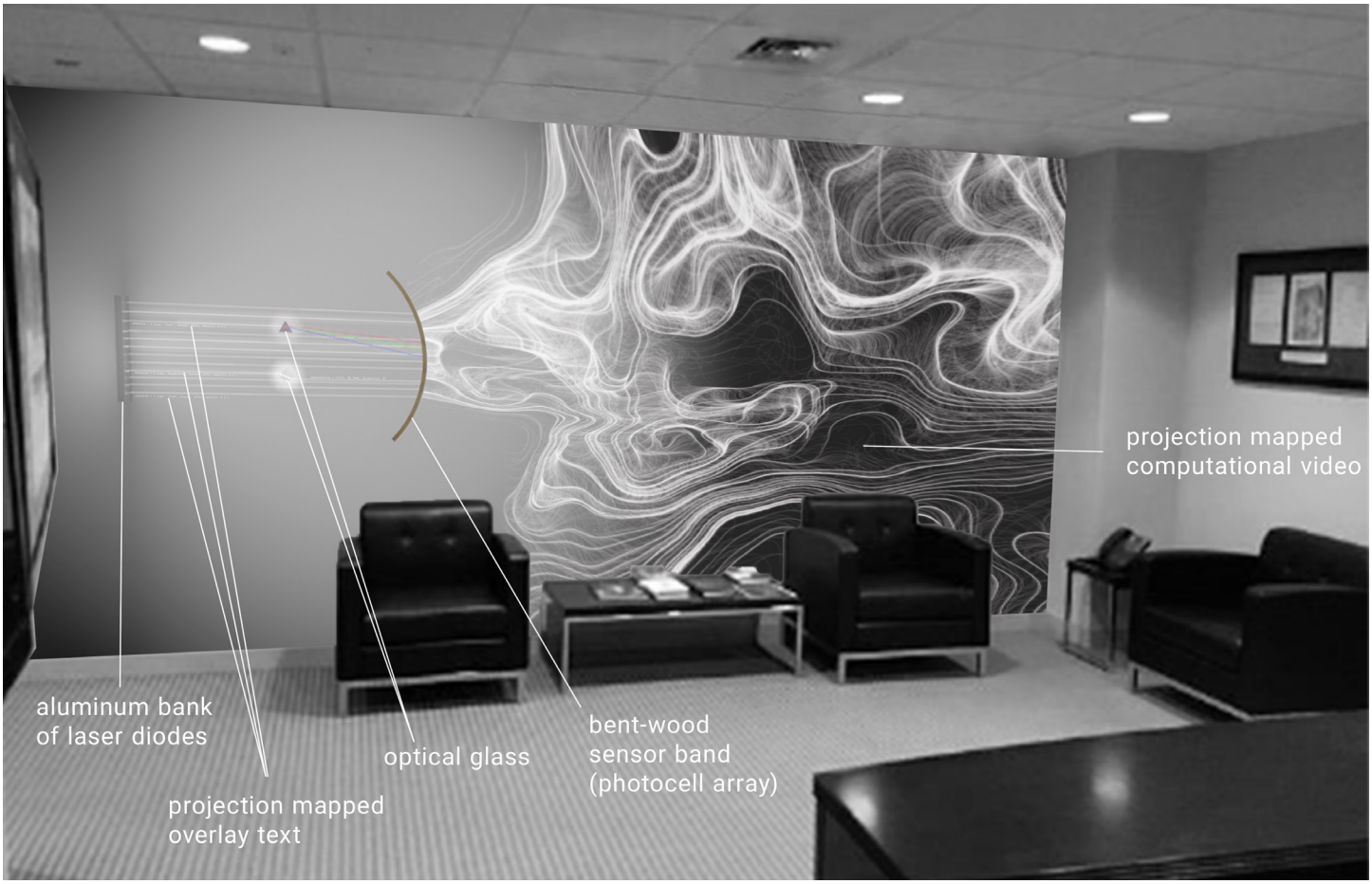
Supply Interrupt

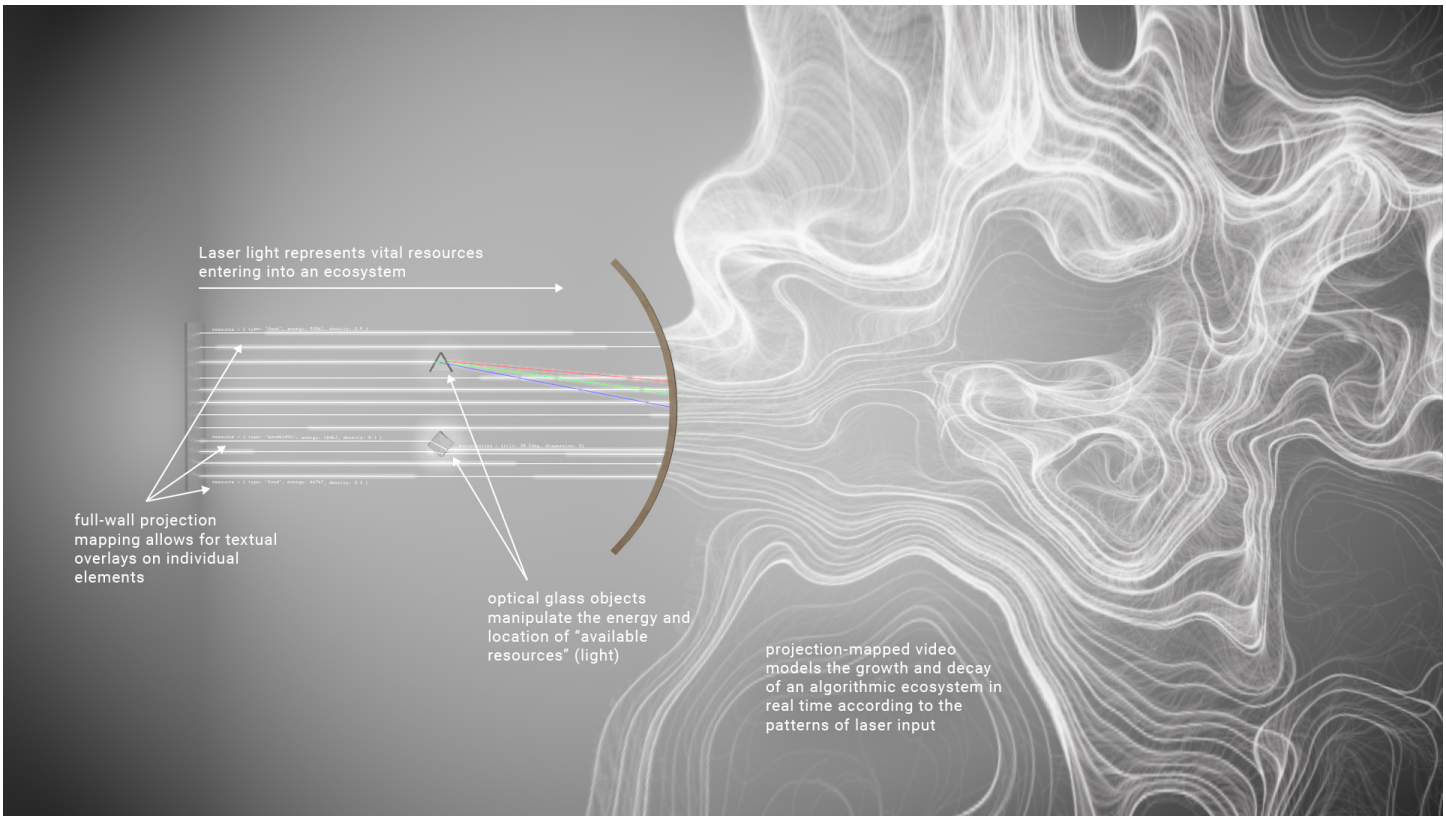
PROPOSAL PREPARED FOR CORPORATE ART CO.

MARCH 3, 2017

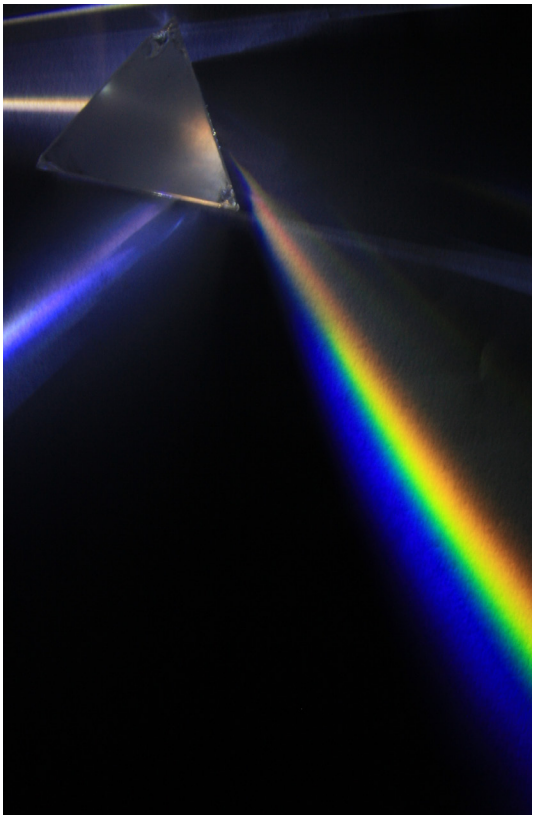
CENTER for DATA ARTS

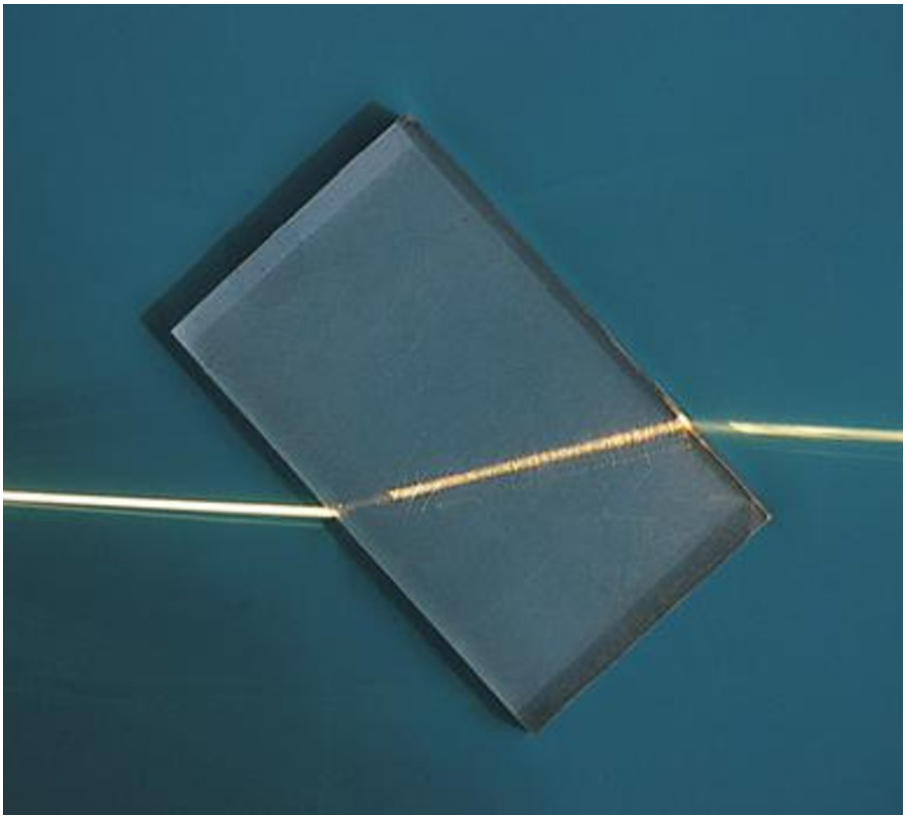
THE NEW SCHOOL

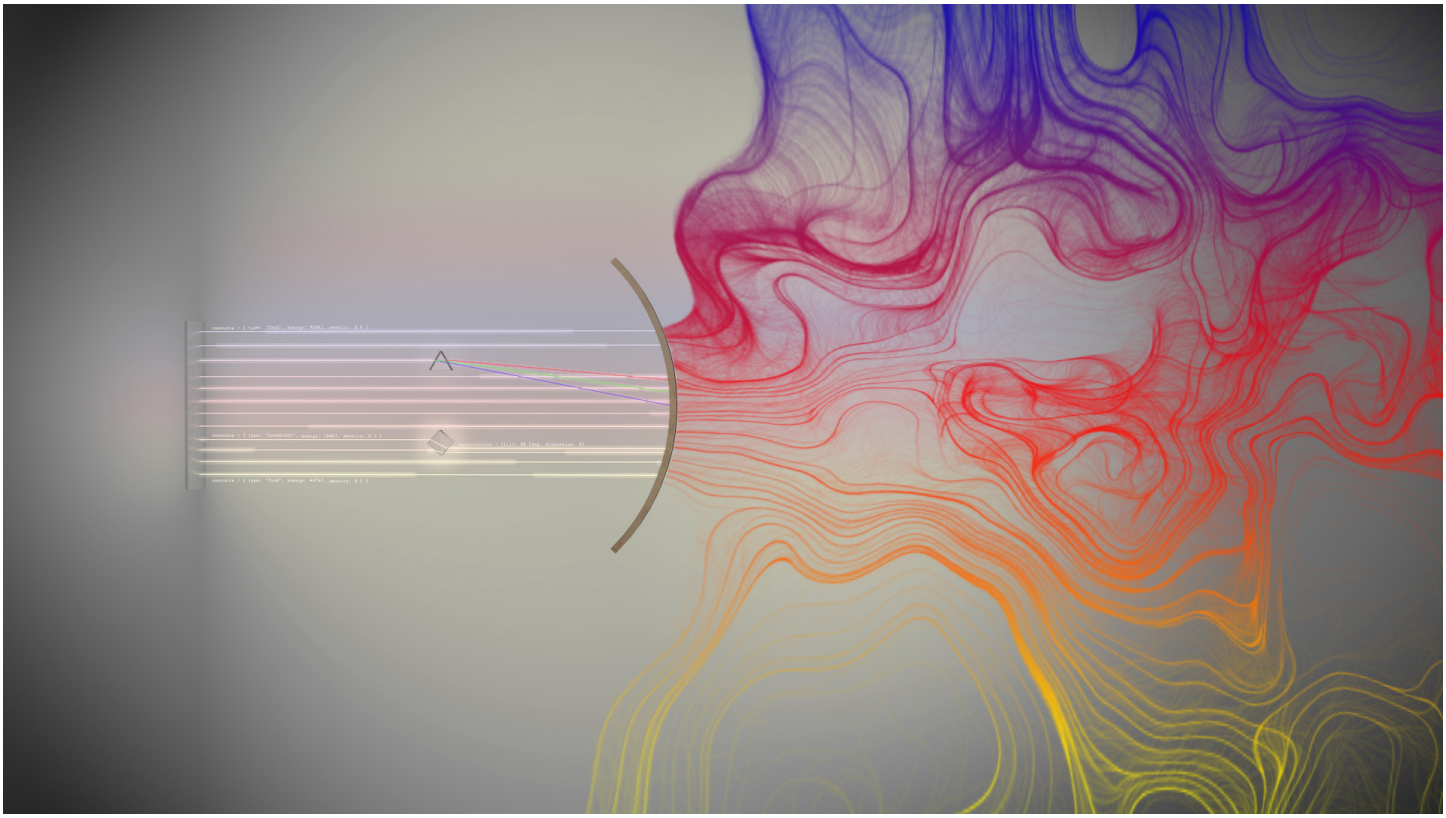

projection mapped
computational video
aluminum bank
of laser diodes
optical glass
bent-wood
sensor band
(photocell array)
projection mapped
overlay text


Laser light represents vital resources
entering into an ecosystem
full-wall projection
mapping allows for textual
overlays on individual
elements
optical glass objects
manipulate the energy and
location of "available
resources" (light)
projection-mapped video
models the growth and decay
of an algorithmic ecosystem in
real time according to the
patterns of laser input

POTENTIAL FOR COLOR







SUMMARY

"Supply Interrupt" is an interactive, wall-mounted sculpture made of light, aluminum, optical glass, mahogany, and projection-mapped video created in real time through custom generative software. The work highlights the connections between our natural and digital environments, and reveals patterns in complex natural processes.

CONCEPTUAL BACKGROUND

"Supply Interrupt" draws parallels between two ecosystems we inhabit: **the internet** – an ecosystem of collaboration and knowledge-production affected by offline social factors – **and Earth's natural environment,** an ecosystem of flora, fauna, and global climate factors. The sculpture **makes use of cutting-edge research** in environmental niche modeling, speciation and migration patterns, and emergent growth algorithms to **reveal the underlying logic of ecosystems in a whimsical, compelling, and tactile way.**

INTERACTION

Viewers can interact with the sculpture by **blocking light** (traveling from left to right across the wall) or by **adjusting optical glass devices** like prisms, lenses, and mirrors that are embedded in the wall. Any change in the pattern of light – be it shadow, reflection, or refraction – will have an immediate and visible effect on the behavior of the projected video display, a mathematical simulation of an ecosystem.

MATERIALITY

The project makes use of light, aluminum, optical glass, and mahogany. Each has a specific conceptual role:

- Light in the form of video projection speaks to the mechanisms of the digital world
- Light as lasers or focused LED light represents energy itself, the essential material of any ecosystem
- Optical glass has been used to understand our universe at least as far back as ancient Egypt
- Mahogany has been used in both scientific and musical instruments from around the time of the Renaissance
- Aluminum is one of the most common materials in scientific apparatuses today

The combination of light, metal, glass, and wood speaks to the diversity of Earth's natural ecosystem: one ephemeral (light), one a raw element (aluminum), one a compound (glass), and one an organic product (wood). Together, these materials address not only the physical breadth of our natural environment, but also the chronological depth of our technological interaction with that environment.

TIMELINE

first eight weeks:

- research & design
- materials testing & prototyping
- alignment with client on conceptual & physical direction

following nine weeks:

- fabrication and construction
- software development
- troubleshooting

last two weeks:

- installation
- testing
- any final revisions or debugging

COST

Materials and Supplies:	$	9,060.00
Artist Fee:	$	11,500.00
Design Fees:	$	13,200.00
Software Development Fees:	$	13,200.00
Fabrication Fees:	$	7,590.00
Studio Cost:	$	6,615.00
Total for Services:	**$**	**61,165.00**

CDA

- director: Ben Rubin
- multidisciplinary research laboratory and design studio within The New School, a progressive urban university founded in New York City in 1919 to challenge the intellectual and artistic status quo
- mission is to transform complex information into meaningful narrative experiences
- engages actively with researchers and educators at The New School
- industry leader in data visualization
- has a long history of innovative and award-winning public art projects

KEY PROJECT PERSONNEL

Ben Rubin – director // resume
Sam Galison – design lead, project lead // resume
Jaime Tanner – developer, research lead // resume

CONCEPT

THE IMPACT OF RESOURCE AVAILABILITY IN NATURAL AND DIGITAL ECOSYSTEMS

The internet is a mechanism and medium for collaborative work, a biome in which a diverse population builds and inhabits a shared body of knowledge. The health of that digital environment, like the health of our natural world, depends on open access to vital resources. In a natural ecosystem, resources might include sunlight, oxygen, or food sources; in the context of the internet, bandwidth, search results, open source knowledge, and social infrastructure are the driving forces that spur growth, transformation, and evolution.

For millennia, humans have sought logic in natural processes: rhythm and melody in waves, structure and symmetry in crystalline growth, form and meaning in clouds. But what do those rules – those formulas of impossible scale – *feel* like? What would it be to influence, with the shadow of a hand, the propagation or extinction of an entire species? To see and understand root growth, tree branching, coral aggregation, or bacterial replication – processes that take years – in the span of a few seconds?

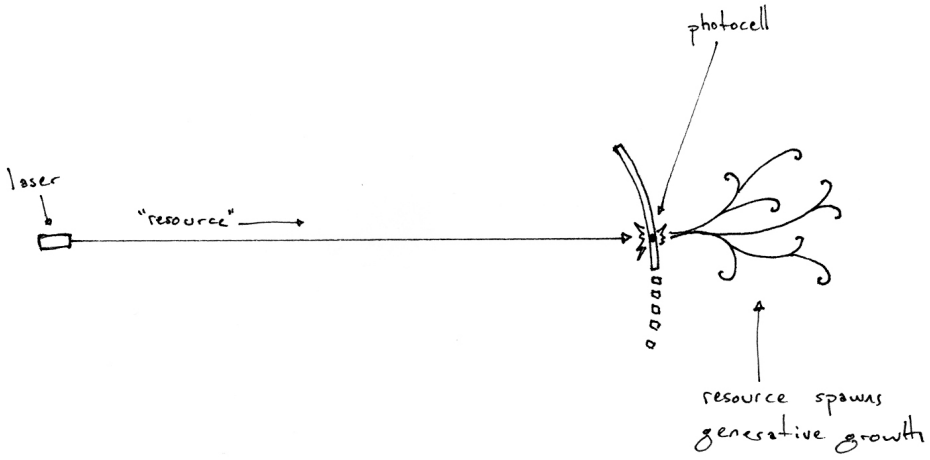
We propose an interactive sculptural installation that brings those processes into immediate physical reality; an artwork that reifies these complex ecological metaphors into a coherent interactive visuotactile system. Physically, the 2.5D sculpture mounts on a wall, and uses lasers, optical glass, an array of sensors, and generative projection mapping to create an ephemeral, allegorical representation of a living biome. The sculpture is interactive; viewers will be able to interrupt or manipulate the laser beams by blocking light with a hand or by adjusting a series of optical devices embedded in the wall, causing an immediate change in the projected video image. This interactivity affords the viewer a visceral, non-cognitive understanding of the forces at play in the system, and elucidates the relationships between an ecosystem and its component parts.

Materiality lies at the core of this work – "Supply Interrupt" revolves around the visual, tactile, and behavioral qualities of mathematical models. As such, the physical materials from which the piece is built must be deliberate, relevant, and meaningful. The work's primary medium is light – video projection and lasers – augmented by milled aluminum, bent mahogany, and hand-fabricated optical glass. Each is intentional: light in the form of video projection speaks to the transmission and display mechanisms of the digital world – fiber optics, pixel matrices, distributed computation; in the form of lasers, light represents energy itself, the essential material of any ecosystem. The aluminum, mahogany, and glass each hearken to a different epoch in western scientific history – aluminum is the material-of-choice for the vast majority of today's scientific apparatuses; mahogany formed instruments both scientific and musical from the Renaissance to the 19th century; optical lenses in crystal date back to ancient Egypt. The combination of light, metal, glass, and wood speaks to the diversity of Earth's natural ecosystem: one ephemeral (light), one a raw element (aluminum), one a compound (glass), and one an organic product (wood). Together, these materials address not only the physical breadth of our natural environment, but also the chronological depth of our technological interaction with that environment.

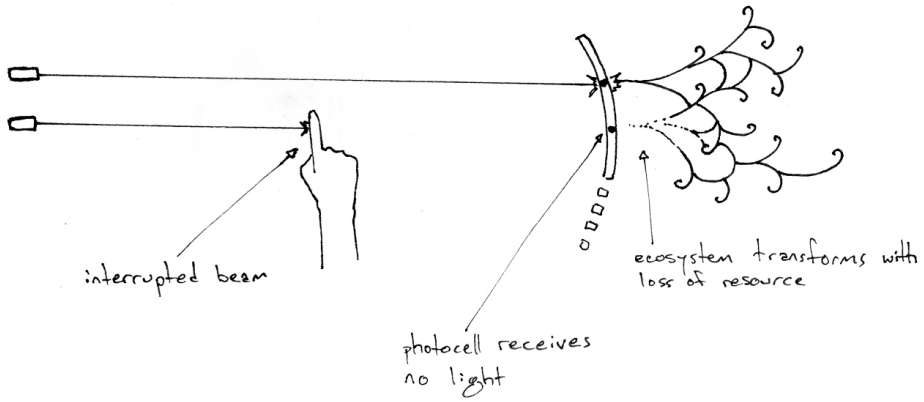
Ultimately, the work is driven by the underlying connections between digital and natural ecosystems. The importance of open access and free collaboration in a thriving internet culture mirrors the value of biodiversity and symbiosis; the fragility and resilience of the web relates to the balance and adaptation of a natural ecosystem. The sculpture as a whole materializes the metaphorical link between threats to net neutrality and threats to the earth's ecosystem.

INTERACTION DIAGRAMS

DEFAULT "GROWTH" BEHAVIOR:



INTERRUPTED "DECAY" BEHAVIOR



(A) CONTRACTOR SUMMARY

The Center for Data Arts is a multidisciplinary research laboratory and design studio within The New School that transforms complex information into meaningful narrative experiences. Under the Direction of Ben Rubin, CDA develops new tools to interact with data, and new metaphors to make sense of it. Using advanced realtime graphics, immersive physical environments, and virtual reality, we aim to fluidly integrate data with our sensory perception of the world to tell provocative and compelling stories.

CDA was originally established in 2002 as The Parsons Institute for Information Mapping, and since its inception, the center has been recognized as an industry leader in data visualization. We updated our name to The Center for Data Arts in May of 2016, and since then we have undertaken new initiatives including a Health Data Design Lab, an immersive timeline of women's history, and a public art project that will use sound, light, and real-time data feeds to make a distant glacier's presence felt in a central Calgary plaza.

We engage actively with researchers and educators at The New School who work in fields such as cognitive science, economics, journalism, sociology, public policy, cultural studies, and education. The New School is a progressive urban university founded in New York City in 1919 to challenge the intellectual and artistic status quo. CDA draws on the incredible diversity of The New School community to set new standards of excellence for creativity and critical thinking in data research, information design, media art, and technological innovation.

(B) CAPABILITIES, METHODOLOGY AND PROJECT TIMELINE

Exploring data in context requires a transdisciplinary approach. As an independent research center and design studio within The New School, CDA is uniquely positioned to leverage diverse expertise and energy from every part of the university, creating opportunities for one-of-a-kind collaborations and encouraging new hybrid practices among students, faculty, and industry professionals. CDA's creative strengths and technical capabilities include:

- A history of innovative and award-winning public art projects;
- Extensive experience transforming large collections of data and media content into artworks, performances, and interactive experiences;
- Proven ability to create automated "Content Choreography" systems that process data feeds and generate an endless evolution of visual patterns and movements.

TECHNICAL CAPABILITIES:

- Data Visualization
- Natural Language Processing
- 3D Design, Modeling, and Rendering
- Interactive Pre-Visualization and Fly-Through Production
- Machine Learning

- Image Classification
- Design of Advanced, Fault-Tolerant Digital Media and Control Systems
- Large-Scale, Multi-User Interface Technologies
- Full-Stack Software Development
- Fine Art Conceptualization and Production
- Digital Fabrication and Experimental Technology Development

Include a detailed timeline of milestones for completing the project.

PROJECT SCHEDULE:

PROJECT PHASE	SPECIFIC GOAL	COMPLETION DATE
Phase I: Idea Development and Research	Project launch	March 17, 2017
	Modeling + "lay of the land" research	March 24, 2017
	Behavioral graphics modeling research	March 31, 2017
	Discovery synthesis + presentation	April 7, 2017
	Client review	April 14, 2017
Phase II: Creative Collaboration/ Exploration and Design Development	Interactive sketches, prototype parts purchase	April 21, 2017
	Material tests, feasibility research	April 28, 2017
	Initial design concept presented to client	May 5, 2017
	Design refinements	May 12, 2017
Phase III: Production Management and Fabrication	Finalize BOM, coordinate fabrication plan	May 19, 2017
	Order parts, software prototyping	May 26, 2017
	CNC aluminum fabrication, software development	June 2, 2017
	Glass fabrication, electronics prototyping	June 9, 2017
	wood fabrication, software build	June 16, 2017
	assembly, software debug, projection test	June 23, 2017
	hardware + electronics troubleshooting	June 30, 2017
	contingency (hardware + software changes)	June 30, 2017
	contingency (hardware + software changes)	July 14, 2017
Phase IV: Installation	transportation + coordination	July 21, 2017
	project install	July 28, 2017
	troubleshooting	August 4, 2017

(C) EXPECTED RESULTS

The installation as a whole will make tangible the metaphor of an "ecosystem" as it applies to the natural world and to the internet. In the language of the sculpture, light is the primary vital resource, transmitted to the system in the form of a laser. Uninterrupted access to light will act as seed and fodder for a mathematical simulation of an ecosystem, projected onto the surface of the wall. Changes in access to that light – the hand of a viewer disrupting the beam, or shifts in the orientation of an embedded lens, prism, or mirror – will signify a change in available resources, and the projected biome will react accordingly.

Loss of a resource often spells decay for some parts of an ecosystem, but might catalyze the explosion of a new species in others. Often, the way an ecosystem functions also drives resource production and availability, creating a closed loop. Our installation will make these factors – especially the importance of equal access to resources – visible, demonstrating interwoven morphogenetic principles of divergence and emergence, fragility and resilience, evolution and stagnation in a novel, compelling, and beautiful way.

Summarize the expected results of your methodology listed above.

Our primary goals are to activate the client's lobby space in a positive way. In the research, production, and installation of this work, we hope to:

- Create an engaging experience for anyone waiting in the lobby
- Transform an otherwise unused space into a communal focal point
- Encourage visitors to interact with each other and with the work
- Craft a materialization – a visualization that is also physical and experiential – of the client's central identity
- Create a compelling work of contemporary art – one that sits at the cutting edge of design and technology, and engages with contemporary artistic dialogues and practices

Include a summary of your timeline for completing the project.

During the first eight weeks of the project, CDA will embark on a research and design phase. This critical phase will consist of defining the mathematical models that will be used in creating the projected video, creating the generative "ecosystem", producing the design specifications and finalizing the piece. Materials testing and prototyping will take place during the second half of this phase, after a client review. This process with culminate in a presentation of the proposed final design, including material samples and prototypes, to the client on May 5th.

Once this phase is complete, the following nine weeks will be dedicated to the fabrication and construction of the artwork. CDA will finalize the designs for fabrication, order and produce necessary materials, and assemble the piece. Software development, testing, and debugging will also take place during this production phase.

Finally, during the last two weeks CDA will install and test the piece on site. During this phase, CDA will coordinate and transport artwork to the site, and supervise installation. After installation, some troubleshooting and testing will ensure that the artwork is properly installed and functioning.

(D) EXECUTIVES, STAFFING, AND MANAGEMENT

CDA's professional staff includes designers, software developers, artists, and scholars. When necessary, our project teams also draw talent from The New School's exceptionally strong programs in anthropology, economics, journalism, strategic design, music, cognitive science, and public policy, among many others. And of course CDA looks to Parsons, The New School's art and design division, for product and interface designers, architects, urban planners, graphic artists, writers, fashion designers, and other creative practitioners whose fields are being revolutionized by data.

KEY PROJECT PERSONNEL

Ben Rubin: Artist and designer Ben Rubin was named Director of the Center for Data Arts in January, 2016. Rubin's innovative applications of media and information technology have been seen at museums, public spaces, and performance venues around the world. Rubin's best-known work includes the media installations Moveable Type (2007), a permanent artwork for the lobby of the New York Times building, and Listening Post (2002); both installations were created in collaboration with Mark Hansen. Rubin's groundbreaking projection design for Arguendo, a play by Elevator Repair Service, earned him an Obie Award in 2014. In 2013, with Mark Hansen and Jer Thorp, Rubin co-founded the Office for Creative Research, where he led many data visualization design and user interface projects. Rubin's design clients have included Microsoft, EES Surgical Instruments, HP, and IBM, as well as architects SOM, Pelli Clarke Pelli, DS+R, and Ennead. Rubin received his BA in Computer Science and Semiotics from Brown University in 1987, and his MS Vis. from the MIT Media Lab in 1989.

Sam Galison: Sam is an artist and designer based in New York City. He has a background in the theater and circus, and currently works with a combination of digital and traditional craft practices to create compelling, immersive experiences in a wide variety of media. Sam's work makes use of techniques ranging from ink and pencil to optical glass fabrication to music composition and experimental, interactive electronics. He has worked professionally as a graphic, web, and physical-media designer at various agencies in New York, and for various individual and institutional clients. Sam holds a BA in "Affective Engineering" from NYU Gallatin and an MFA in Digital + Media from RISD. The former was a self-designed major drawing from the Interactive Telecommunications Program in Tisch as well as from fine art, philosophy, design, and engineering; the latter culminated in a written book and multimedia installation, both centered on the phenomenology of being present and the uncanny distance between lived experience and abstracted, mediated, or archival memory.

Jaime Tanner: Jaime is a native New Yorker who first became interested in the field of data visualization as means for both exploring and communicating scientific data and models. She has studied and worked in various areas of scientific research, such as behavioral psychology, ecology and neuroscience. She holds an M.S. in Data Visualization from Parsons School of Design. Her current work explores the relationship between humans and nature. She is interested in the ways in which we attempt to dissect, understand and control our habitats and the environment. In her work she aims to create tools that not only communicate complex scientific data, but allows experts and non-experts alike to interact with and question the constructed nature of this data.

CDA will manage all aspects of the project with the key personnel listed above and will facilitate any specialized work/production requiring outsourced vendors.

Estimated cost of staffing and management: **$ 45,490.00**

(E) COMMUNICATION & TIMELINE

CDA will maintain open communication with both CAC and the client throughout the project, with explicit check-in dates in each phase, specifically:

Phase I: Idea Development and Research

Project launch	March 17, 2017
Client review	October 20, 2017

Phase II: Creative Collaboration/Exploration and Design Development

Interactive sketches, prototype parts purchase	April 21, 2017
Initial design concept presented to client	May 5, 2017

Phase III: Production Management and Fabrication

assembly, software debug, projection test	*June 23, 2017**

**optional in-progress check in*

Phase IV: Installation

transportation + coordination	July 21, 2017
project install	July 28, 2017
troubleshooting	August 4, 2017

(F) EQUIPMENT

MATERIALS AND SUPPLIES

Projector	$ 1,300.00
Computer - Mac Mini	$ 1,000.00
Lasers (8-12)	$ 300.00
Sensor + Microcontroller Hardware	$ 200.00
Wood material and hand fabrication	$ 1,200.00
Glass material and hand fabrication	$ 1,460.00
Aluminum material and CNC fabrication	$ 2,000.00
Additional wiring and communication electronics	$ 600.00
Additional installation hardware	$ 1,000.00
TOTAL:	**$ 9,060.00**

(G) EXPENSE BREAKDOWN

The following estimates are preliminary projections based on the scope of work outlined in this proposal. The costs cited below are best estimates of what actual design and development expenses will be. The following estimate does not include applicable taxes, freight, or travel costs, which will be submitted via invoice at the time of purchase.

Idea Development and Research, including consultation, research and discovery synthesis:	$ 8,563.10
Creative Collaboration and Design, including concept development, R&D, and comprehensive refinements:	$ 11,621.35
Project Management, including vendor contact, scheduling and budgeting, and client communications:	$ 4,893.20
Production and Fabrication, including digital art preparation, preparing files for programming:	$ 4,587.38
digital proofs and presentation materials:	$ 3,058.25
glass, wood, and aluminum fabrication:	$ 10,703.88
software and embedded electronics prototyping and development:	$ 12,233.00
Production/Installation, including transportation, installation, hardware, and software / video calibration:	$ 5,504.85
Total for Services:	**$ 61,165.00**

(H) EXPENSE SUMMARY

OVERVIEW OF COSTS

Materials and Supplies:	$ 9,060.00
Artist Fee:	$ 11,500.00
Design Fees:	$ 13,200.00
Software Development Fees:	$ 13,200.00
Fabrication Fees:	$ 7,590.00
Studio Cost:	$ 6,615.00
Total for Services:	**$ 61,165.00**

(I) LICENSING AND BONDING

NA

(J) INSURANCE

NA

(K) REFERENCES

"And That's The Way It Is"

Ben Rubin

https://vimeo.com/51650488

projection mapping

And That's the Way It Is (2012), is a public art installation by Ben Rubin; it is permanently installed at Walter Cronkite Plaza, the University of Texas, Austin. Rubin created the piece in collaboration with statistician Mark Hansen and data artist Jer Thorp. Six projectors on a nearby rooftop project text, which is extracted daily from television news closed-caption feeds, onto the University's CMA Building, which is part of the College of Communications. The piece was commissioned by the UT Landmarks public art program.

Unfamiliar

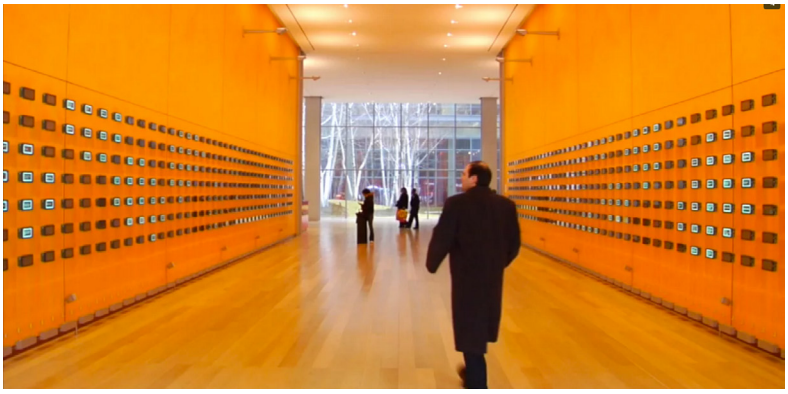
Sam Galison

http://www.samgalison.com/#/unfamiliar/

optical glass + video

"Unfamiliar" (2016) is an immersive room-size composition in video, optical glass, and music. One wall holds a massive, rear-projected video of a sublime and unstable seascape, blinking on and off with a warm, artificial thump. The other three walls hold five wooden shelves, each with one or two glass objects sunken into a slab of cement. An embedded video screen in each shelf fills the glass objects with a collage of original and archival family footage. Each glass/video/cement shelf is choreographed with one instrument in the four-channel surround soundtrack. In the room, the sound of each instrument is spatially linked to the position of its corresponding glass

object. The composition loops every six minutes. “Unfamiliar” was inspired by the uncanny terrain of memory and its relationship to focus and presence. The video uses three generations of family videos and barely-moving footage of the natural world to get at the strangeness of what we choose to remember and the feeling of close focus, attentive listening, and total presence found in wilderness exploration.

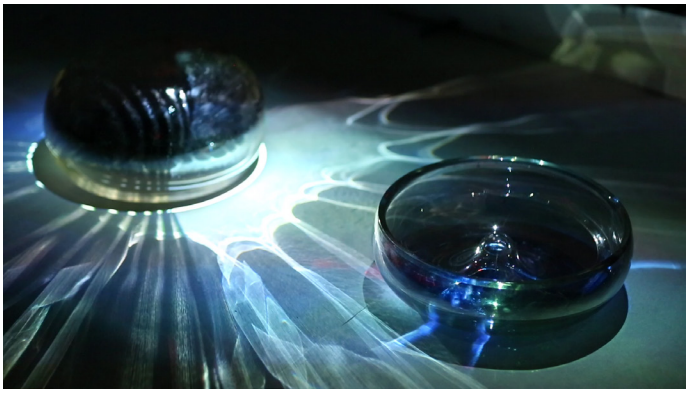


Movable Type

Ben Rubin

https://vimeo.com/113240712

MOVEABLE TYPE (2007) is an art installation by BEN RUBIN & MARK HANSEN. It is permanently installed at the New York Times Building, located at 8th Avenue and 40th Street, New York City; it is open to the public.



One To Hold, One To Echo

Sam Galison

http://www.samgalison.com/#/one-to-hold-one-to-echo/

projection mapping + optical glass

“One to Hold, One to Echo” (2015) centers around two glass vessels made by hand, a faceted dome and half-toroid bowl. Each vessel was partially silvered on the internal surface, interacting with the projection mapped video in different ways. The faceted dome refracted its video, echoing fragments of video throughout the space. The toroidal bowl, crafted to hold memories instead of fracturing them, gathers the video into a single point on the ceiling before fanning it out again in reverse. The audiovisual material is all found footage from old family videos, played and manipulated in real time.

Specimen Box

Ben Rubin

https://vimeo.com/147750277

interactivity

The OCR began work on Specimen Box in 2014 at the request of Microsoft's Digital Crimes Unit. Microsoft's Cybercrime Center monitors communications coming from hundreds of millions of PCs around the world that have become infected by botnet malware. Employing data sonification together with advanced visualization techniques, Specimen Box provides a configurable multi-sensory presentation of botnet signal activity in real time. It also features a multi-touch gesture-based interface for navigating, exploring, selecting, and examining the billions of signals that have previously been collected. Users can access the collected signals based on their activity levels, the geographic locations of their sources, or their daily activity patterns over time, using clustering to group sources with similar behavior. Split views allow two different data selections to be compared. The activity of one botnet strain can be compared against another, for example, or the activity of a botnet in a certain region on a given day can be compared with its activity in a different region, or on a different day. Data sonification allows users to probe the data for audible rhythms, cycles, and textures, calling attention to subtle time-based structures and patterns that might have evaded visual or computational detection.

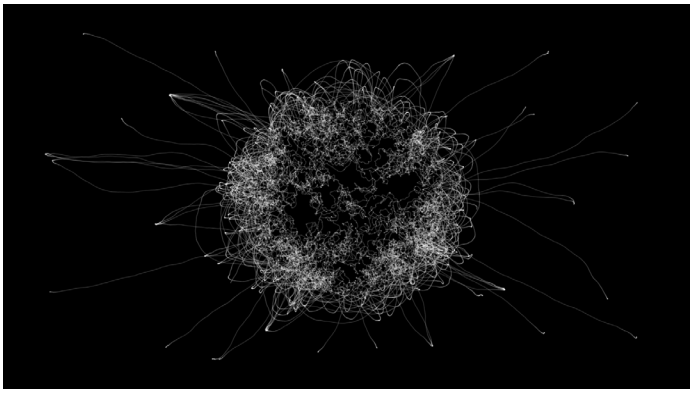
Species Bias

Jaime Tanner

http://visualizedata.github.io/thesis/jaimeTanner/project.html#

Interactivity

Using the publications from one major scientific journal, the visualization allows the the reader to explore animal species organized taxonomically and by number of publications where the species is mentioned. Using research publications as a lens through which we can explore scientific methods of inquiry, this piece visualizes not only the species which receive the most attention from humans but also those which may be least understood.



Space Termites

Sam Galison

http://webwork.samgalison.com/spacetermites.html

interactivity + generative graphics

Originally part of a larger experiment in artificial coral growth patterns, “space termites” uses cellular automata to create a generative image. Each “cell” is attracted to a central hub, and behavior limitations guide the cells in pseudo-random movement patterns. The resulting image is a slowly shifting planetary mass, never quite static.