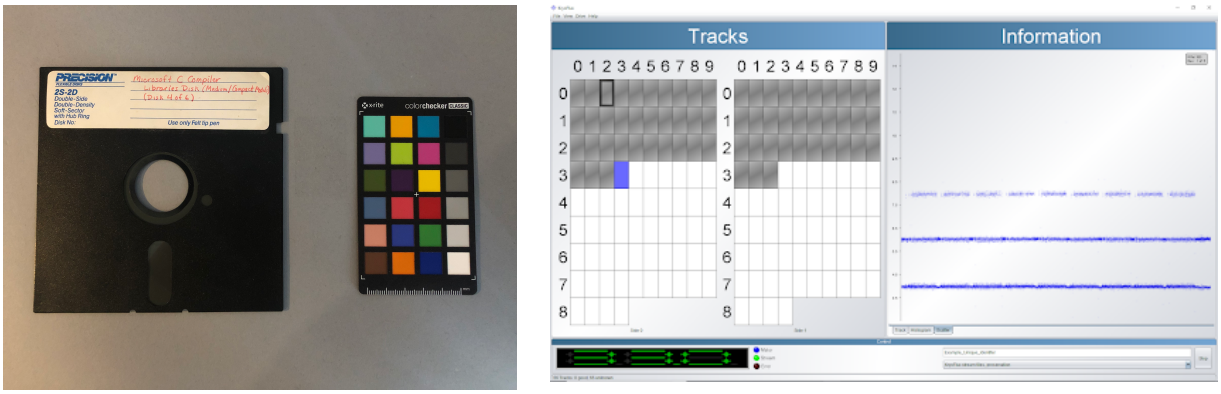
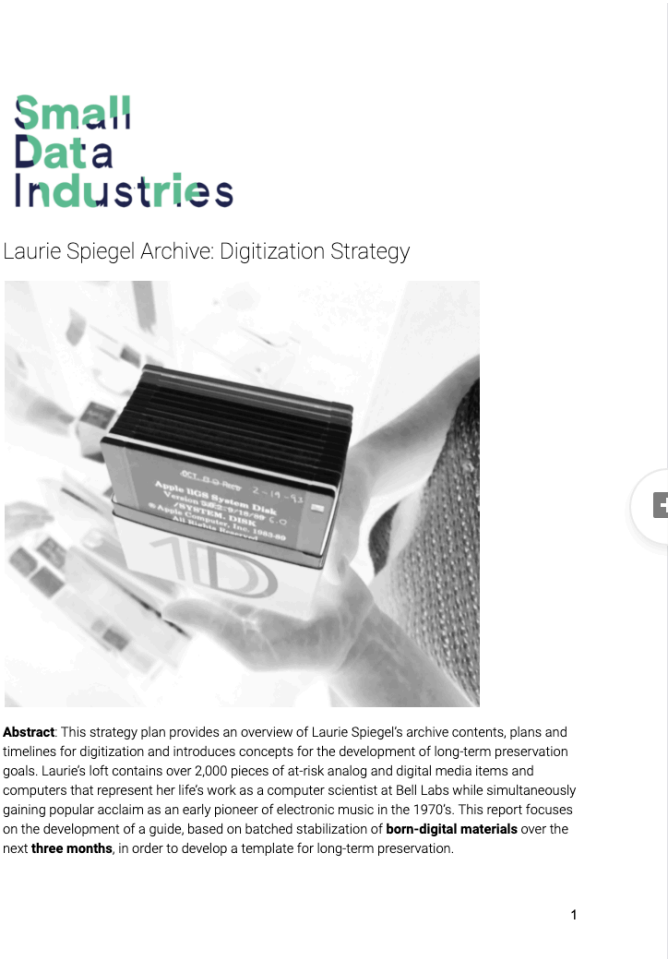


Figure 10. A photograph of each item is taken prior to creating stream files (using Kryoflux) and disk imaging.

For the in-lab stabilization (disk imaging) of the floppy disks, continuing through Summer 2019, each will be labeled with a unique identifier, inventoried and photographed. Since floppy disks are no longer readable on contemporary systems, it must initially be run through a program, *Kryoflux*, in order to package its contents into a readable format for preservation. In other words, *Kryoflux* reads the disks' data in order to create an image file that can be saved (e.g., on a contemporary hard drive) or loaded into an emulator of the software that was used in the creation of the floppy disk contents (see *Appendix* for the step-by-step *Kryoflux* process that was used here). As of July 2019, the stabilization process will continue — with the resultant aspiration being disk images of all 1,145 of floppy disks. At the conclusion of the project, she will receive: 1) the digital archive (folders containing the media photograph and corresponding disk image), 2) her physical disks (now labeled with corresponding identifiers), and 3) an Excel inventory of these items, including new unique identifiers, filenames, folder locations and other associated metadata (see *Appendix* for this metadata schema).

Dictated by time and priority, other born-digital items, such as hard drives and optical media can also be stabilized following the same process of being photographed, inventoried, labeled and disk imaged. In the future, a full inventory, inclusive of analog items, will need to be undertaken (and absolutely must be done prior to outsourcing to digitization vendors). Physical and digital storage are also integral factors for immediate and long-term considerations. Although it is not possible to inventory and stabilize Laurie's full loft in the Small Data lab, the intent is to leave her with a plan in place to 1) continue with the stabilization of any remaining born-digital items; 2) an understanding of outsourcing options and protocol; and, 3) develop strategies or support systems for long-term maintenance and stewardship. From a disciplinary perspective, the project aims to develop insight into possibilities and challenges for the development of a sustainable stewardship plan for the long-term preservation of her loft's holdings. Importantly, documentation of this process, such as in this report, is essential and should be stewarded alongside the digital and physical items that will be returned to Laurie. In addition to this NDSR Art report, the final inventories, and the initial Work Plan (also an NDSR Art deliverable) should also be included. The detailed process for developing this documentation is iterated in the next section, *Methodology*.



Small
Data
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Laurie Spiegel Archive: Digitization Strategy

Abstract: This strategy plan provides an overview of Laurie Spiegel's archive contents, plans and timelines for digitization and introduces concepts for the development of long-term preservation goals. Laurie's loft contains over 2,000 pieces of at-risk analog and digital media items and computers that represent her life's work as a computer scientist at Bell Labs while simultaneously gaining popular acclaim as an early pioneer of electronic music in the 1970's. This report focuses on the development of a guide, based on batched stabilization of **born-digital materials** over the next **three months**, in order to develop a template for long-term preservation.

1

Figure 11. Work plan strategy report for Laurie's archives

METHODOLOGY

For the "old" archives, Eyebeam and Laurie Spiegel's, the practical strategies follow a parallel step-by-step methodology. Through the pro-bono work on their individual archives, the concomitant ambition was to create free and open-source documentation of the inner-workings of this process (as put forth in this report). In the section below, the project's methodology is charted with focus on Laurie's archive as it was being created from the ground-up[7] — in simple and accessible language so that it may be replicated in the future. This could be by stewards of her archive or individuals, without support, who are facing similar challenges. Although one should always consult professional resources (or, if possible, a conservation specialist) prior to undertaking this type of work, this section may provide a preliminary template in the form of an experiential case study that focuses on **preemptive conservation** (i.e., beginning a project with long-term stewardship considerations). This is in contrast to extemporaneous digitization as a form of preservation — which, as has been demonstrated, results in long-term consequences[8]. In other words, for individuals facing similar challenges, these projects could be viewed as a practical **prototype** — focusing on the development of a long-term planning— rather than digitization focused on quantity dedicated, sustainable strategies for maintenance.

Physical & Intellectual Control

To reiterate**, regaining** control in Eyebeam's case and **inaugurating** control in Laurie's archive, rested in the physical and digital organization and a centralized inventory. Where **physical** control is indicative of identifier labels and associated ordering in archival boxes, **intellectual** control requires the development of a naming convention (unique identifiers) and data organization structure (such as inventory or database software). This will require a collaboration with stakeholders to understand their needs and abilities in terms of budget, storage and stewardship and is paramount to establish prior to working with the archive. Upon the stakeholders' determination of the desired control structure, the methodology is, for the most part, analogous.

It will be of use for future stewards — or anyone that will cross paths with the archive, such as Eyebeam's incoming residents — to also consider this process in order to develop informed decisions about the storage and structure of their data. For instance, as discussed with Roderick Schrock (Director of Eyebeam), this could be translated into a list of requirements for all incoming residents in terms of the baseline requirements they need to implement in order to ensure that their work and documentation can be seamlessly incorporated into their (forthcoming) digital archive for long-term preservation and access. In

[7] Many of these steps were completed on Eyebeam's archive in the past. Although if this sequential process was followed by Eyebeam at the outset, it could have mitigated some of the problems its archive is facing today. As such, the methodology put forth in this section will be indicative of the process followed in the work with Laurie's archive rather than with Eyebeam's.

[8] At the minimum, this report's case studies and associated guidelines, put forth below, may serve as a useful supplementary resource when working with third-party digitization vendors (when comprehensive best-practices are not possible).

the following months, Eyebeam and Laurie will be encouraged to consider the following in preparation for the return of their archives:

1. Finalizing the digital storage system and intended organizational structure
2. Managing and protecting Small Data's final inventory (2019) spreadsheet
3. Plan for outsourcing the remaining materials to third-party digitization vendors
4. Establishing who will inventory and label these remaining items prior to outsourcing
5. Plan for shipping, receiving and re-inventorying returned digitized materials — that is, upon return incorporating filenames, digital locations, and restoring the physical item to the appropriate archival boxes
6. Achievable, documented procedures for physical and intellectual control of the archive
7. A long-term plan for safeguarding and preventing obsolescence (for instance, projected needs and logistics for migration after a certain number of years)
8. Meeting criteria for physical conditions[9]
9. Projections and logistics for migration needs
10. Guidelines for future stewards and/or incoming residents
11. Considerations for access (both short- and long-term)

Procedure

The methodological strategy for both Eyebeam and Laurie's archives commenced and concluded using the similar procedural steps. In other words, many of the intermediary procedural steps (such as outsourcing) had been completed in prior phases with the Eyebeam archive. In many ways, Eyebeam's archive required working backwards (deconstructing a completed archive), whereas Laurie's was about building an archive from the ground-up. Since the majority of media artists' will be in similar situations (a studio full of unprocessed materials), this section will focus on the step-by-step procedure taken with Laurie's project[10], as one that began at Phase 0:

[9] See: "AIC WIKI Main Page." n.d. Accessed July 29, 2019. http://www.conservation-wiki.com/wiki/Main_Page

[10] Laurie's project was unique in that born-digital materials could be stabilized in-lab and did not need to be outsourced to third-party vendors. This will not be the case with the majority of artists' archives as they will need to rely on third-party digitization vendors for *all* of their media materials. As such, this section will illustrate this procedure and the actual steps taken for the in-lab stabilization of Laurie's born-digital materials (using Kryoflux) can be referenced in the *Appendix*.

Phase 0: Planning and Inventorying:

1. Determining and implementing a metadata schema
2. Item-level counts of all media items (analog and born-digital)
3. Unique identifiers assigned and labeled for each item
4. Assignment of each item to a physical space or archival box
5. Completing the inventory spreadsheet noting ID, physical location (box number) and associated content metadata

Phase I: Stabilization and Physical Organization

6. Item-level prioritization and selection for outsourcing with a notation of such in the inventory
7. Requesting quotes from appropriate third-party digitization vendors (born-digital[11] and analog materials will most likely require separate vendors)
8. Following best practices for packaging items for shipment
9. Systematic updating of inventory metadata fields when digitized items are shipped (e.g., a column reading "Out for digitization?")
10. And when they are returned with accompanying digital files and returned (e.g., "Digitized (Y/N)," "Date Digitized," "Filename," "Folder location," and so on)
11. Replacing returned physical item to appropriate archival box

Phase II: Storage and Digital Organization

12. Ensuring that the digital filenames (disk images or format-specific digitization files) contain their unique identifier (and maintaining this universal filenaming schema across all items)
13. Finalize folder structure (containing the files, above) the established folder-naming schema (ensure that this corresponds with both analog and born-digital files)
14. Periodically updating inventory with folder locations and individual filenames as digitized items are returned

[11] *Ibid.*

Phase III: Long-term Maintenance

15. Assigning accountability to a steward that will maintain the physical and digital archive (e.g., oneself, a hired archivist or a third-party company)
16. A document that details a long-term plan for:
    - Monitoring the physical and digital integrity of the archives (such as with checksums)
    - Intellectual control (steward of the inventory, files and/or database),
    - Physical control (such as tracking items that are removed) of the archive
    - Expectations for stewards, owners and/or users of the archive
    - Plans for migration, long-term costs and logistics
17. Stewardship of this documentation alongside the archive
18. Updating or creating new documentation with changes to the archive (maintenance, migration, file or folder location changes, alterations and updates to inventory spreadsheets, etc.)

Considerations

This section will outline certain considerations that were made specific to Eyebeam and Laurie's projects. Within projects with limited durations or funds, such as an NDSR Art residency, the following sections may be of use in determining scope, feasibility and decisions regarding item-level selections for digitization.

Scope

It is often difficult to determine the projected scope of how many items can be processed and stabilized in a finite period of time. In terms of digitization, some procedures can be automated (optical media), while others will require individualized work, evaluation and/or troubleshooting (such as with Laurie's floppy disks). While the time required for hard drives is based on storage capacity, floppy disk identification using *Kryoflux* can be a challenging, trial-and-error process. More detail related to item-level time projections will be explored below.

Regarding Laurie and Eyebeam's archives the Small Data Industries lab was professionally equipped to handle the in-lab stabilization of the born-digital formats: 5.25" floppies, 3.5" floppies, Zip disks, Jaz disks, Bernoulli disks, Syquest, USB Drives 2.0 and 3.0 devices, Firewire 400 and 800 devices, SATA hard drives, PATA hard drives and Optical media (CDs and DVDs), As such, these items did not need to be prepared, packaged and shipped for outsourcing, which reduced some aspects of time and cost.

Selection

As the next step, heuristics should be implemented to determine which media should be prioritized for stabilization. The first consideration is the age and content of the media based on the following questions:

- What is the content of the disks? Eyebeam's extant metadata indicated original artworks. If known, Laurie can identify these at the item-level. There may also be certain media types that will prioritized above others based on external or more immediate need (for instance, Laurie requested the completion of MacLeyvier and Apple II disks to be completed first).
- How old is the given media format? Knowing the media format helps determine a date range and use of the item. Generally, the older the format, the more likely the content is original and unique.
- Are the label annotations handwritten or printed? Handwritten annotations may indicate original works, whereas printed labels are often correlated with commercial media.
- Is the item commercially produced? There may be copyright issues of digitizing and archiving commercial content. These items may not be included due to associated (and most likely unnecessary) costs
- How at-risk is this given format?[12]

When considering the digitization of an archive that includes a broad chronological span, one should consider the potential for duplicate content. Due to the time and cost required for digitization, it would be inadvisable in the long-term to digitize the entire archive without seeking to identify these duplicates.

Time

The next step in developing the scope of the work plan is estimating the time required, which factors into costs, staffing and achievability. For the full archives, the overall timeline will be dependent on the number of people working on the project, training and allocated hours per week. Regarding individual items, it is not always possible to make accurate projections. For instance, the time required for floppies will vary based on whether or not the format is known and, often, the label may be incorrect or reformatted requiring extra troubleshooting. As mentioned, the amount of trial-and-error to determine a floppy's format can vary considerably. The flux-level image only takes about 2 minutes and the sector-level image that follows takes about 1 minute. But if the format cannot be identified, this process becomes unpredictable. Further, as mentioned, whereas floppy disks must be individually processed, multiple optical media can be read at once, and the time required to read a hard drive will vary based on capacity.

[12] See: "Media Preservation." n.d. Museum of Obsolete Media. Accessed July 29, 2019. https://obsoletemedia.org/media-preservation/

Budget

The analog materials from both archives will ultimately need to be outsourced after completing the full inventory of the archive. There are professional vendors that specialize in digitization of certain formats, including analog materials. Once the counts and formats were established for Laurie, customized quotes from two third-party vendors, George Blood and Media Preserve, were requested. This provided an estimate but, ultimately, may not align with the actual cost due to a number of facts, such as damaged items that may take longer to work with (such as the damaged optical media from Eyebeam's archive). Cost is also dependent on runtime will significantly dictate the ultimate cost of the service. Thus, while inventorying audio and video items for shipment to the vendor, it will be of use to record the runtimes, if possible, in the spreadsheet. This will allow for a more accurate prediction of actual cost.

Metadata

In the future, an item-level inventory of all media pieces will be required with all pieces labeled with a unique and corresponding identifier. A final, corrected item-level inventory of Eyebeam's archive is expected to be completed by the end of the Summer 2019 since *all* of the items (analog and born-digital) are stored in the Small Data. In contrast, it is likely that only an item-level inventory of the born-digital will be completed for Laurie's archive since the analog items will not be brought into the lab (her loft contained nearly 2,000 media items, about half being analog). Thus, the digitization will be split into two phases — analog being the second (outsourcing) phase — and these items may have their own inventory, identifier and metadata system. As mentioned, this item-level inventory is particularly important prior to shipping the analog items for digitization in order to maintain intellectual and physical control of her full archive.

Prior to digitization, a metadata system (see *Appendix* for the schema that has been suggested for Laurie's archive) will be developed according to the media types and content (while adhering to published baseline requirements). Where Eyebeam's archive came with an inventory and established metadata categories (that translated to the 2019 inventory), Laurie's had to be created. It is also important that before these irreplaceable materials are sent out to vendors, that one has the ability to track their identifiers, store "before" and "after" photographs of their condition and monitor their physical movements. Thus, **before** outsourcing any items for digitization, it is important to choose and invest in digital storage that provides basic redundancy and bit-preservation, have a plan for digital organization of files, and record metadata for **all** items in the collection. Upon shipment and return of items, it is important to track the physical media and their digital counterparts as a result of the digitization for accurate inventorying and long-term data storage.

THE "NEW" ECOSYSTEM

The "new" stream of the NDSR Art project, *Something Old, Something New*, utilized field-based research to explore the broader ecosystem of contemporary media art today. It focused on the path of a time-based media art (TBMA) piece from artist's studio to gallery to private collection, looking for the problems the piece faces at each stop along this trajectory — inclusive of the interstitial spaces between. To do so, the NDSR Art resident, Rachel Ward, conducted nine (9) interviews, 1-2 hours long on average, with artists, studio staff, gallery owners, directors, international private collectors and collection managers, in an attempt to construct a comprehensive overview of this ecosystem.

This research was presented at the American Institute of Conservation (AIC) in May 2019, which concluded with four recommendations based on the needs of the stakeholders. Scheduled in AIC's Election Media Group (EMG) section, this talk was entitled *Conservators in the Wild: Collaboration with art studios, galleries and collectors.* The title is meant to call attention to the conservation needs of time-based media art (TBMA) that exists outside the walls of institutions, (that is, in "the wild") in the contemporary art market — much of which is still being negotiated and standardized. In other words, the world of contemporary art is often referred to as "the Wild West" (a phrase which also came up many times in the session).

TBMA "IN THE WILD"

Speaking from the perspective of the NDSR Art resident, Rachel Ward, the past 12 months represented an immersion into contemporary art spaces — as a contrast to her prior work in the disciplinary spaces of cultural anthropology, ethnographic objects and Indigenous rock art conservation[13]. Although the art world has "practices, rituals and customs" that were unfamiliar, the methods remained the same: observation and interviews in the field. These are often the only tools an anthropologist has in exploring new cultures in order to create primary source materials based on their independent research. Whereas past fieldwork was conducted in literal fields and escarpments — here, being "on the ground" equated to Chelsea galleries and the contemporary media art world — and interviews were with emerging media artists, gallery owners, and private collectors. These interconnected spaces are what will thenceforth be referred to as the "**ecosystem** of contemporary time-based media art".

Within this ecosystem, the concern is the **path** of a TBMA piece from artist's studio to gallery to private collection, while looking for the problems it faces at each stop along its trajectory. This work also examines obstacles in the path's **liminal spaces** and the broader ecosystem that grows over many years in terms of obsolescence in private collections, reiterations in gallery spaces and new editions from the artist. As time

[13] This is currently being translated to Rachel Ward's doctoral research in an effort to renegotiate traditional cultural anthropology themes to that of digital anthropology, media archaeology, artist archives and media art

passes, the spaces between these move farther apart — galleries close and artists retire — while complexities, particularly to the private collector grow.

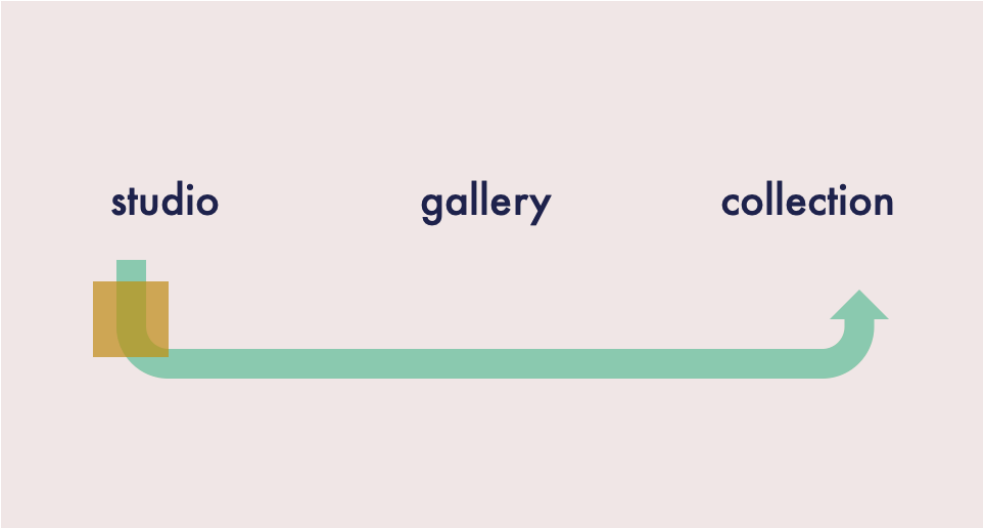

Figure 12. Depiction of the path of a TBMA object from studio to gallery to private collector

This leads to the question: when time-based media art in private collections no longer functions, **who is responsible for conservation** — the artist, gallery, installation team or private conservation practice (that is, if a collector is even aware of such services)? Within museums, established protocols and processes are in place — but where should one turn without this system of defined support? Artists often pass their work directly from studio, to gallery to private hands. Yet these important, complex media pieces are stricken with the same inherent dilemmas as those safeguarded within institutions: obsolescence, demands for migration, repair and preservation.

STAKEHOLDER INTERVIEWS

To unravel this theme, direct quotes will be presented as parsed from stakeholder interviews to esteem first-hand voice rather than post-interpretation. Each stakeholder operates in a unique space within "the ecosystem" — for instance, when an artist's work enters the gallery, when the collector reaches back out to them if a piece isn't working, or instances of reiteration for new shows in galleries or museums. Overall, the attempt was to include a broad spectrum of viewpoints to construct a more comprehensive understanding of this ecosystem, from established and emerging artists, to small and investment collectors, to the most serious, professionally managed private collections.

Artists

Introducing artists' needs is a quote conservation interview (August 2018) with an emergent iOS app artist. He said that it would be ideal to have someone to preserve an in-situ snapshot of how his work functions and looks today. He explained:

> *Something that could emulate the current snapshot would be great. And then, if I'm updating it, can you also preserve my updates? You can preserve the original, but if I send you new files and versions, can you can file those away too?*

Lastly, he asked: "yeah, if my computer gets destroyed, can I talk to you guys and get my file back? Or is that treating you too like a backup server?" He also said it would be useful if his gallery could keep previous versions, available for download. This was something he was thinking about but hadn't brought up with them yet. This point will be returned to when at least one gallery director interviewed was contemplating this very concept.

The next conservation interview (May 2019) was with a contemporary virtual reality (VR) artist. They similarly indicated that someone to maintain their archive would be of great value. Because, based on the rapid development of VR, they are constantly updating their work based on new releases of software. With each new Unix platform release, they need to create and save the updated artwork, the project file, and the new version of the software used to export that. They said, "so I need to archive both of them. What I've been doing a poor job of is archiving the software used to execute the file and creating a really neat structure for this." In other words, they would like someone to design a storage system based on these specific needs. They also mentioned that with an increasing number of "long-term museum shows with hundreds of people every day […] the survival rate of a headset is about three months […] they burn out". They contemplated this for a moment, saying, "imagine in 10 years." They are constantly creating new artworks and, in terms of perpetually returning to his old work, they said "I cannot afford this in terms of time."

Next, in an interview (October 2018) with the technical director of an internationally-renowned installation artist. The discussion surrounded the process and path the piece takes as it leaves their studio and enters into a gallery or, often, directly into a museum or private collection. When the studio couldn't send their own software and electrical engineers for the install, he explained "it's hard to hire people to handle that kind of stuff." When he has to resort to hiring AV locally, he said "they can introduce more problems." He used an example of one international installation when a word was lost in translation:

> *They were like pushing these fiber optic video cables to the wall, messing them up … I would ask a translator to explain it to them … I ended up having to go there and cut open the cable and say look, fiber optic? fiber optics? And they were like 'ohh…'*

He said when the pieces are in private collections, he generally travels there or the work is shipped back. If it is fixed locally, the contractors first need to submit a proposal for approval and then he or the artist flies

out to inspect it and certify authenticity. So, he said, generally, it takes more time to train someone to fix it than just doing it yourself. Rather than continually being called in for conservation, he said the artist wants to focus on the new stuff. Not so much on the nitty gritty stuff like creating an archive. But when it comes to repairing the work the archive is fundamental. He said he wastes a lot of time "sifting through old data to figure out how it works and who made it because a lot of TBM artists collaborate with many different people."

In sum, there was a trend that developed in the artist interviews, who all said they want to focus on creating new work rather than repairing old work. They said a solution could come in the form of someone to redundantly store and manage their archive — containing not just the master file but a library of all versions and associated software releases. The archive should also provide comprehensive documentation, such as who created or repaired the work and when. In summation, the artists need help in the development of bespoke storage and long-term archive management.

Galleries

The gallery owners and directors that were interviewed are all middle-market New York City galleries that work with contemporary media artists. The galleries shared many of the same perspectives and complications in terms of what it meant to deal with pieces that are not fixed, static, or wholly tangible. They were probed to consider aspects beyond displaying the work in the gallery, such as the transitional space the piece lives in when going *into* and *out* of the gallery.

Beginning with the same desire as put forth by the VR and iOS artist, one gallery director interviewed (May 2019) said, "I've been obsessing over the idea of offering storage our artists. Like, here's the back end to our server, and here's your 20 terabytes of space, put your whole studio up here." He went on and explained, "I think financially and mentally it's really hard for artists to think about this. I can't tell you how many times I have dealt with an artist who was having a hard drive problem". The discussion then turned to the selling of a piece that had only previously been shown in museums. He said, "we had to get a lot of information about how to prepare people's homes directly. We know how it plays back in the studio and in a museum environment. But how does it play back in a client's home?"

He went on to say, "if there were parameters set by a living artist for the future, it would make sales, maintenance and conservation easier, then going online and into a museum much easier. But that element of sales is one that's not typically ever discussed in conservation." Further, he said, "I've heard museum professionals, both curators and conservators, talk about how there's an ethical gray area with telling an artist these things […] and putting this fear of the future in them […] you might affect their output." In these regards, another interview (December 2018) with a long-established gallery spoke from this perspective as well:

> *Everything has a life cycle… every medium. Everyone realizes the fragility of the pieces: Some pop artists used house paint. Entropy is part of the thing. Things should die after a*

while. Artists used to destroy their old work. The whole avant-garde is based on 'out with the old and in with the new.' It's not a new idea.

Collectors

Lastly, this research integrates perspectives from three levels of collectors. First, a serious collector (via his full-time collection manager) that has a lifelong passion for media art and cares deeply about his collection. For instance, he has spaces built and designed for every new acquisition. Another that collects as an investment — he is buying multiples to sell. And another that is halfway in between, it seems to be an enjoyable and tech-themed interest of his. He generally buys directly from galleries or fairs and is not talking to art advisors. In the interviews, they were asked about problems they encountered in bringing the piece from the gallery into their home, and where they turn if it stops working. In the interview (October 2018) the "techie" collector, who mainly collects VR, he was asked what the process looks like when he buys a piece from a gallery:

> *The gallery will typically send me a kind of physical presentation box, with you know a couple of stickers on, a bit of glitter, and the certificate of authenticity. These works, they're not particularly high res or HD. Typically, it will just come on a USB memory stick.*

He explained that when something goes wrong with the piece, he generally tries to fix it himself. He said he has a few pieces that are stored in his closet that aren't functioning but that he intends to "tinker with." The most difficulties he's had were with DVD pieces where he was left to "unpack them and strip out the codec." Another piece that was internationally shipped to him was "basically, a high-end gaming PC" that generated the work. But when he opened the box, he saw that "it had just gotten shaken to hell. It wouldn't even turn on." Clearly, the main issue here had to do with the interstitial space — that lacunae between gallery and collector's home. Specifically, in this case, due to the need for international shipment of a physical object (as opposed to a digital transfer).

Another conversation was with a mid-level collector (July 2018) — a commodities trader, who often collects multiple editions of the same piece, ultimately to resell on the secondary market. Within moments and without hesitation, he emphatically pronounced: "there is nothing more difficult for a collector than when he's having a dinner and goes to put on this thing and it doesn't work […] and you think, oh man, I wish I just had a painting". In order for collectors to continue collecting TBM pieces he explained, "the idea is to make it easier for collectors so they can rely on the works." He remarked that issues like this in art and technology pieces are "creating distance" from collectors, although "if collectors believe in, trust and have someone behind them, then it will be much easier."

Shortly thereafter, a thorough interview (August 2018) was conducted with the full-time collection manager for a large private collector that predominately buys from blue chip galleries. She explained, "sometimes it takes years to install and we don't want to wait this long to find out something wrong or missing." They have

a personal install team in New York City, but for remote work, they often have to hire outside services. Further, she explained, the "burden of care often falls on artist when no one else can find solutions." For instance, one piece arrived without installation instructions, so she sent list of questions to the artist, but she got no response. She asked, "What should the collector do then?"

She said there is a general lack of understanding in buying and selling TBM art. She often has to personally ask a gallery for documentation at sale. And there is the "perception that once it's sold, they aren't responsible." Often "problems arise with installation or display settings […] a museum always documents this but not the gallery." Even the most basic things are not mentioned to collectors. With astonishment, she divulged that "they never even told us to use a write-blocker!" which is an established best-practice for TBMA acquisitions in museums.

TAKEAWAYS

In interviews with media **artists**, it could be surmised that concerns often stem from their old pieces in private collections that require repair. In these regards, they expressed the need for outside assistance, as well as creating comprehensive archives, documentation and customized storage systems based on their medium (such as iOS apps, VR, or installations). For the **galleries**, their needs mainly focused on a simple and easy way for them to safeguard their artists' work, storage that would be synced with the artists' studios for new versions and updates, as well as a way to document the artist's specific parameters for iteration, installation and repair. Lastly, in the interviews with private **collectors**, it was apparent that they desired a change in the viewpoint that once they buy a piece, they are the sole party responsible — or at the very least standards of documentation and installation instructions. Often the most basic things are not mentioned when they purchase a piece from a gallery (such as the collection manager's write-blocker debacle). Finally, collectors want to trust that if something goes wrong, there will be a defined system of support.

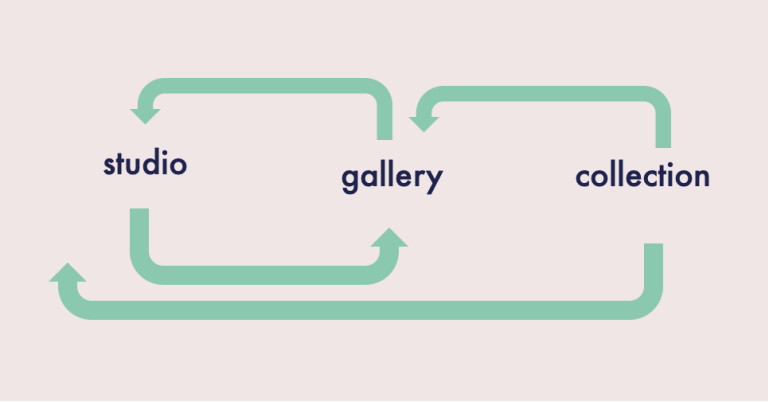

Figure 13. Depiction of the contemporary media art "ecosystem"

RECOMMENDATIONS

In looking forward to collaboratively develop recommendations for these problems, it was clear that many of these issues would have established standards of protocol and systems of support within museums, such as on-staff AV teams and conservators. But when these problems arise "in the wild," new strategies must be conceived, often on the fly (as one gallery director put it), to address these urgent and, what could be very expensive, concerns. It seems that needs which occur outside the walls of institutions could be provided as a **service**, such as managed archives and storage (such as a simple and affordable monthly subscription for management). For current and **future** collectors of TBMA, there needs to be this type of trust that there is a system of support that will safeguard their investment.

SYNTHESIS

This section represents the theoretical and methodological synthesis of the old and new project streams — when their bisecting courses reunite in a mutual recommendation of **preemptive conservation**. These preventative considerations should be discussed in all spaces — that is, "**new**" archives from emerging artists as well as stewards of "**old**" obsolete media archives. The following provides an overview of some relevant questions that could aid in the development of custom strategy based on goals and visions for the artists' archive and legacy. It reiterates many of the points put forth in the *Eyebeam* and *Laurie Spiegel* archive sections — in combination with the "new" gaps and needs discovered within the *Ecosystem* interviews — in an effort to synthesize old, new, needs and divergences that inform each other in the development and innovation of best practices.

PREEMPTIVE CONSERVATION

Although Hurricane Sandy left Eyebeam's archive in a state that will never be fully recoverable, it did provide critical insight into oversights that were made at the time (although inevitable under the circumstances) to develop *new*, necessary best practices that now must be carried forward. As Roderick Schrock, Director of Eyebeam, explained, the current problem with the archive was not only the damaged sustained by Hurricane Sandy, but the lack of planning that led up to that situation. This involved inattentiveness to physical storage and a lack of intellectual control (with no existing record of what it contained) even before the catastrophe. In other words, it was in a state without any control or preemptive consideration for potential dangers. In a practical sense, going forward, this proffers a case studio in worst-case scenarios as to what can happen to vulnerable, unprocessed and undocumented archives[14]. Although singularly tragic, it reiterates the urgency in enforcing guidelines and accountability to protect non-institutional archives.

As such, the following concerns apply equally to stewards of established *old* archives and young artists who are seeking guidance at the ground-level to begin preserving their *new* work. Answers to these questions may inform hands-on work and iterative analysis to form strategies for the long-term viability of the collection and methods for future digitization. As indicated, although the full-stabilization of Eyebeam and Laurie's archives supersedes the current project's scope and timeframe (the 2,000 analog items in Laurie's loft could take many months), the process still created meaningful to develop important frameworks in terms of methodology, established best practices, and future projections. As introduced in *Methodology*, for both **new** and **old** archives, whether to **regain** or **inaugurate** intellectual and physical control, the following questions should be considered:

- Where is the archive going to be stored physically and digitally?

[14] Cf. Anderson, Laurie. 2018. *All the things I lost in the flood: essays on pictures, language, and code*.

- What are your access/information needs?
- What is your budget for storage?
- Requests for storage plan or providers?
- Who will prepare the remaining items for preservation?
- Is there a need for outside assistance? What is the budget for such? (i.e., a professional archivist or grad student)?
- What do you want to do with metadata being created?
- Will it be a spreadsheet or database?
- Will it be stored on-premises, or external cloud storage?
- Who will steward the inventory and **digital** files?
- Who will protect and maintain the **physical** archive?
- What else is needed for stewardship in the long-term?

Determinations of storage may prove to be one of the more challenging aspects of the process. Predicting how much storage space will be required can prove difficult as there are many unknowns; for instance, actual run-times, born-digital capacities, or the amount of duplicate content cannot be known until digitization is complete. Nonetheless, considering the significant cost of digitization, the files created as a result of digitization must be maintained with care. A carefully developed plan for storage will help to ensure the investment of digitization is effectively protected, as the primary and final steps of safeguarding an artists' legacy.

STEWARDSHIP

Following the return of Laurie and Eyebeam's items from the Small Data Lab, stewardship of their archives will need to be assigned and established, preferably to one individual. For all archives, old or new, limited access and interaction with the objects and files, could, potentially, prevent complications related to loss of intellectual control — such as files being shared, edited or lost across multiple drives or computers. It would also ease the process related to employee turnover; that is, if a new steward of the archive comes on, it could simplify training and the transfer of materials and documentation. For whomever will be managing an archive, whether new or old, they should be comfortable and accountable for the following:

- Stewardship of the physical archive: ensuring that the appropriate climate and temperature conditions are maintained in the room where the archival boxes will be stored.

- Periodically ensuring that items are correctly organized within the boxes. A tracking system in the central inventory may also be of use if multiple items are being removed from the archive at one period of time[15].
- Stewardship of the final inventory. Guardianship of this file is of the utmost importance in maintaining intellectual control of the items, as well as allowing for identification of individual media items in the physical inventory.
- Similarly, one person should be responsible for guarding and maintaining the digitized media files, inclusive of:
- Establishing a file-naming system for digitized files
- Establishing and maintaining folder naming and structures
- Ensuring that there is a permanent location on the digital storage system, with a regularly updated backup location (particularly if the entire digital archive is stored on a shared server as the entire archive could be inadvertently deleted).
- Intake of any new digital files into the appropriate file-naming and folder system; as well as entering this information into the Inventory spreadsheet.
- Ensuring that checksums are valid and that no files are corrupt.

In other words, in addition to simple storage decisions, careful consideration will need to be placed on establishing what will be captured in that storage and a meticulous system for doing so. In the future, it would be of value to implement a requirements list for new work that is produced to ensure that their most crucial data is packaged for preservation. That is, the preemptive adoption of the naming schema and metadata system that aligns with the structure of the digital archive (rather than retroactive filenaming). Following that, the data must be checked periodically to ensure they are not facing which should be automated through a checksum process.

ACCESSIBILITY

Per the conversations with Eyebeam, if this process had been considered 20 years ago, it would have mitigated many of the complications that are being repaired, with urgency, today. Where the archive could have faced a certain death due to obsolescence, it is now being resuscitated and given a second life. Rather than cloistered in a vault, Eyebeam Director, Roderick Schrock explained that he would like this to exist as a "living" archive. As he thoughtfully posed, "what does continued life mean for something like this? What does it look like? How will it need to be fed and adapted in order to live? And how can facilitate

[15] It may also be advantageous to direct any internal or external requests for archival media to the sole steward. This would prevent issues associated with physical disorganization within the archival boxes, increasing liability associated with loss or damage to borrowed items.

that? Who at Eyebeam will be responsible for this? And what will Eyebeam look like then?" These questions should also be posed in regard to incipient artists' archives; i.e., what is the purpose of it? Who is it for? What should it look like in 20 years?

In line with Eyebeam's mission, Roderick also stressed the social importance of considering how this archive can be made public and accessible. Following Eyebeam's history and dedication to the not-for-profit, he would like to ensure there is accessibility to the rich and meaningful content of this archive. But to do so, he explained, would need to define what "accessible" means. It would be ideal if Eyebeam could innovate this type of access and become exemplar of what open-source access could be for an archive like this. But there also needs to be consideration and what should be made public — access should not be entirely unbridled — in other words, there are many intellectual property (IP) and copyright issues to consider. Thus, the return of the archive, in the future of Eyebeam, may not just be about guardianship and stagnancy, it may elicit interesting questions, projects and innovations for future stewards of the archive. Taken in summation, these important concepts should be considered for Laurie new artists' archives for pre-emptive, rather than salvage, conservation.

S H A R I N G

Laurie and Eyebeam's archive are invaluable to the cultural and artistic record and preservation is urgent in order to prevent a complete loss of content. For other small institutions or independent artists facing similar, pressing challenges, this project may form the basis for old and new and new archives alike. For instance, by translating this report into an open-source published handbook, it could aid archivists who may encounter this type of urgently at-risk media in their work or simply want to adopt best preservation practices now. This NDSR Art project focused not only on quantifiable item-level preservation but considerations of methodological approaches, holistic perspectives of the nature of the archive, and the constantly-evolving needs and gaps that lead to new conservation technologies — essential for access and integrity. The future unpacking, writing and distribution of this project is essential in making a contribution to larger audience of specialists and non-specialists who must make critical decisions about their own urgently at-risk media, where imminent and inevitable obsolescence and physical decay threatens the preservation of their work and legacy. Importantly, the collaboration and sharing of knowledge from institutions and private practice is paramount to preserving this legacy. Museums (for instance, the Guggenheim's Variable Media Initiative) and non-profit organizations (such as Matters in Media Art and the Joan Mitchell CALL program) provide open-access handbooks for artists for legacy preservation. These altruistic endeavors have proven invaluable to the field, yet dawning innovations often occurs outside of the walls of institutions, that is "in the wild," and it would be of great public value for independent and private practice conservators to also share their work in published, accessible guides for unrepresented artists without the funds to employ their services.

SUMMARY

This year-long NDSR Art residency focused on "old" (Eyebeam and Laurie Spiegel's) and "new" archives of time-based media art (TBMA). **Eyebeam** is a prestigious artist-in-residency program in Brooklyn that supports tech-artists who work on projects related to social justice. Since they were established in 1997, they have hosted renowned artists such as the late Carolee Schneemann and Cory Arcangel. Initially they were based in Chelsea but when hurricane Sandy hit, the majority of the archive was severely damaged. Since Sandy, the full archive (about 1200 obsolete media items) has lived in boxes and filing cabinets. It needed inventoried, organized and a plan for preservation and access. The project began by packaging the media and bringing it to the **Small Data Industries** lab.

To return the archive to Eyebeam in a "living" and accessible state, the stabilization process focused on **regaining** control. In these regards, the most complex of these proved to be regaining **intellectual control** due to the dissolution of stewardship and digital organization over the years. To recap, three (3) separate inventories were inherited, thus each item had up to three different ID stickers. Following the unraveling, structural deciphering and data-interpolation of the discordant intellectual data, the goal was to regain **physical control** by stabilizing the 750 media items (formats that can be handled in the Small Data lab). This process will be completed through Summer 2019, while synchronously compiling the new stabilization information. Overtly, the broad goal is to leave the archive in a better state than when it was picked up from Eyebeam at the start of the project — with one final inventory with a uniform identifier system, all media labeled and organized into archival boxes, and long-term plan for a safe return and life at Eyebeam.

The second "old" archive is that of **Laurie Spiegel**. Amongst many of her impressive accomplishments, Laurie was an early pioneer of electronic music, some of which was included on the Voyager Golden Record (1977) that was sent into outer space and in 2019, she was inducted into the Women's hall of fame. Through this prolific career, Laurie has created and accumulated over 2,000 pieces of at-risk analog and digital media items and computers, representing her software work at Bell Labs, algorithmic music programs that she coded, and analog instrumental tracks. In other words, the full body of work that she coded, documented and collected over her lifetime is stored in non-archival conditions in her home loft. Thus, unlike Eyebeam's archive which required **regaining** control, Laurie's was about **inaugurating** intellectual and physical control from the ground-up.

Laurie's archive contained media pieces (such as 30-year-old floppy disks) that were significantly older than Eyebeam's (which was founded in 1992). Although decades "younger," Eyebeam had media formats that were equally at-risk for obsolescence including zip disks, optical media (CD and DVD) and MiniDV's. Thus, the process and strategy ran parallel: inventories were created for Laurie's archive (about 900 analog items and 1,145 floppy disks) and repaired for Eyebeam's (about 1,270 items). The stabilization of the archives will continue through Summer 2019, equating to a prepared physical archive (archival housing boxes) and digital archive (photographic inventory and disk image of each item, see *Appendix*).

The "**new**" stream of this project diagrammed a metaphorical ecosystem of emerging media art today — specifically, the path of a TBMA piece in the contemporary art market, investigating the problems the piece faces at each stop along this trajectory — inclusive of the interstitial spaces in this path. To do so, interviews were conducted with studios, gallery owners and directors, and international private collectors. What followed was four recommendations for the preservation of "new" TBMA: managed archives, safe storage, trusted support and a support system that is simple and affordable (such as a monthly subscription for management).

Lastly, in consideration of the **synthesis** of the *old* and *new*, the major takeaways had to do with preemptive planning, whether in terms of repair (Eyebeam) or construction (such as for Laurie and nascent archives). This report attempted to meld past, present and future TBMA archive methodologies related to inventorying, media stabilization and long-term preservation work plans. For all archives, this is founded in preliminary stakeholder questions in order to design a strategy that meets their needs in terms of storage, access, stewardship and budget. Needs for both "old" and "new" equates to the development of an accessible model for sustainable long-term stewardship of artists' work. This entails an ongoing preservation plan for basic media stabilization and asset and information management. In mapping out this process, this NDSR Art work could serve as a case study and prototype for other organizations, artists, conservators who have similar archives and are unsure about how to manage their collection.

Most importantly, the synthesis of past and present will always equate to that of focused control — inaugural control in Laurie's older archive or young artists' "new" archives — whereas Eyebeam's was about regaining control. As was learned from the Eyebeam project — learning from past mistakes is an invaluable tool that shapes decisions in developing new systems for future artists' archives. This directly feeds into the "new" ecosystem research to inform emerging artists' needs now for preventative conservation rather than salvage repair. Thus, in this report, the attempt was to illustrate this methodological synthesis to better preserve artists work going forward, particularly outside the walls of institutions. Alternatively, these methodologies that are created outside of those walls ("in the wild") by independent conservators and private practice should consider sharing their work and practice — ideally in non-specialist language — for a larger audience of unrepresented artists or archive stewards without institutional backing or funding. This would serve the greater good for preserving individual artists' legacy, ultimately contributing to a more accurate, comprehensive and unbiased archival record of our cultural history.

CONCLUSION

After a year of working in these spaces, the significance of what it means to operate outside the walls of the institution became palpable. Every stakeholder and object that interacted with this project existed in "the wild." That is, both the "old" (Eyebeam and Laurie) and the "new" contemporary TBMA (artists, galleries and collectors) operated outside the demarcated walls of certain institutional protection. They were often left to their own devices to deal with the functionality of their work which, due to the complexities of media objects, left little time to devote to its safeguarding. Artists generally do not have time beyond the creation of new work nor the specialized training to establish their own protected archive. As such, in doing this work, it is important to consider the what **'grassroots' archiving** might look like — such as for a solitary artist or a non-profit organization with a few employees.

This concept was explored in NDSR Art resident Rachel Ward's Capstone *Breakout Session* (June 2019), "Studio Archives: Strategies for Assembling an Artists' Archive from the Ground Up." This workshop put forth an introductory workflow and list of resources — in the form of a one-page handout (see *Appendix*) — particularly for individuals who are initiating this work on their own. The intent of this workshop was to share the resident's own knowledge gaps that were encountered early on in the course of this NDSR Art project — and the auto-didactic resources that were utilized to fill them. This handout represents a compiled list that proved to be the most useful in gaining a basic understanding of the concepts and workflows associated with artist archiving. Approachable materials, such as this handout, are an important element of this project's output — that whether or not there is money or institutional backing, it is important to create simple and open-source templates for **autonomous legacy preservation**. As put forth in *Recommendations* for the "new," this is founded in preventative conservation rather than salvage repair. Here, the methodologies for the 'old' (salvage) and the 'new' (preemptive) should represent constantly-evolving composites to best preserve work going forward, particularly for unpresented artists and **artists-in-need**.

Due to the importance and value of time-based media art (TBMA) work that exists in 'the wild', new practices are needed in the field of conservation that similarly operate outside the bounds of the institution. Independent media conservators could provide this support for the nascent work of a new, emerging artist, or resuscitate life into an old, aging archive. Within the contemporary art market, they could strengthen weaknesses with prudent and solution. In doing so, it could **pre-emptively safeguard** the legacy of artists — and by protecting works in private spaces, it may make TBMA more collectible. This could financially facilitate media artists to sustainably continue working in this medium for years to come. Importantly, these defined spaces of need may open up new roles and **career opportunities** for emerging media conservators, in the collective goal to preserve a global artistic legacy — from small art pieces "in the wild" to priceless artworks in institutions.

With these new career opportunities, this report will conclude with the suggestion that emerging archivists and conservators consider their role in the unconscious shaping of 'the archive.' That is, in addition to practical hand-on conservation, it is important for practitioners to develop a deep awareness of archival

theory and arguments — particularly as related to biases that exist within the cultural record. In conjunction with a final extrapolation of the 'old versus new' — where, throughout this report, *new* has been indicative of *now* — it is consequential to consider what 'new' means in terms of perpetuity. That is, what the **responsibility** is, as archivists, in assuring potentially flawed or adulterated foundations of the *old* aren't metastasizing inaccuracies and biases into the *new*. For archives are what create "societal memory" where "archives become the social basis for and validation of the stories we tell ourselves," yet only "some can afford to create maintain records, and some cannot."[16]

Drawing from published research, it is argued that, throughout history, "archives are established by the powerful to protect or enhance their position in society" and, since the Middle Ages, there has been a "systemic exclusion of women from society's memory tools and institutions, including archives."[17] Andrea Noble refers to this as "the male dominated art-historical institution,"[18] where historically men governed these institutions and — consciously or unconsciously — made decisions about "what becomes archives and what is destroyed."[19] Through inclusion or disregard, they left their imprint on what society now accept as fact and history. There has been a push towards a 'feminist archival excavation' in academia to give voice to "women artists overlooked and neglected"[20] in this realm. Where the privileging of the male voice —both in art and society — can be learned and/or subliminal, there is the inevitability that "**certain voices will be heard loudly and some not at all**."[21]

Fortunately, these once unheard or faint voices are becoming louder through the perseverance and courage of the women supporting each other in the *#metoo* movement and recent media attention proving the purposeful exclusion of women in museums, history and contemporary society. Although this work often exists far outside the bounds of the applied work of archivists — as individuals who may be the sole stewards of this singularly tangible form of "societal memory" — it implores interdisciplinary cooperation in the development of the recognition that "archives have the power to privilege and to marginalize. They can be a tool of hegemony; they can be a tool of resistance."[22] This point is paramount to remember in the creation of a shared vision of society where 'the archive' is the source of our cultural memory. Additions, modifications and deletions are the archivists' actions that create and permeate our contemporary and future realities — as the "facts" that will be resounded by future generations of students, conservators, artists and researchers.

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[16] Schwartz, Joan M., and Terry Cook. 2002. "Archives, Records, and Power: The Making of Modern Memory." Archival Science 2 (1–2): 13.
[17] Lerner, Gerda. 2011. The creation of feminist consciousness: from the Middle Ages to eighteen-seventy. New York: Oxford University Press, as referenced in Schwartz & Cook, 2002:7.
[18] Noble, Andrea. 2000. "Tina Modotti Image, Texture, Photography." Albuquerque: Univ. of New Mexico Press, xxxiii.
[19] Schwartz & Cook, 3.
[20] Noble, xxxiii.
[21] Schwartz & Cook, 14.
[22] Ibid, 13.

Author Bio

Rachel M. Ward (NDSR Art Resident 2018-19) is a Ph.D. Candidate focusing on digital anthropology, media art, archives, gender and technology. Following her B.Sc. in the physical sciences, she earned her M.Sc. in **Social Anthropology** from the London School of Economics. The following year, she was awarded the Rotary Ambassadorial Scholarship to complete a postgraduate degree in **Visual Anthropology** (G.Dip.), training in documentary filmmaking and rock art conservation. Now, as a doctoral candidate in the Making Culture Lab in the School of Interactive Arts & Technology (SFU), Rachel's work converges on **Digital Anthropology** and the creation of interactive-experimental ethnography for the embodied preservation of cultural knowledge. She has produced several documentary films and haptic anthropological art installations which she chronicles in a recent book chapter in Digital Echoes (2018). Currently completing her doctoral research, she is working in the studios of late-career women artists who pioneered new forms of technology in their work in New York City (1970-90's) and who are now facing the social- and technical-complexities of archiving their work.

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APPENDIX

RESOURCES: STUDIO ARCHIVES

Breakout Session // Studio Archives: Strategies for Assembling an Artists' Archive from the Ground Up // Rachel M. Ward

You enter an artist's studio filled with physical artwork, letters, receipts, photographs, old computers, negatives and floppy disks — what do you do next? This workshop starts at the ground-level of creating an artist's archive. It introduces a list resources for "DIY" archiving, followed by free-form brainstorming based on our own unique archival situations, challenges and unknowns to share knowledge and collectively suggest solutions.

1 / BACKGROUND

DIY Archive	callresources.org/diy-archive
Case Study	joanmitchellfoundation.org/blog/the-artists-archive-case-study
Podcast: Artist Estates	hyperallergic.simplecast.com/episodes/what-should-artists-do-with-their-work

2 / HANDBOOKS

Artist Studio Archives (ASA)	artiststudioarchives.org/resources
CALL Legacy Planning	callresources.org/career-documentation
CALL Estate Planning	callresources.org/estate-planning-workbooks
ARLIS Artist Files	artistfiles.arlisna.org/maintenance-recommendations-for-artist-files

3 / NON-PROFIT + WORKSHOPS

Volunteer Lawyers for the Arts	vlany.org
Artist Archives Initiative (NYU)	artistarchives.hosting.nyu.edu/Initiative/symposia
Arts & Business Council	artsandbusinesscouncil.org/for-artists/
Community Archiving Workshops	communityarchiving.org

4 / FOR-PROFIT

Art Legacy Planning (ALP)	art-legacy.com
Artist Estate Studio	artistestatestudio.com
CALL Legacy Specialist	joanmitchellfoundation.org/artist-programs/call/specialists/
GYST Services	gyst-ink.com/artistservices

5 / WEB ARCHIVING

Web Recorder	webrecorder.io
Wayback Machine	archive.org/web

METADATA: EXAMPLE SCHEMA

The following represents the metadata schema that was recommended for **Laurie Spiegel's archive** in order to initiate the digitization process and for the long-term discoverability of items in the archive:

Metadata	**Description**
Inventory Date	Date the unique identifier (ID) was assigned
ID	Unique identifier associated with each media piece
Location (Loft)	The general loft area (Bedroom, Filing Cabinets, etc). These can be numbered on a floor map.
Title	Title of the media piece
Artist	Creator of the media item
Year Created	Year the media piece was created (or copied)
Category	What the media contains (Documentation, Master, Assets, etc)
Media Type	Video, audio, data, etc
Format	VHS, U-matic, hard drive, etc
Metadata (housing)	Printed material on the item's case (if it has one)
Metadata (media)	Printed material on the media object itself
Container Annotations (Printed)	Printed labels on the external container/housing
Container Annotations (Handwritten)	Handwritten notes or labels on the container/housing
Stock (if known) / Manufacturer	Brand (Sony, Memorex, etc)
Media Standard(s) Capacity	Maximum capacity of the media with indication of type (mb, min, inches, etc)

Media Length (min)	Duration of recorded materials on media item
Data Capacity (mb)	Maximum capacity of the media
Playback Mode	What method should be selected for viewing the media, such as shuffle play or repeat play
Condition	Good or Bad (if bad, details as to why in "Condition Notes"
Physical/container risk	Details on damaged containers / physical damage on media
Condition Notes	Relevant notes to condition
Priority (scale 1-3)	Priority based on risk and uniqueness of media contents
Original Art (Y/N)	If item contains the original (non-duplicated) material
Preparer (for stabilization/digitization prep)	The individual's name who is inventorying and packaging the item for shipment to digitizer
Date of Shipment to Vendor	The date the item is shipped to vendor
Out for transfer (Y/N)	Changing this from 'Yes' to 'No' once the item is returned with digitized copy
Digitized/Stabilized (Y/N)	Select 'No' if item was not selected for digitization or if the item was too damaged for the vendor to stabilize
Digitization/Stabilization Date	Date the vendor digitized the item
Digitized/Stabilized By (and/or Engineer Name)	Name of the vendor (or, if possible, the name of the Engineer) who digitized the piece
Digitization/Stabilization Notes	Any notes included from the vendor about this item
Physical Location (original item)	Final location (in loft) of the original piece
File Location	Where the digitized file is now stored (folder name and if it is on a hard drive, database, etc)

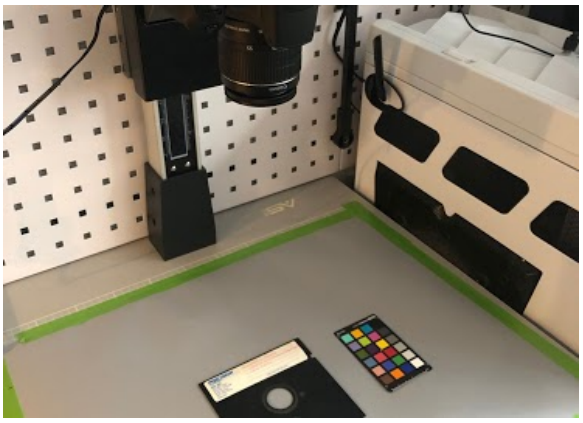
File Name	Full file name
Checksum/MD5	The unique checksum assigned to this file

HOW-TO: KRYOFLUX

This tutorial was created in preparation for the stabilization of Laurie's archive using **Kryoflux**, a software that reads data on a floppy disk to determine its format and create a disk image of the media's data that can then be saved and stored (alongside an associated checksum) for long-term digital preservation. In order to capture the data, one first needs to create a **stream file**. If one only created the **profile image**, it could fail, and it wouldn't be clear why. The stream file is what allows one to see why this process may have failed (for instance, by incorrect **physical identification** such as if the disk has been reformatted without receiving a new label). If this is the case, the profile can be changed accordingly for a second attempt.

A Three Step Process

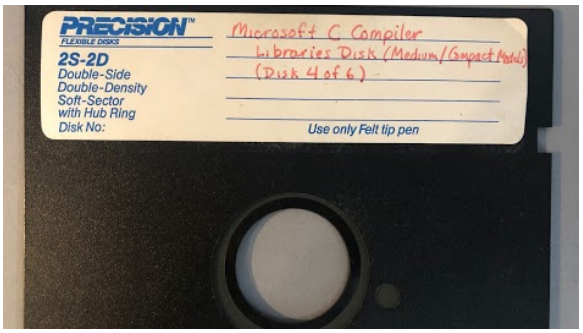
1. Physical Identification (label, notches, photographing)
2. Stream File using Kryoflux (reading the data to confirm the label's format)
3. Profile Image (the disk image)



Physical Identification

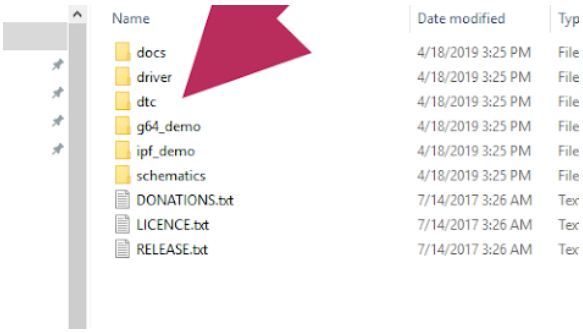
Capture a photo of the media with new ID labels (where appropriate) and establish unique identifier system, if possible, using a photo table setup

Ensure that the original label with annotations is in the photo, along with the ID sticker that is (or will be used) in the inventory (note: sticker not shown here)



Note the format as indicated on label. Here it reads "Double Sided Double Density" (see the section *Media Identification*, below)

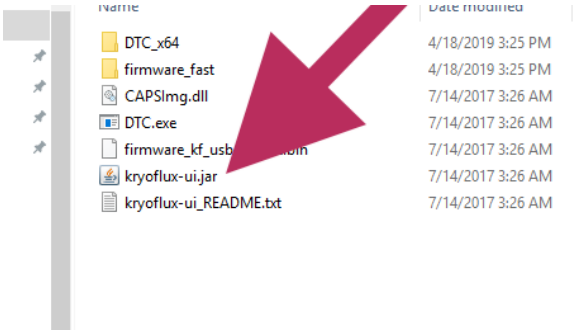
Note: that all media can be reformatted, and that label is not always a valid indicator of the format



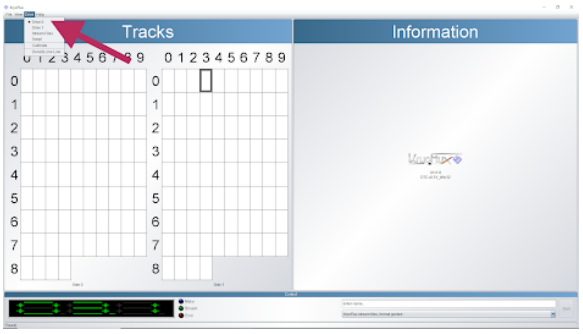
Kryoflux

In Kryoflux folder, open:

> DTC



> ul.jar



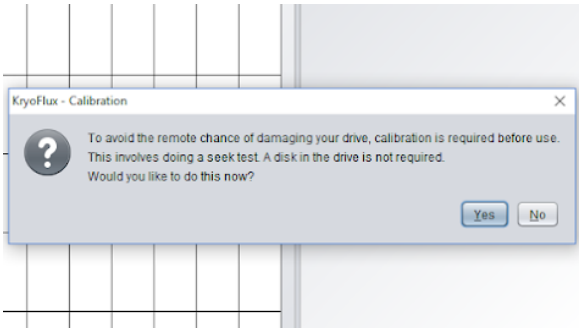
Select the correct drive, in this instance:

Drive 0 = Floppy 5.25"

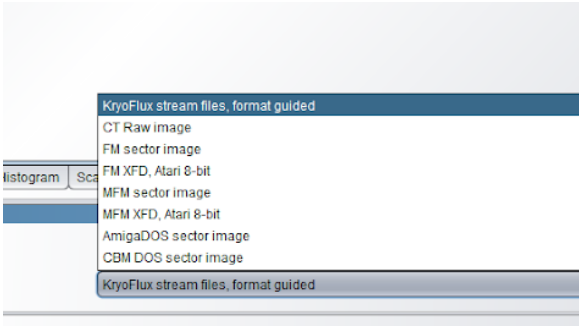
Drive 1 = 3.5"

Make sure there is no disk in the drive and calibrate it to ensure that it is sure it is running properly:

Menu > Drive 0 (dot indicator) > Calibrate

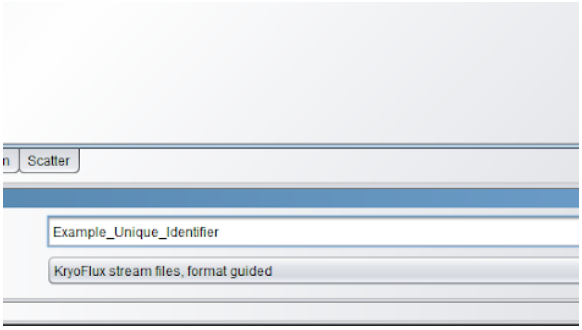


Select 'Yes'

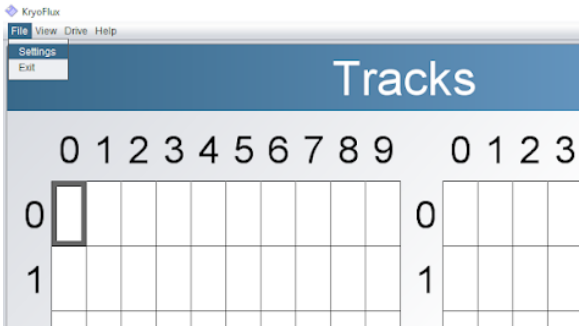


Create the Stream File

Lower right corner

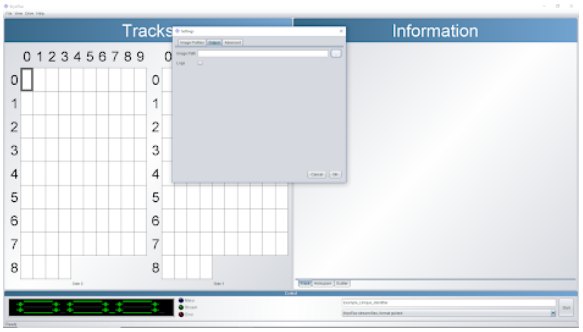


Name the disk image incorporating the media piece's unique identifier

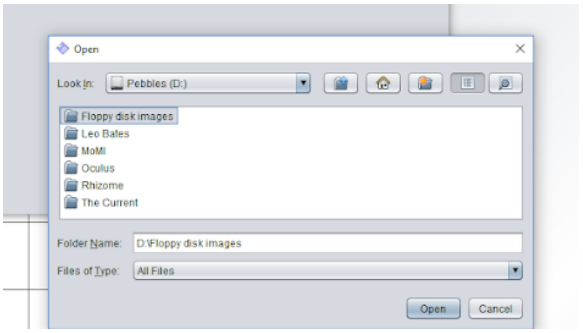


Select where the stream file will be saved

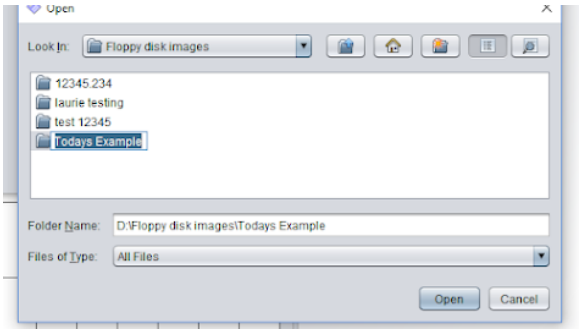
File > settings



Select the 'Output' tab

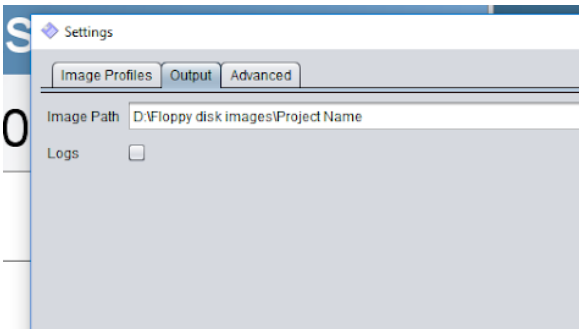


Create a new folder here incorporating the project name



Create a subfolder named with the unique identifier

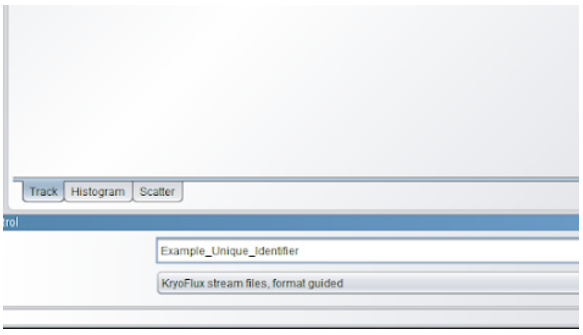
This folder will ultimately contain two photos and two types of disk images



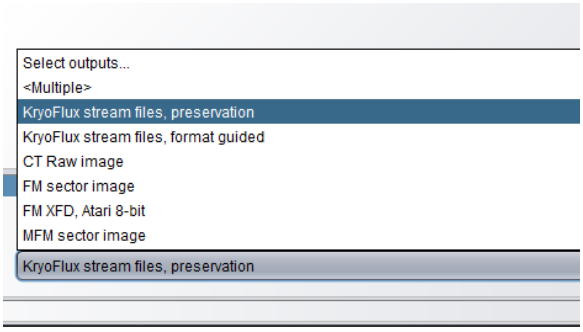
Confirm that the image path is correct and select:

Settings > Output > 'Open'

Insert disk into the drive (in this instance 'Drive 0')

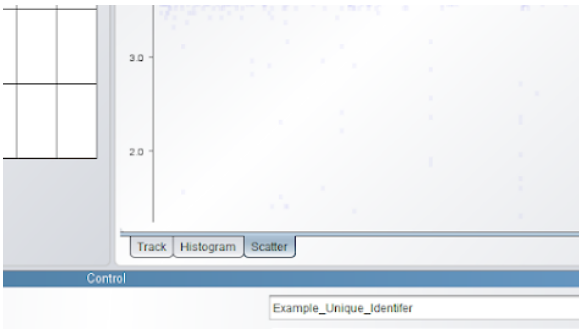


Return to lower right corner



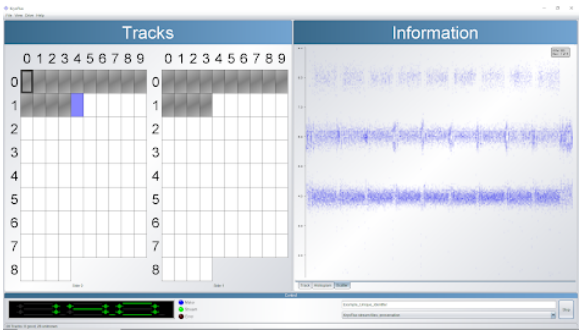
Select "Kryoflux stream files, preservation" from the drop down

> 'Start'



Select the 'Scatter' tab

This creates scatter plots of the stream files to evaluate the geometry to confirm whether or not it matches the format printed on the label



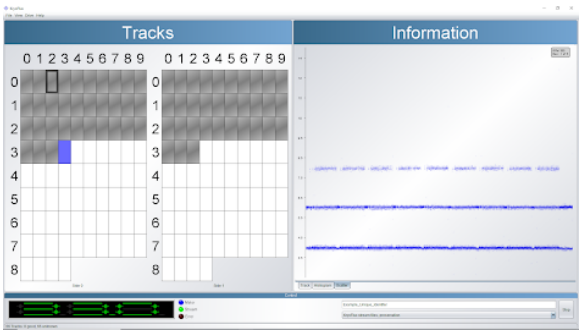
Reading the Stream File

Boxes = represent disk sectors

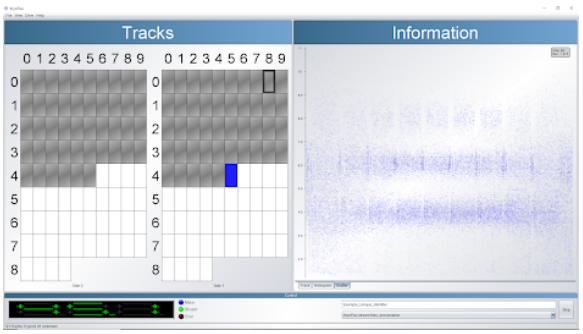
Tracks = represent the disk's front side (left) and the flip side (right)

Wave forms = represent data

Dots on scatter plot = white noise (no data)

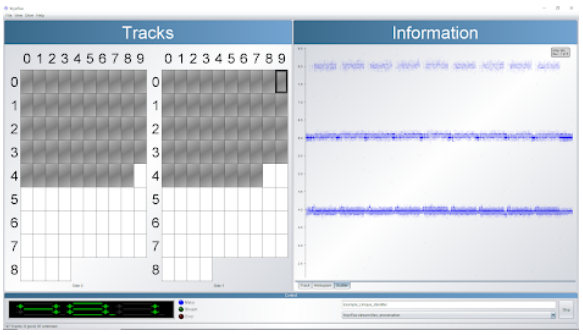


Scan mouse across boxes to note each sector's its scatter plot (stream file)



For instance, in this box (see image at left), white noise shows no data exists in this sector

Whereas three sold lines represent data



In this instance, there is data on every other sector on both tracks (both sides of the disk)

Thus, this scatter plot indicates a double-sided double-density format

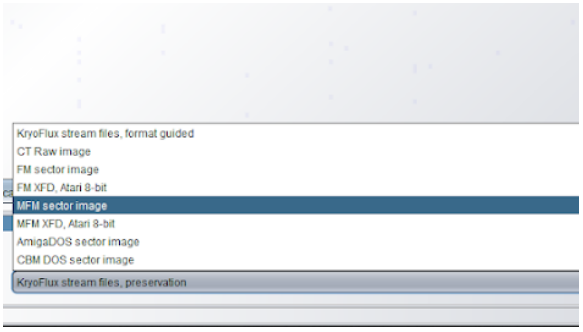
***But** our label said it was "single sided"*

In this case our label does not match the disk

Creating a Sector Image

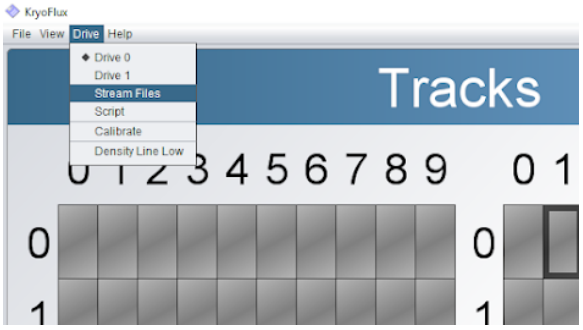
The next step is to create a sector image (reading the stream files)

First, **remove** the disk from drive



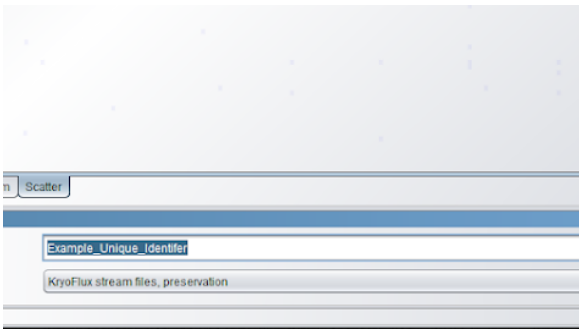
Select a profile that is equivalent to the geometry of the disk. Consultation with a published reference guide will be required to complete this step[23]

In this instance, because it was confirmed in the last step that this is a double-sided, double-density disk; select "MFM sector image"

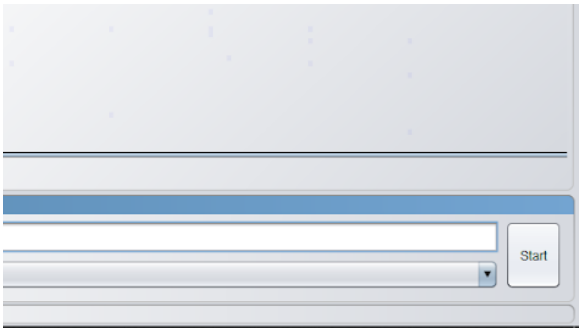


Drive > Stream Files

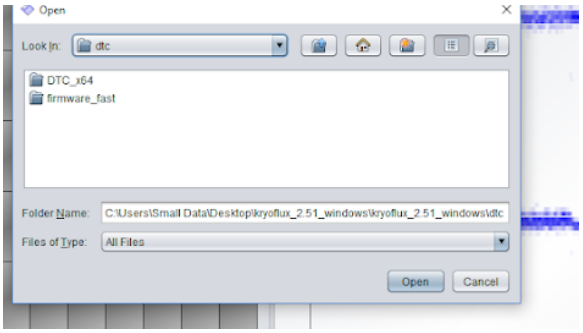
[23] Reference here: https://en.wikipedia.org/wiki/List_of_floppy_disk_formats



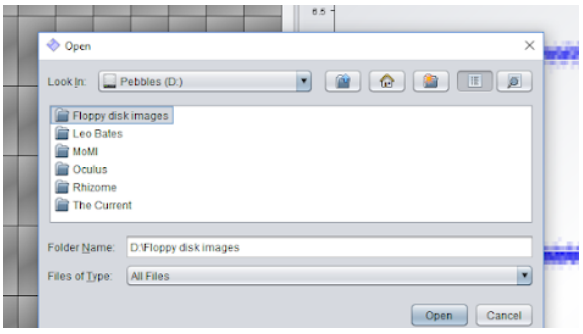
Name it the same unique identifier



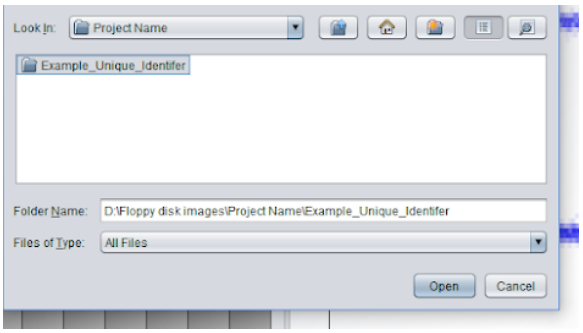
> 'Start'



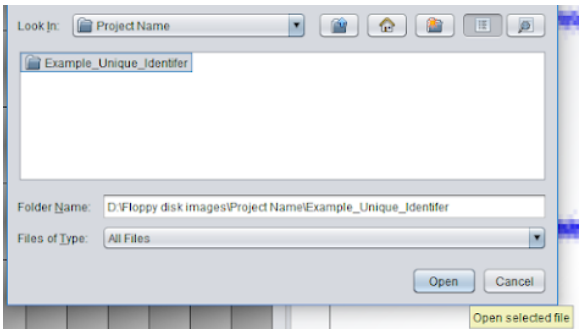
Select the location of the stream files



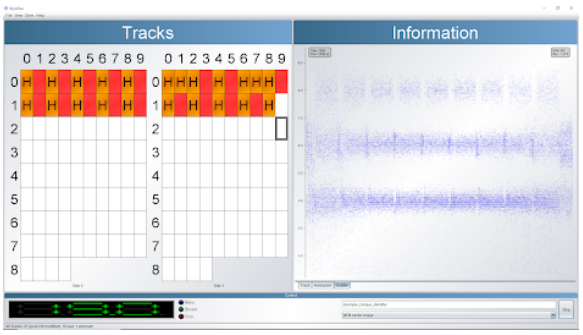
Save in the folder created in previous step



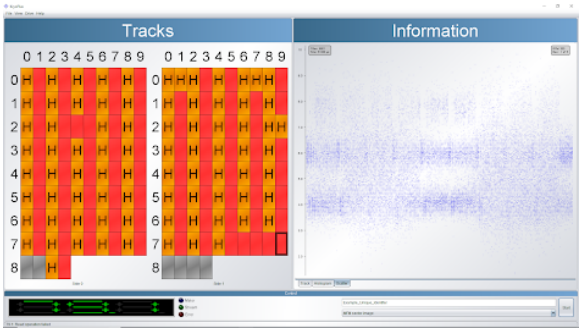
Select the name of the identifier (the new folder generated by Kryoflux)



> Open

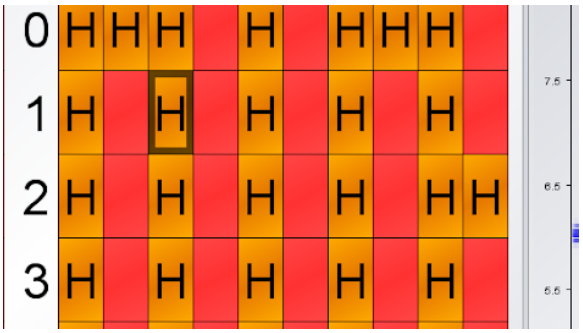


This will quickly convert stream files into usable sector images

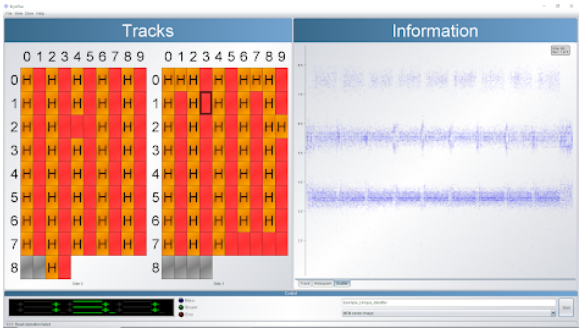


The raw data in the stream files can now be interpreted according to disk files

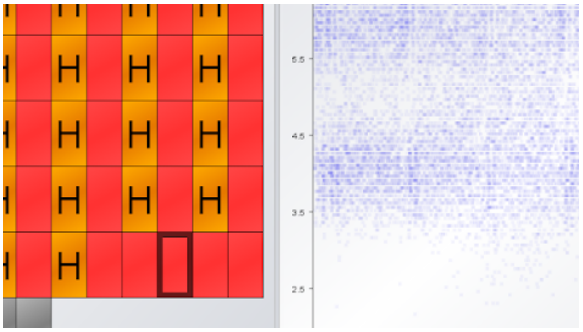
Note: if the "MFM Sector Image" profile is not correct, this process will result in a "fail" message



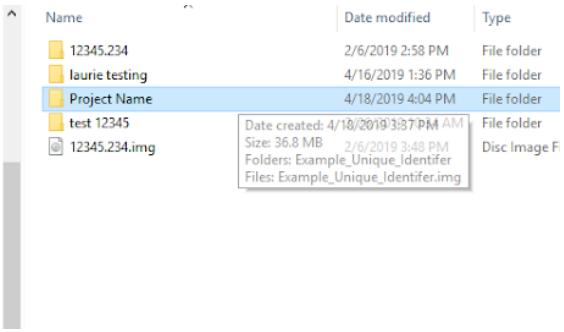
If it is correct, the boxes will appear as orange



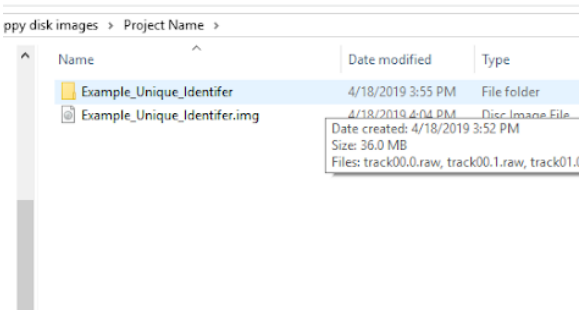
Thus, in this instance, the profile also indicates what was expected: double-sided, double-density



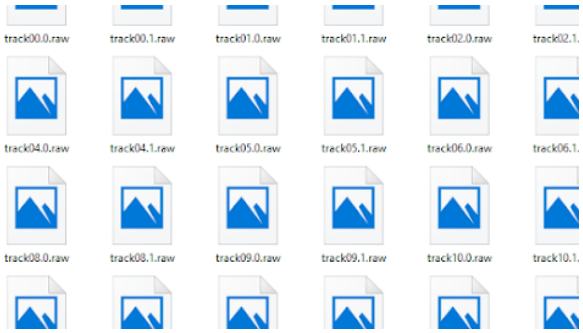
Although, in this case, there are some bad sectors (red). This could be due to physical damage on the disk.



Now return to folder to see the 'bucket' that was created here



It will now contain the sector image and stream file folder



Each new sector image will now appear in the new folder

Tutorial created by Rachel Ward, as demonstrated by Ben Fino-Radin (2019)

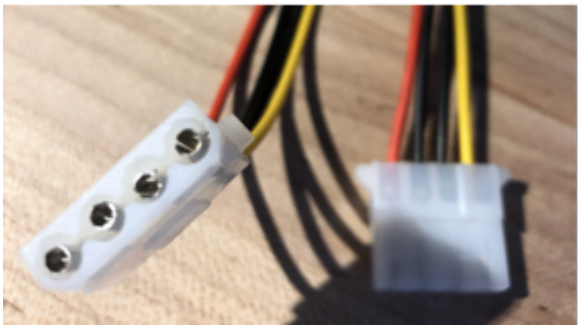
HOW TO: FTK IMAGER

This tutorial illustrates how to create a disk image using FTK Imager software. The first step is to follow best-practice instructions for connecting the media (in this instance a hard drive) to a computer using a write-blocker. It is important to note that there are various write blockers and connections dependent on the media item. This section serves only as an example to illustrate what a write-blocker setup may look like.

Write-Blocker Setup

Write-Blocker Setup

The first step is connecting the write-blocker to the media. Connections will vary by media type (some examples are included below).



Connection Example 1:

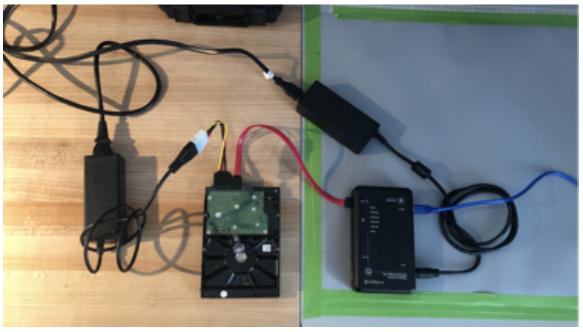
For SCSI Drive (multicolor)

Connection Example 2:

For IDE Drive (wide and white)

Connect the **data** cable (blue) form the write-blocker to the computer

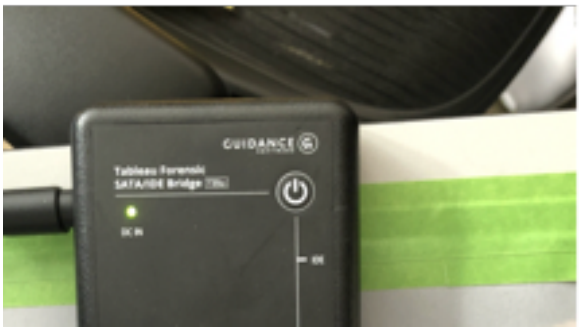
In this case, the data cable is a blue USB 3.0



Connect the appropriate **data** cable from the hard drive to the write blocker (in this instance, the SCSI multicolor cable)

Connect **power** to both the hard drive and the write-blocker

A single green will indicate that the write-blocker is getting power



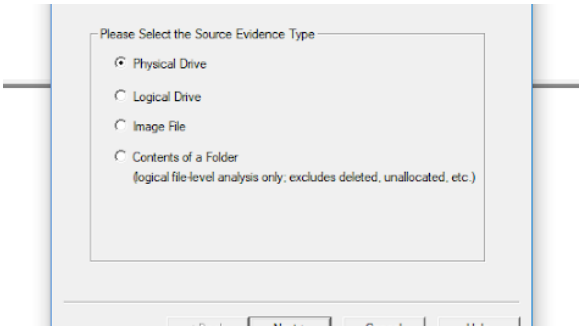
Click the 'Power' button write blocker: three green lights will appear, and the hard drive will begin making a spinning sound, indicating that it is on

The hard drive is now ready to be disk imaged

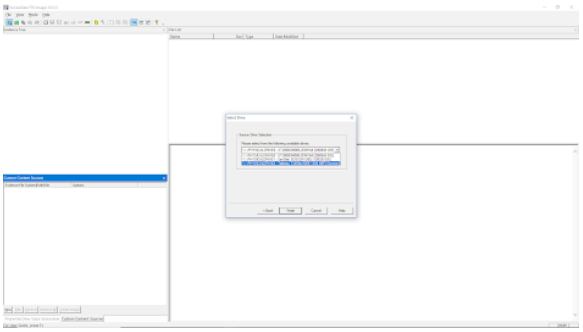
FTK Imager

Open FTK Imager and in the popup, click "Yes" to allow changes

Select "Add Evidence" ('Green +' icon) in toolbar

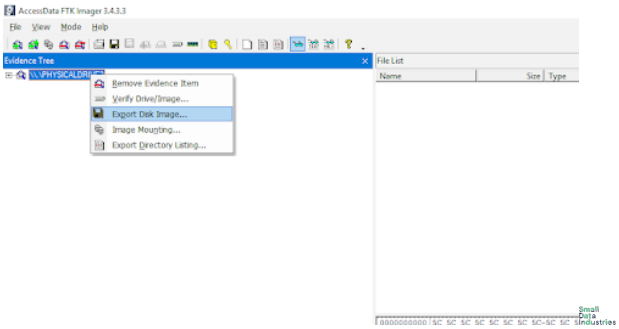


Select 'Physical Drive'

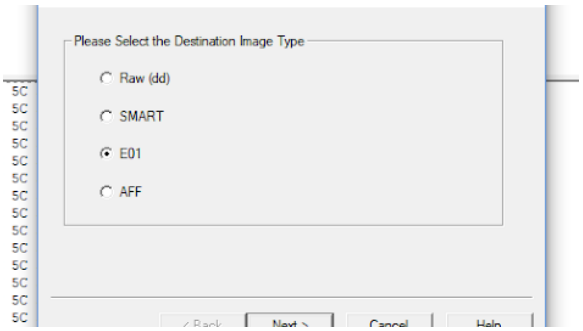


Next, choose the physical drive that matches the size (in GB) to the connected drive

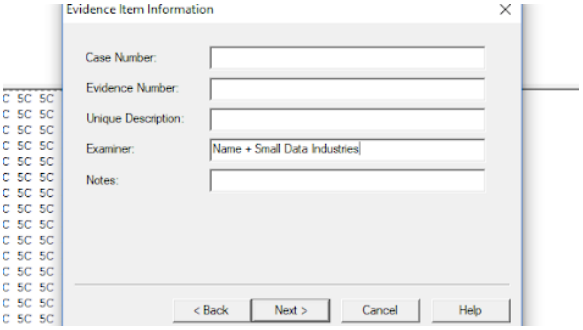
Capacity is generally indicated on the bottom of the hard drive



Right click Physical Drive > Export Disk Image

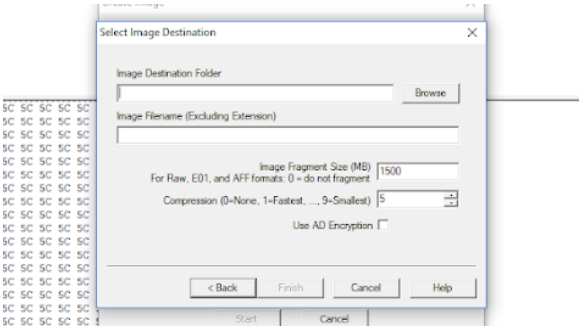


Select E01

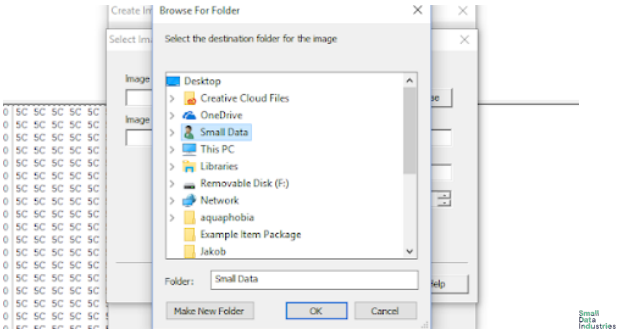


Enter the metadata information according to the project's pre-established schema using the 'Evidence Item Information' menu

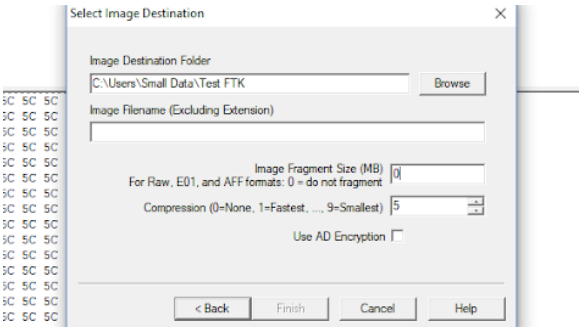
Use this consistent scheme for 'Case' and ' Evidence Number.' It is also best-practice to include name and affiliation in the 'Examiner' field.



Select where the disk image should be saved using 'Browse'



Create a project-specific folder



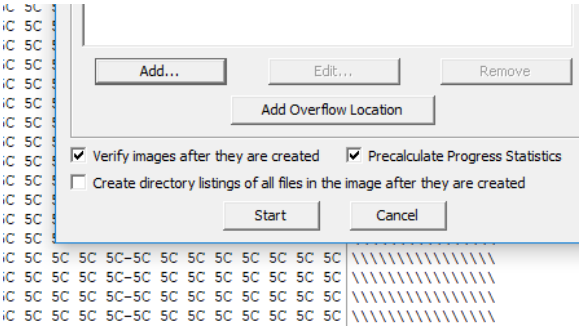
Enter filename (the unique identifier of the media piece)

Image fragment size < change to 0 (zero)

Compression > leave at default (5)

Encryption > leave default (unchecked)

'Finish'



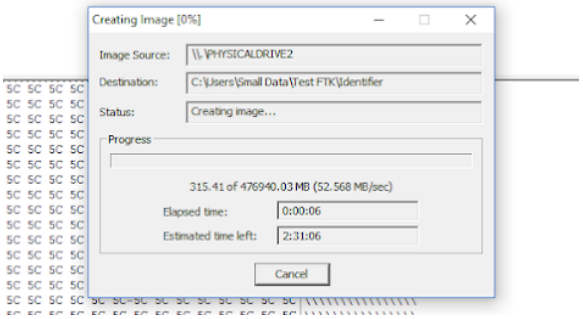
Popup window:

Verify Images > leave checked

Precalculate Progress Statistics < checked

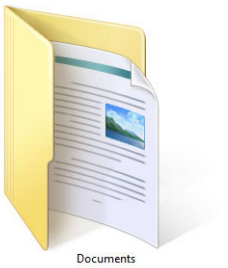
Create Directory < uncheck

'Start'



The estimated time depends on hard drive capacity. Once it is finished, it will say "verification has passed." The package/folder will now contain two items:

1) E01
2) Text file



The folder was created by the disk image using the "Access and Version Number" metadata that was entered. The 'log file' contains information about the physical hard drive (such as serial number), and MD5 and SHA1 checksum for the disk image. This indicates:

1) When acquisition started and finished,

2) results of verification and when it started and finished,

3) checksums that were calculated from verification and outcome (in this instance showing "verified")

Tutorial created by Rachel Ward, as demonstrated by Ben Fino-Radin (2019)

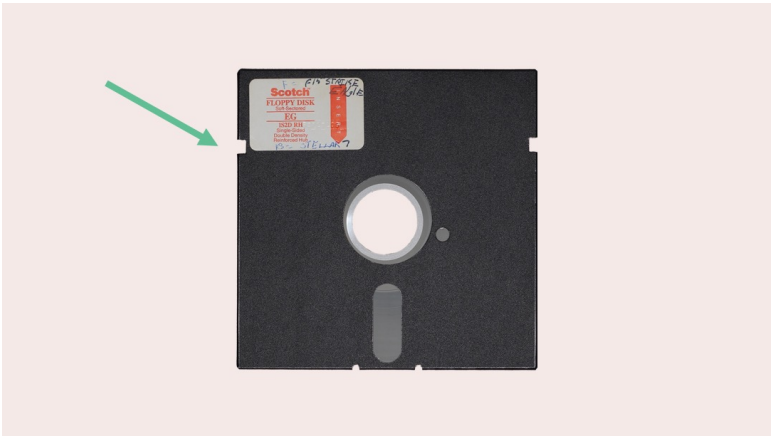
IDENTIFICATION: OBSOLETE MEDIA

This section includes a selection of photos taken throughout the course of the NDSR Art residency to aid in the identification of obsolete media formats that were encountered in the work with the "old" archives[24].

5.25" Floppy Disk

1976-early 90s

Technically called the single-sided "5.25 Mini-floppy" as a replacement for the 8" Floppy.

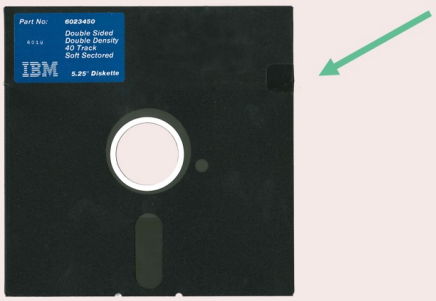


"Flippy" Disks

1976 – mid-1980s

In order to use both sides of a disk, the user could punch a second notch allowing both sides of a single-sided disk to be read (on a single-sided drive) by 'flipping it over'

[24] Many more detailed identification guides exist online, for instance: See: "Media Preservation." n.d. Museum of Obsolete Media. Accessed July 29, 2019. https://obsoletemedia.org/media-preservation/



Double-Sided Double-Density

Introduced 1978

A double-sided, double-density disk was introduced two years later followed by a quad-density which had a capacity of 720 KB.

Note: Here, notch is covered with adhesive tape for write-protection.

360 KB

3.5" Floppy Disk

1982-1990s

A hard-cased, smaller disk ultimately replaced the floppy. A double-sided version introduced in 1984 (720 KB)

1.44 MB

High-Density (HD)

Introduced 1984

A high-density version followed two years later.

Here: Note the second notch in addition to the write-protect notch.

Bernoulli Disk (Iomega)

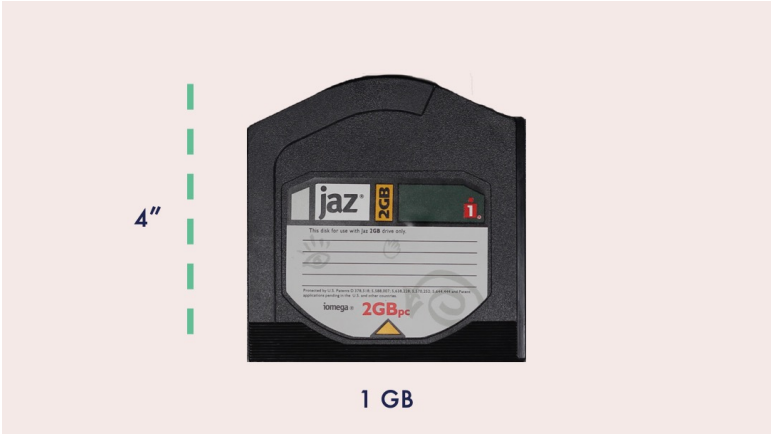
1982-1990s

Introduced by Iomega, this represented a significant increase in capacity, although requires an experience external drive

Zip Disk (Iomega)

1990-2003

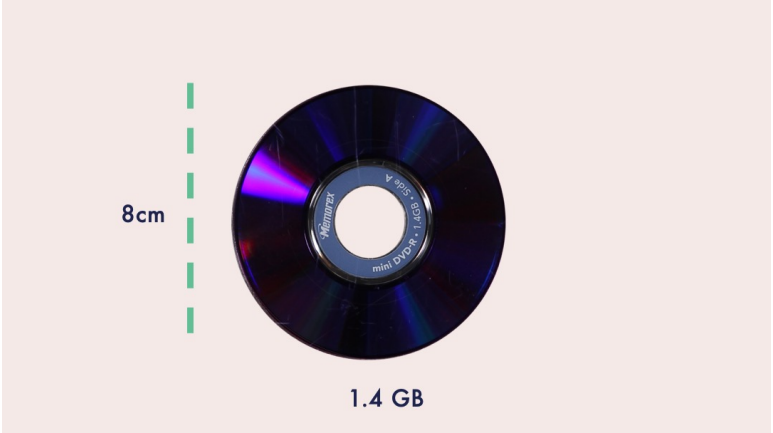
Also produced by Iomega nearly a decade after the Bernoulli, with a large improvement in capacity



Jaz Disk (Iomega)

1996-2002

Also introduced by Iomega, representing a 10-fold increase in capacity and later releases held up to 2GB



Mini DVD-R

1997-2012

A smaller version of the DVD-R, and commonly used in camcorders (which have also been rendered obsolete). A 1.4GB disk held 30 minutes of video.

Photography and graphic design by Rachel Ward (2019)