CMAC

COMPUTATIONAL MEDIA, ARTS & CULTURES

Duke
UNIVERSITY

COMPUTATIONAL MEDIA, ARTS & CULTURES PHD PROGRAM

The CMAC PhD program is an innovative, interdisciplinary program co-sponsored by the Department of Art, Art History & Visual Studies, the Program in Literature, the Information Science + Studies Program, and the John Hope Franklin Humanities Institute. Students in the program combine deep knowledge of media theory, cultural studies, history, and the fine arts with computer programming, digital media development, and data science. The CMAC program was built with support of the Mellon Foundation through the Visual Studies Initiative and successor grants. Core faculty come largely from the constituting programs, with additional and affiliated faculty coming from around campus. The program is currently able to support three new students over a five-year period. Six students are currently enrolled in the program. Two new students began in Fall of 2019 and we anticipate 3-4 will graduate in 2019-20.

Most students in the program come to Duke with an MFA or other prior graduate work and are interested in deepening their theoretical and critical knowledge of computational media, areas for which Duke is renowned, alongside their computational media practices. Over the course of the academic program each PhD student must complete two language exams, a "human" language, and a "computer" language, as well as produce a hybrid dissertation consisting of scholarly, written work and a practice component. Written work typically focuses on an aspect of media art and culture, often with a global and/or social impact dimension. Practice components have included media artwork, databases, data visualizations, and games. Current students are researching the production of media art in conflict zones in the Middle East; the social impact of media art LGBT experience in Turkey; the history of artificial intelligence; and the environmental impact of new technologies.

TABLE OF CONTENTS

THE LABS

DALMI
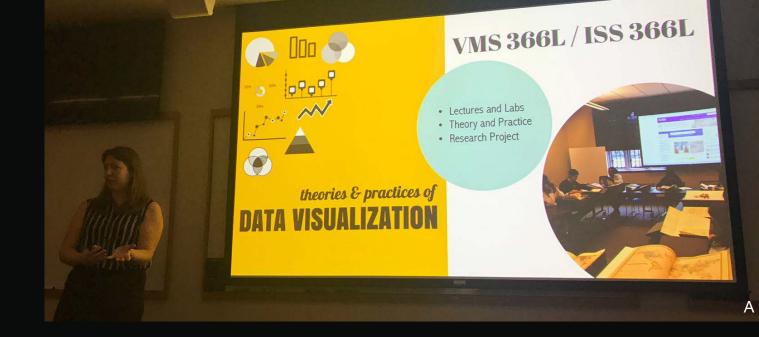## DUKE ART, LAW & MARKETS INITIATIVE

DIRECTOR: HANS VAN MIEGROET

Ongoing research of the Duke Art, Law and Markets Initiative (DALMI) yields previously unavailable information about the economic, cultural and legal forces and factors that drive and influence art market broadly defined as part of a cross-disciplinary STEAM approach, defined as follows:

(1) study clusters of buyers, areas, price series, auction results, clusters of characteristics buyers project in art whether or not intended by the maker, using the consumer theory of Lancaster and the bundled characteristics theory developed by Professors De Marchi (Economics)
and Van Miegroet (Art History & Visual Studies);

(2) implement vertically integrated study and research projects that use a hybrid combination of new art historical, legal and econometric techniques to study consumer preferences for art and the impact of cultural industries on local political and cultural environment (two year, vertically integrated teaching and research project Bass project on Creative Industries in Durham) and how these interact on a local scale with specific legislative and local cultural environments;

(3) conduct advanced research in a systematic manner of the factors that affect price, choice, legislation, consumer preference and use the result of these findings through economic theory regarding the role of irrationality in purchasing and investment decisions. This research is instrumental to expand innovative teaching and research in an emerging academic field (Art, Law & Markets as part of STEAM) in which Duke University has gained expertise and seeks to develop distinct international leadership.

A

B

The DALMI research has yielded new information, publicly available on international art markets as well as the social impact of cultural industries in Durham. We also have developed new undergraduate courses in the History of Art Markets (ARTHIST 231; ECON 344) and offer seminars on Art and Markets, which involves Duke undergraduate and graduate students in the humanities, social sciences, sciences and law (STEAM). As part of our mission, we also have establsihed a formal partnership between DALMI and the J. Paul Getty Provenance Index Database (Getty Research Institute, Los Angeles, CA) one of the largest art databases in the country, which is now headed by one of our Duke/AAH&VS/DALMI PhD graduates, Sandra van Ginhoven. Our DALMI team is critically aware that, as scholars in the digital humanities, computational media can profoundly transform all kinds of existing paradigms, methodology, business practices and epistemology of art market research and the many disciplines it affects, such as Art History, Cultural Economics and Social History, but also Econometrics and a variety of Information Sciences.

For more information on the lab and its work, visit *www.dukedalmi.org*

DIRECTOR: MAURIZIO FORTE

The name Dig@Lab recalls the main goal of this research lab, which is "digging for information", looking for new interpretations at the intersection of archeology, remote sensing, cybernetics, heritage, computer science, neuroscience, cognitive science, art and history. More specifically, it is aimed at the investigating how the information is shaped, elaborated, stored and then culturally transmitted by different societies, with a special focus on ancient civilizations, heritage and archaeological landscapes. It was founded in 2013, it is core member of CMAC and co-managed by the Dept. of Classical Studies and Art, Art History and Visual Studies. It serves a large community of Duke (Trinity College, School of Engineering, Nicholas School, Biomarine lab) and international students and scholars (Italy, Spain, Austria, Sweden, UK, Greece, China). In a few years was able to record and post-process over 45 TB of data and it achieved a relevant international reputation with visitors and guests coming from very prestigious institutions such as Cambridge, Oxford, Venice Ca' Foscari, Upenn, EPFL of Lausanne, Parma, Padova, Rome, Florence.

The digital workflow generated by our methodological approach includes data capturing, archiving and data management, virtual reality, augmented reality, gaming and simulation. Data capturing involves remote sensing (multispectral drones, GPR, ground penetrating radar, digital photogrammetry, laser scanning), archaeological excavations and landscapes' surveys. Data archiving involves the creation of 3D repositories, while VR applications are developed for the Duke DiVE (Duke Immersive Virtual Environment), Oculus Rift, Oculus Go, AR (augmented reality) and related systems. In the past five years, we have delivered several apps (some of them developed by Duke students) and two virtual museums in Italy: the virtual museum of Regium Lepidi, and the exhibition "The Trajan's Puzzle" at the Museum of Imperial Fora in Rome. The virtual museums are permanent installations open to the public and hosted in historical and archaeological city-museums. The lab serves also a large community of undergrads, grads and PhD students and as well post-doc scholars in archaeology, history, classical studies, computer science, neuroscience and digital humanities in general. The Dig@Lab has its home at Visual Studies (Smith Warehouse Bay 10) but it collaborates with several different departments at Duke such as Classical Studies, Nicholas School, Computer Science, Robotics and Institute for Brain Science. It can count on two

post-docs, two PhD, 1 MA students, plus several undergrads. The lab is the ideal cross-disciplinary incubator for digital technologies and the humanities.

MULTIDISCIPLINARY RESEARCH AND EDUCATION
The Dig@Lab is one of the leader research teams in the digital humanities of the Bass Connection community and it worked since 2014 with over 50 undergrads and 15 MA and PhD students. It collaborates more specifically with the XR Studio lab, the Robotics lab and the neuro-humanities group (Franklin Humanities Institute). It was also the main organizer of the series on Neuro-Archaeology, sponsored by Mellon (special guests: Vittorio Gallese, Colin Renfrew, Lambros Malafouris, Anjan Chatterjee).
The lab equipment includes a wide range of technologies: georadars, 5 types of drones, robotic total stations, VR devices (Oculus Go, Rift and Quest), AR tools and devices, holographic screens, 3D cameras, 3 optical scanners, a time of flight terrestrial lidar, professional DSLR cameras, rover-robots and a several kinds of laptops and workstations. In terms of software and apps, the lad is equipped with the most important packages and trendy products for research and teaching.
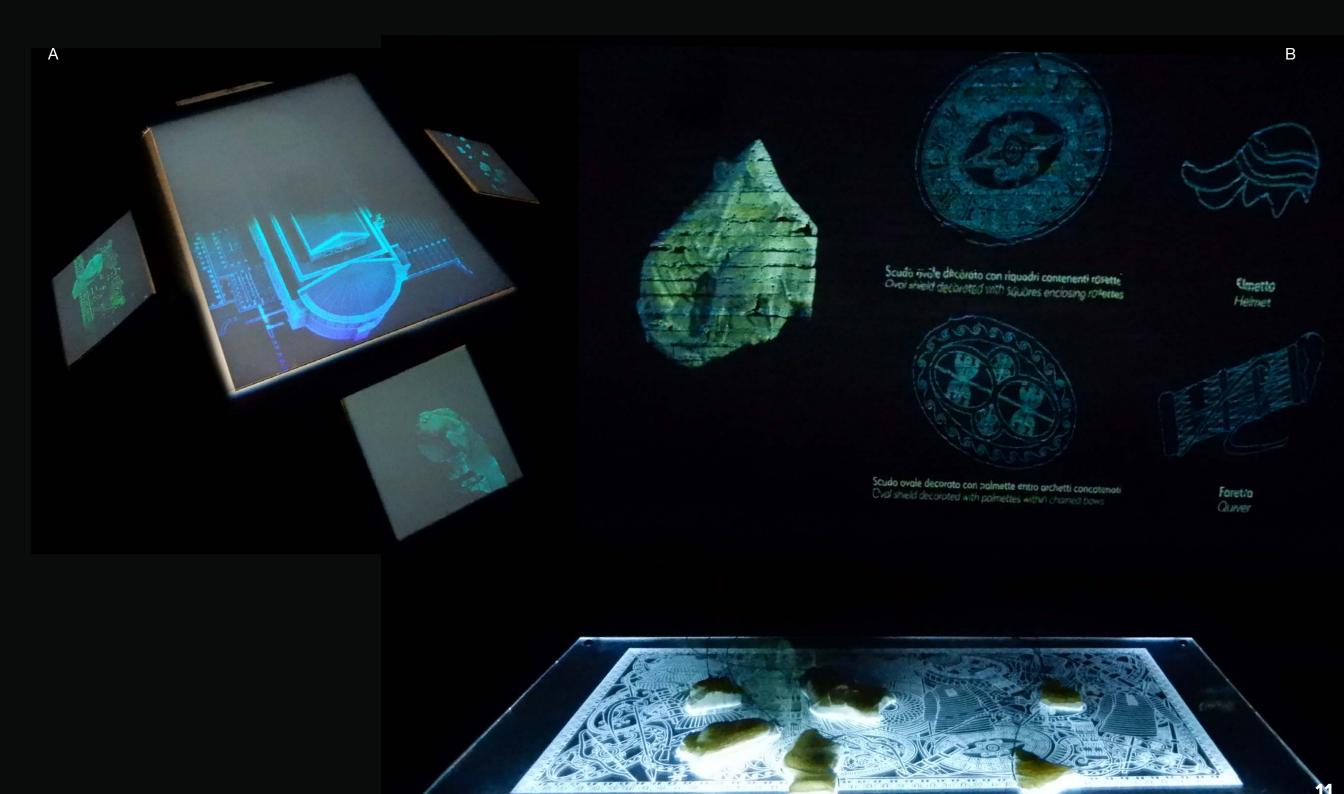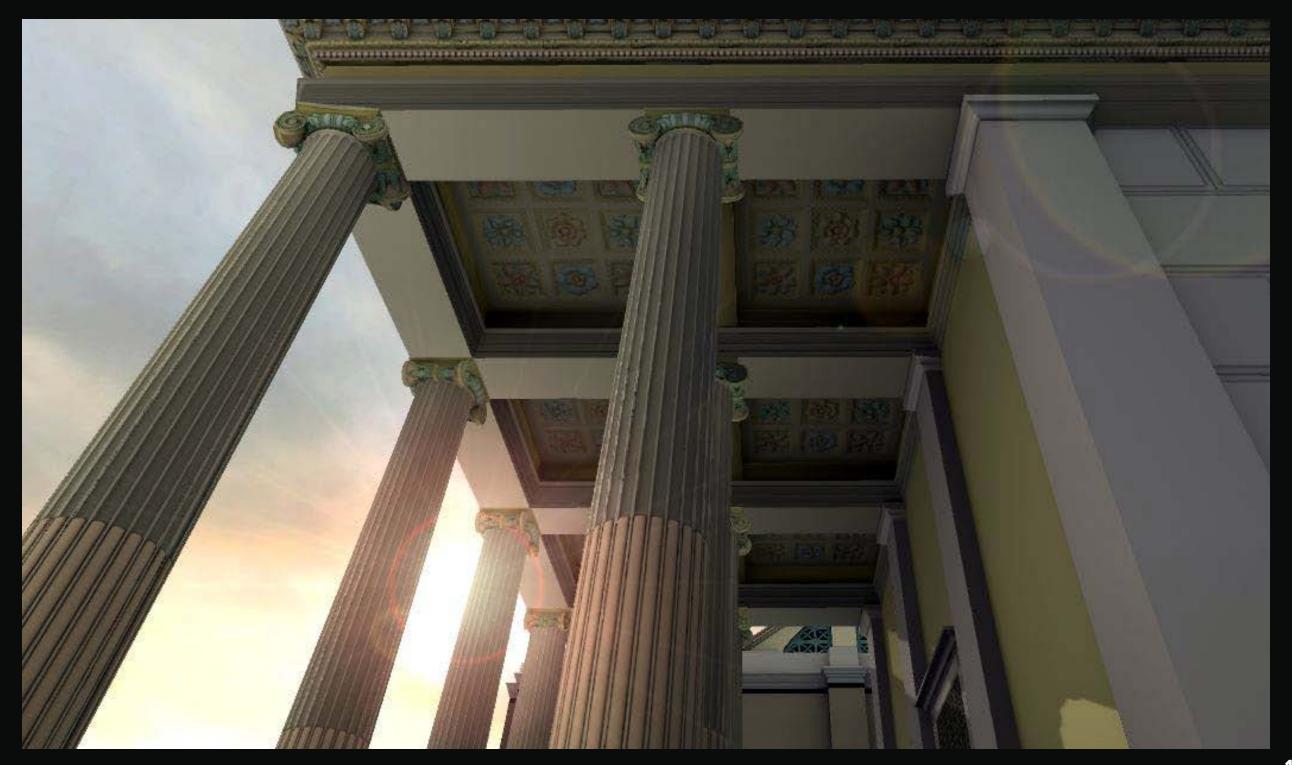
A B
C D

8

A

B

9

A

B

Scudo ovale decorato con riquadri contenenti rosette
Oval shield decorated with squares enclosing rosettes

Elmetto
Helmet

Scudo ovale decorato con palmette entro archetti concatenati
Oval shield decorated with palmettes within chained bows

Faretra
Quiver

11

the emergence lab

CO-DIRECTORS: JOHN SUPKO, PHD AND BILL SEAMAN, PHD

Since 2014, the Emergence Lab has been a site of interdisciplinary and transdisciplinary teaching, research, and collaborative creative work at the undergraduate, graduate, and faculty levels. Through its cross-listed seminars, exhibits, and publications the Emergence Lab facilitates new ways of making and thinking about art in multiple media, focusing on computational modalities. It aims to include as many Duke students and faculty as possible in these explorations. Very few media labs explore emergence and generativity through computational means.

We *enhance the research* of Duke by contributing student- and faculty-initiated works of art and media related technological research that take multiple forms – exhibitions, performances, audio recordings, papers, books, media installations, and major software systems.

We attract students from multiple departments including Computer Science, Mathematics, Music, Visual Arts, Literature, Neuroscience, Engineering, Economics, and Art History. Supko also teaches a course related to innovation entitled Arts Entrepreneurship that often meets in the lab. Additional courses taught in the lab include Experimental Interface Design, Experimental Drawing focusing on computational tools, and Experimental Sculpture. We have also held workshops related to physical computing, and virtual reality. We also attract students from the research triangle: N.C. State, and U.N.C. - Chapel Hill.
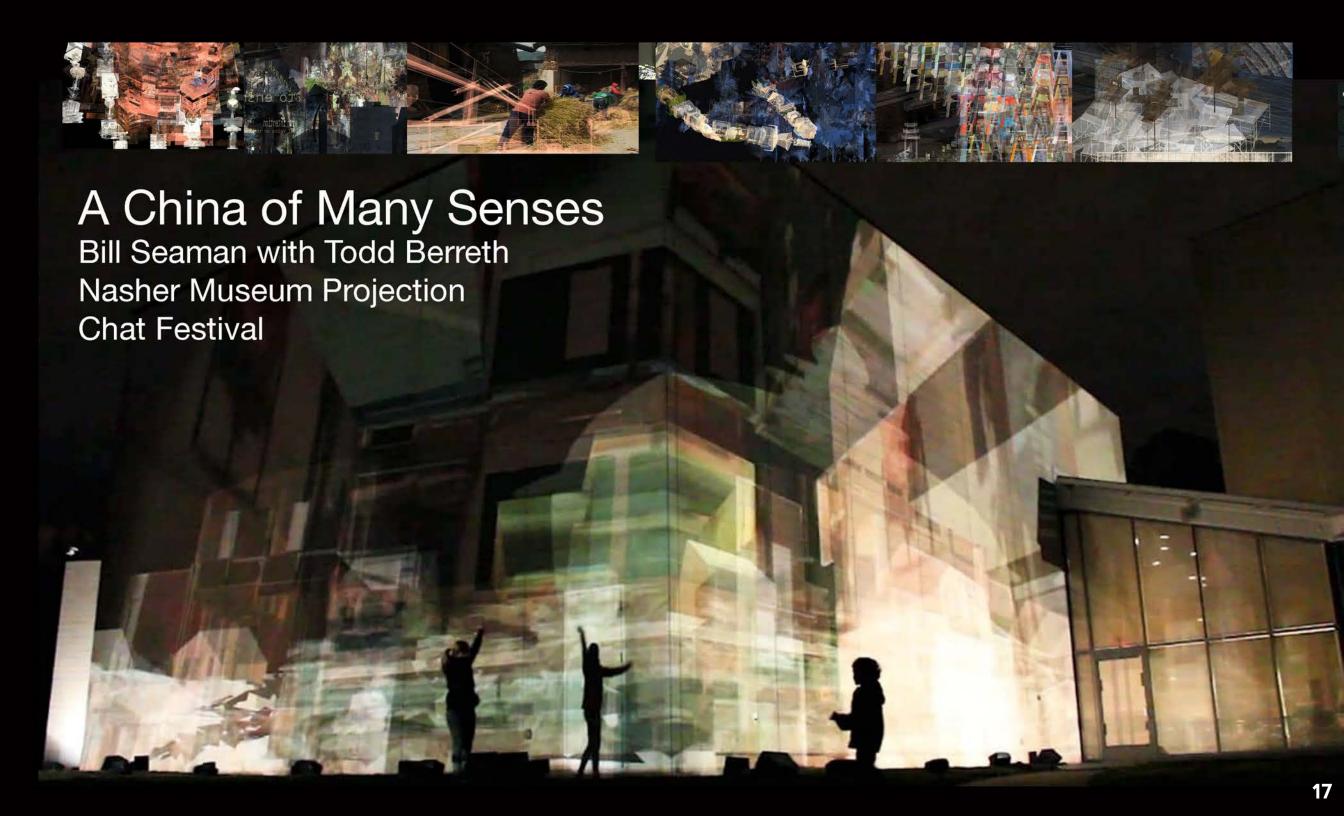
In both our album s_traits and in our experimental performance work called The Oper&, commissioned by the Mary Duke Biddle Foundation, we developed complex computational systems to explore generative music and text. Additionally, in The Oper&, we focused on generative image, and lighting to complement live human vocal and movement performance. Alternately Seaman and Matthew Kenney (and others) have worked to develop a transdisciplinary search engine, entitled The Insight Engine, that is related to the future of AI. Supko has also developed real-time computational musical scores that have been performed internationally. We are very interested in having each student develop their own creative voice in terms of computational potentials.
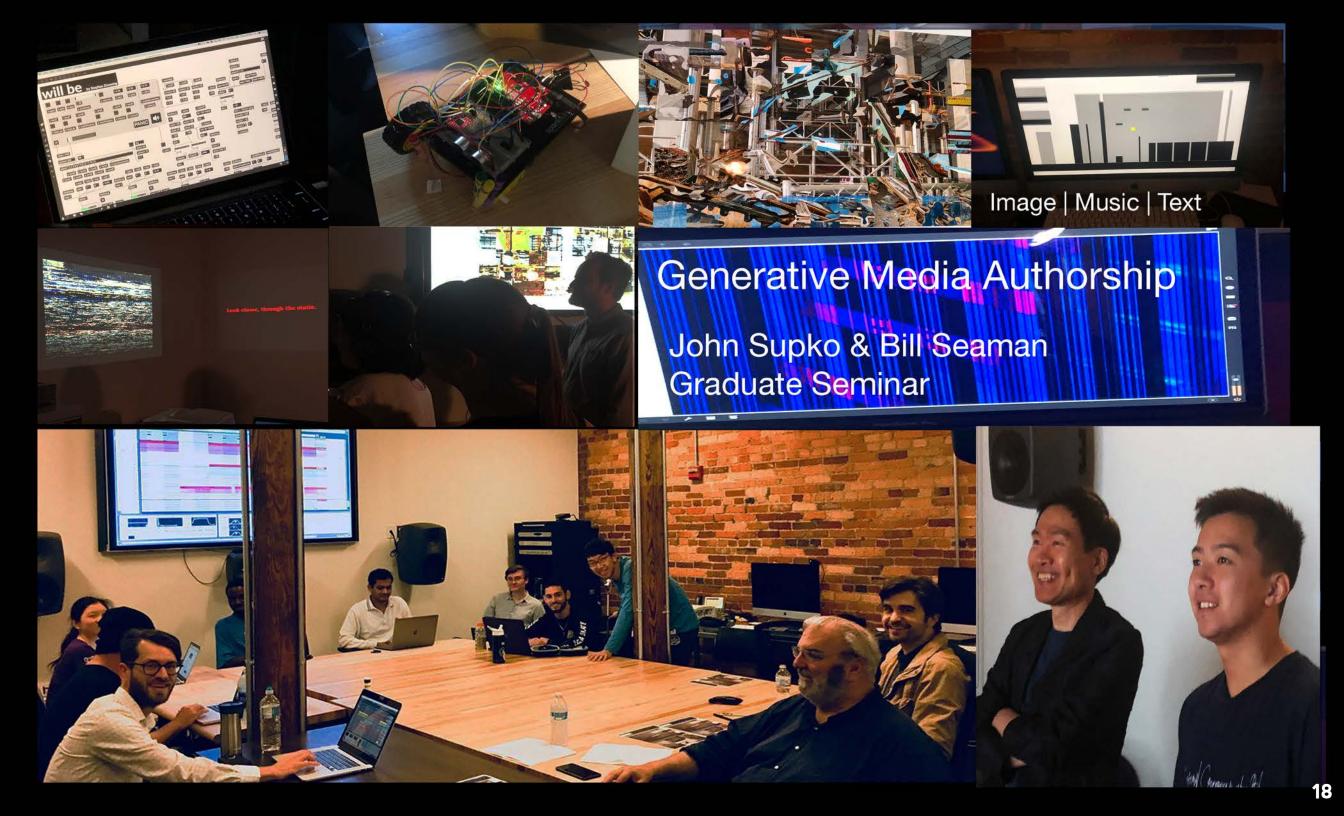
We include the history of art as well as computation, and the history of media experimentation, in developing new understandings of the potential of contemporary computational processes. This includes AI, experimental processes related to novel database design, visualization, sonification and the new possibilities of hapticization, as well as the development of creative (aesthetically oriented) computational engines. Central is the enhancement of each students' creative exploration of computational processes, which later can be folded back into STEAM-oriented research.

The main lab projects have included The Oper& - an experimental generative multimedia opera; the CD s_traits (Mentioned in the top 10 of new classical releases of 2014 in the New York Times and Boston Globe), a work employing AI music generating engines and human collaboration; The Insight Engine – an experimental form of transdisciplinary database employing AI and computational linguistic processes; A China of Many Senses (Seaman, Berreth) , a computational generative work which was presented on the facade of the Nasher Museum via industrial-sized projections.
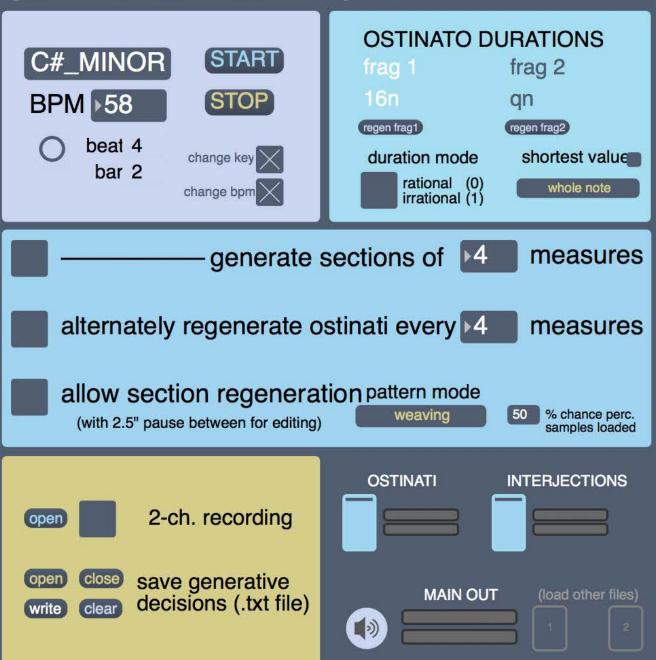
We have had a series of distinguished international visiting scholars from Canada, Europe, and Asia. We have facilitated three year-long residencies by international scholars at the lab. We have published a series of papers in international peer-reviewed journals, and the UNESCO-funded Handbook of Anticipation, as well as Anticipation Across Disciplines, a unique research area including cutting-edge computational implications.
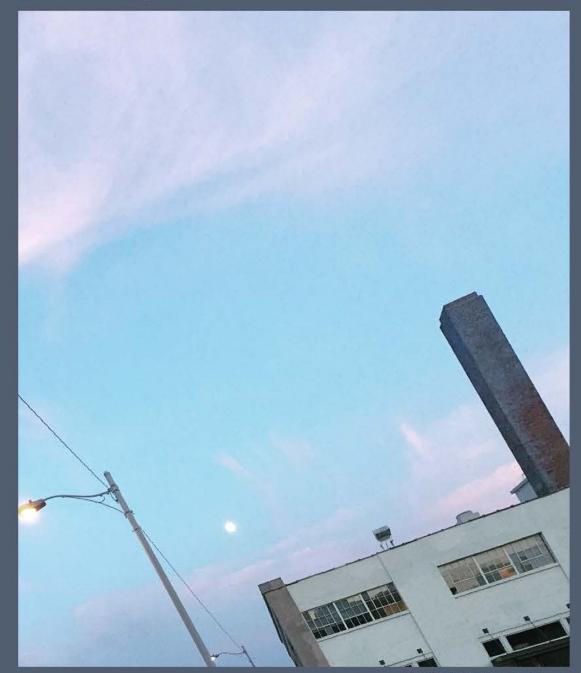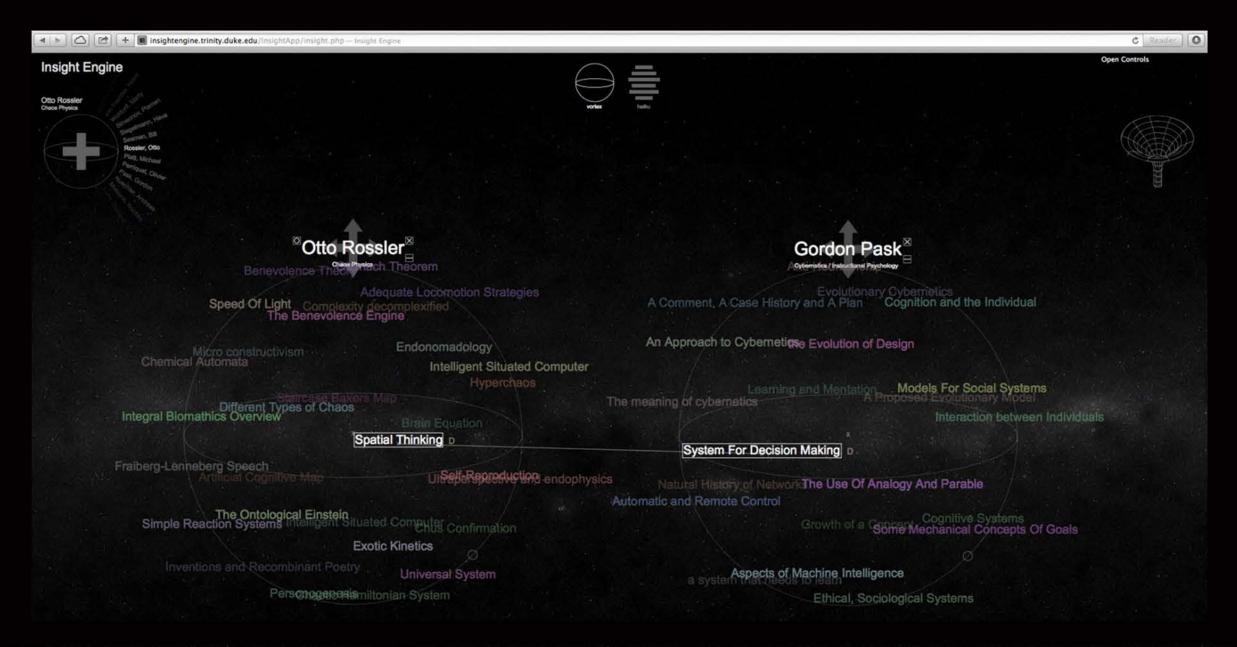
THE_OPER& by John Supko & Bill Seaman;
directed by Jim Findlay; performance by Lorelei Ensemble

a generative experimental opera driven by AI

16

A China of Many Senses
Bill Seaman with Todd Berreth
Nasher Museum Projection
Chat Festival

Image | Music | Text

Generative Media Authorship

John Supko & Bill Seaman
Graduate Seminar

18

second factory

generative music engine

john supko

C#_MINOR

START

STOP

BPM ▸58

○ beat 4
bar 2

change key ☒
change bpm ☒

OSTINATO DURATIONS

frag 1
16n
regen frag1

frag 2
qn
regen frag2

duration mode
rational (0)
irrational (1)

shortest value
whole note

——————— generate sections of ▸4 measures

alternately regenerate ostinati every ▸4 measures

allow section regeneration pattern mode
(with 2.5" pause between for editing)
weaving
50 % chance perc. samples loaded

open ☐ 2-ch. recording

open close
write clear
save generative decisions (.txt file)

OSTINATI

INTERJECTIONS

MAIN OUT (load other files) 1 2

19

The Insight Engine - Transdisciplinary Search Engine and Database
Bill Seaman with Todd Berreth, Matthew Kenney, and Olivier Perriquet

Passage Sets / One Pulls Pivots At The Tip Of The Tongue
Wall of Light Version - Bill Seaman with Todd Berreth

audio-visual performance
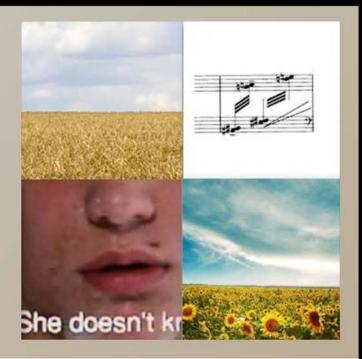Uliasz and Karriem

Quran Karriem
Endings

Computational Media, Arts and Cultures PhD students working in conjunction with the labs and related exhibition spaces.

Quran Karriem's endings is a generative text and audiovisual work that engages with data on fatal encounters with police in the US since January 1, 2015. The dataset is actively maintained by the Washington Post, and each new entry is added to the piece. The data are incorporated into brief stories that range from the purely factual to the subjective. As the stories appear onscreen, the placement and coloring of the lettering accumulates, losing textual legibility while revealing an image. The rendering of each story is accompanied by an audible tone in a stereo field. Higher pitches constitute younger ages at time of death, while the left-to-right placement of each tone corresponds to the location of the encounter within the range of longitudes in the continental United States. Occasionally, a computerized voice breaks through the din of tones to read one or more of the illegible stories aloud.
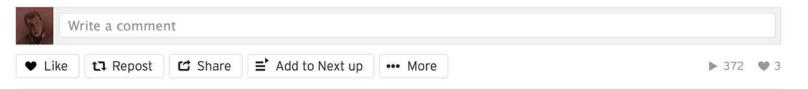
John Supko
FLESH

6 years ago

#Experimental

26:36

She doesn't kr

Write a comment

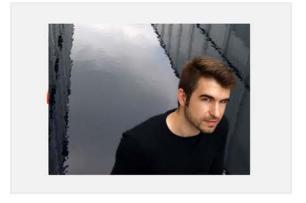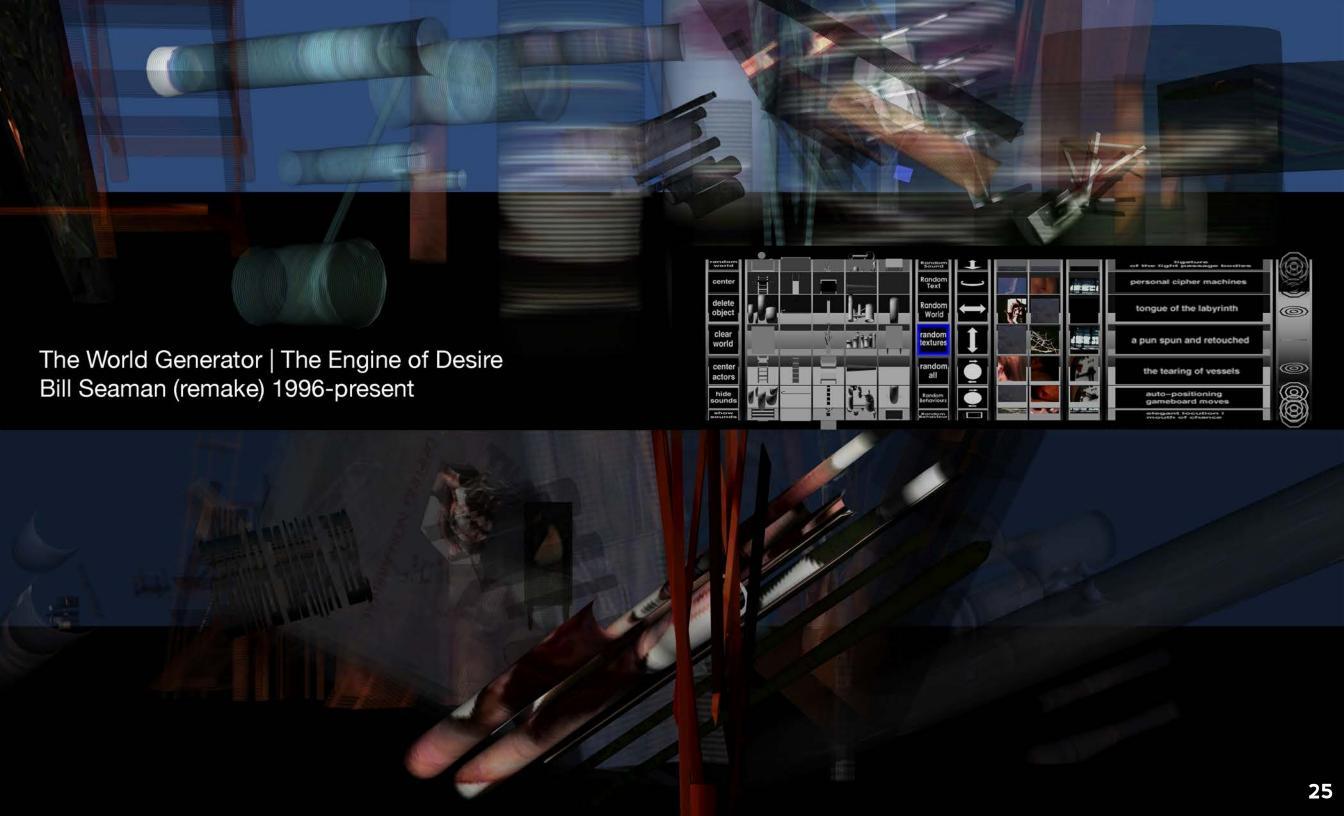♥ Like   ↻ Repost   ↪ Share   ≣' Add to Next up   ••• More   ▶ 372   ♥ 3
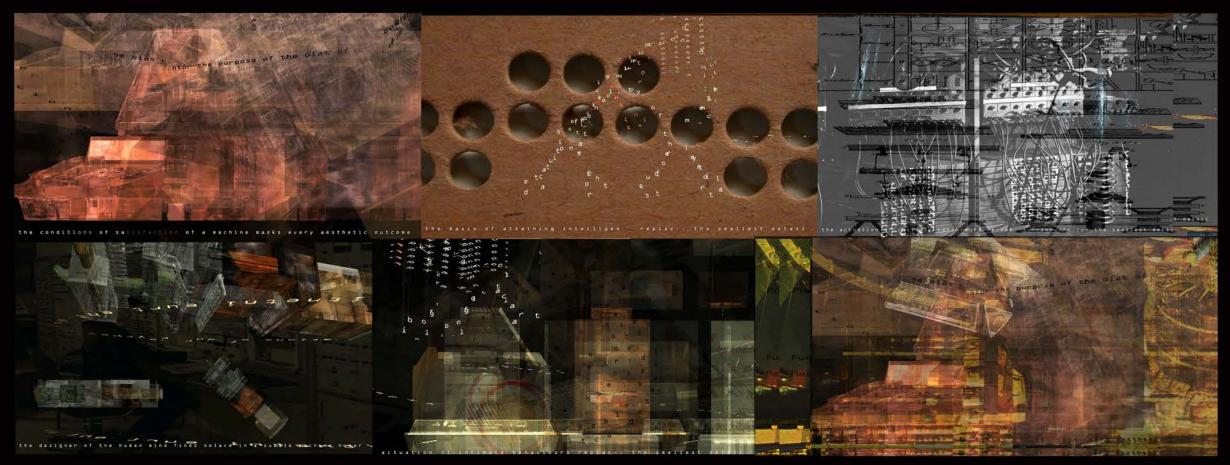
John Supko ⊛
👥 142   ◖◗ 124

FLESH, written for Jack Dettling, is a work for vocalizing pianist and electronics conceived as a series of images: a long, pensive walk in a faraway city; a simple song relentlessly and violently interrupted; a train barreling toward an unknown destination; a computer that studied poetry with Christopher Knowles; an uneasy coexistence of the sacred and the profane (a Bach chorale and 1980's shock radio); and, finally, the frenetic energy of an amusement park tamed by the vagaries of a wandering mind. FLESH seeks to depict both the serendipitous beauty and arbitrary danger, or even violence, of the technological age by using both generative processes and extreme noise to create sonic environments that the pianist must

Show more ▼

◖◗ Related tracks   View all

24

The World Generator | The Engine of Desire
Bill Seaman (remake) 1996-present

Engine of Many Senses
Generative Virtual Environment
Bill Seaman with Todd Berreth

SELECTED PUBLICATIONS & COLLABORATIONS

s_traits (2014)
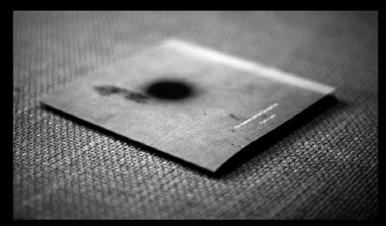Seaman & Supko

Light Folds (2013)
Seaman & Craig Tattersall

f(noir) (2015)
Seaman & Craig Tattersall

divine the rest (2014)
Supko & NOW Ensemble

the pale catalog (2015)
Seaman & K. Leimer

Luminous Hands (VR work, 2015)
Seaman, Sonke Johnsen, Biology/Photonics,
Todd Berreth, programmer

undergraduate classes
experimental drawing

a free invention for george pitcher

commissioned in honor of his 88th birthday by jeffrey edelstein

TURN ON (CLICK ONCE)

TURN OFF (CLICK ONCE)

dac~

by john supko (2013)
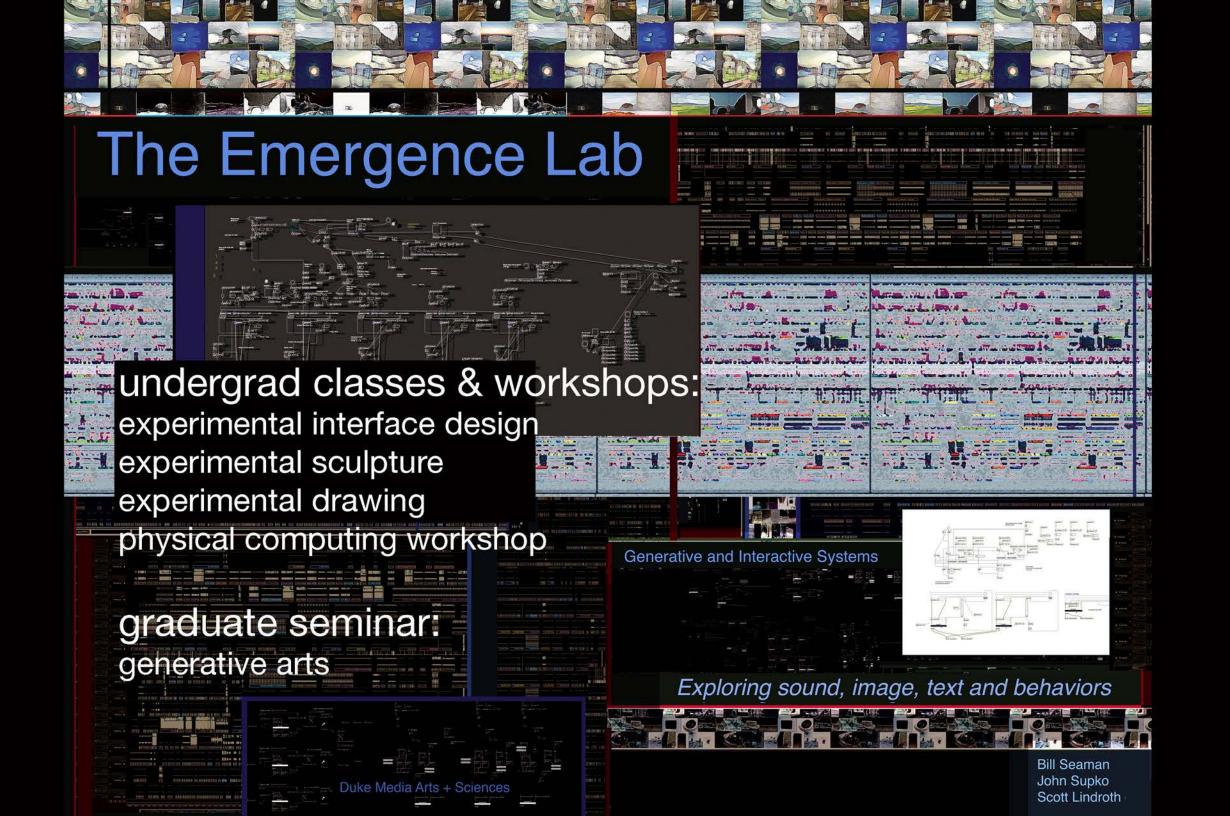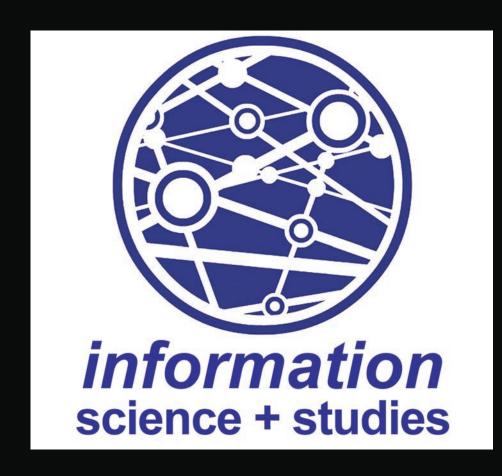
29

s_traits
Bill Seaman and John Supko

OUT FROM THE STRAITS
Jeffrey Edelstein

s_traits is an ongoing collaboration between Bill Seaman and John Supko. It started in 2011 with conversations about generative music and how to make it. The two quickly discovered that they had been independently exploring what might be described as the "uploading" of human creativity to the computer: Supko's work involved developing software that emulated his compositional process; Seaman was investigating how creativity could be codified and reanimated through artificially intelligent systems. A narrative history of the collaboration between Seaman and Supko captures how they wrote s_traits. Their work together began when Supko gave Seaman the electronic track from a discarded version of his percussion duo Straits. Seaman edited this track into hundreds of tiny samples, many lasting barely a second. These samples became the first entries in what would evolve into a database of source material for s_traits. Over the next two years, they added more than 110 hours of varied but complementary sounds to the database. The new material included field recordings, analog and digital noise, acoustic and electronic instruments, cassette recordings of Supko's juvenilia, recordings of Seaman and Supko playing the piano (inside and out), and soundtracks from documentaries made in the 1960's and 70's. As the source material began to expand, Seaman and Supko increasingly focused on the technical details of using the computer to compose music. The majority of the samples in the database were created with a series of software tools designed by Supko. This software was also able to generate new hybrid samples from the existing collection. It thus enabled both composers to remix—again and again—the work of the other. The unpredictable results of these processes were added to the database. When the sample database reached its current proportions, Supko built a new software system that could navigate the many hours of music in the database, extract and recombine dozens of samples, and compose complete multitrack compositions. The new system paired these compositions with fragments of a text Seaman wrote after the poem Straits by Kenneth Koch, which had inspired Supko's earlier percussion duo. (Seaman's text appears in full on the album cover.) But rather than leave the system's compositions untouched, the composers treated them as first drafts, which they developed into the tracks on the present CD. In the end, 26 tracks were composed this way. Both composers contributed 13 tracks, although Seaman and Supko do not identify who composed what. The two sets of 13 are interwoven so that all the odd-numbered tracks belong to one composer and the even-numbered tracks to the other. Every track begins with a text fragment, which also serves as a title. Seaman and Supko plan to write a track for each of the more than 300 remaining text fragments.

Jeffrey Edelstein is a critic and Director of New Music at Crane Arts in Philadelphia.

s_traits ••• what I say it is, it is not • what I say, I say in the silences • reviver • a bidirectional revolution • a code in the breaks • putting a spin on coded records • the late voice was welcomed in • the boat gently oscillated • a room of numbers in one • roussel never made it to africa • the ocular canal • lined with tiny waves • using misunderstanding • the woman's pun was spun • a textile of the turntable • turned the tables and was run • run the code at different speeds • time fetched and stretched • this is the temporary housing • of sound I seek • readymade for rrose • setting a coded trap • the point, the pinnacle, self-writing code • capsized through the father of motherhood • the horizon of time • seemingly frozen in drops • crystals of saline, or salient props • crystalline shoes • the deception of destiny • is chance thrown • the spinning of the tall telling • the stillness of the day • the first words to be cast • the soft lips spread • the tongue in touching voice • the trajectory of code words • maneuvering cyphers • in removing the disengagements • detachment rains • thè stable shifter oscillated • droning on across the day • probabilities at play • the voice flew • through a window of chance • the home of sonic decay • re-seeding the distance, till nothing fell there • bathing in the low light • licking the soft white ligature • the i-ching was spoken • a stumbling visit to stochastics • a silent shower of words • the liquids delicately fell • acting as they do as substitutions • gentle persuasions, invasions, on less than ocular occasions • the legitimate family resemblance • the thrown sense • palpable, taking on another • the forking cut • the throat of light • the salient flow • action at a distance • the floating sight • the flesh curtain • the sensual tongue • folded and folding • the cycle is over as soon as it begins • the breath of chance • in a change of wind • the still are moving and moving still • windows are spoken, bored, and barred • the drunk is plastered and sings a succinct cypher • the legacy hardware is put in motion • breathing life into the old code • the drive is on the blink • the broken voice is crackling across the surface of the direct impression • waxing poetic • waxing pathetic • swimming in the reproduction as a substitution of tongues, one finds a full house • a pool of loops, a loop of pools • a sentence swimming in uncertainty • the rotating branch of indeterminacy • the birdsong is rhythmic, repeated, rare • the atmosphere derived of swells and swallows • thoughts are in the air • the lines of flight glisten from the angles that bare all • the slight slit, the hint of a glimpse • the hands of chance • the symbols are posted • skyward across the horizon • smoke signals and screens • unchallenged • the physical code flew in a straight line, winded but flowing • the wall was penetrated by codes • the single signal code: true • the spinning of this truth • a recording of the lie • the lay of the land • the release of a sigh • the painter's voice and the singer's eye • the painting was of wind on water, described by smeared words • on a mirror touched in steam • confused with intention • to expose the mouth • the breadth of the text, the breasts heaving • the memory of a moment • the mouth of chance • flourished and smiled on the day • a word released in sway • across a forest of signs • the exploded sense well taken, rewarded in kind • in flight • the wording, though wandering, went away • the edifice slid, silently • the wall fell astray • the wall of a boat floating • the river of change was swollen • like the throat of chance • but later the line was filled with the salt of tears • the records were circling along with the crew • and energies were channeled • panoramas were encrypted • sent from the shore • deplete or imply • the wind of a voice • swept the sleeping in specific • turned the tongue to the tune of a dream • the love of the moment • the falling of the now • the audience sits still • the machinery of chance, the shunting, the swell • the angle of the timing • the clicking • the shell • the hiding place • encoded with entrance • the grafting of the tones • gave purchase to the shell • I had fallen for the delicacy • the sweetness of her tell • the doubled was doubled over • drunken like a boat • on a sea the horizon reflects upon the shifting lines • banking the poetics of light • the lines were red • coded as they were • a point, very fine • in the blue of sadness • the sky was mourning after such a night • after all the love lost and the loss of the light • the painted lips moving • delicately take flight • the cost of the tongue • translations and tempting the code of silence • the river empty • the fate of the straits or the traits of inflection • the words have legs • running askew • the dream has a pearl • the silence was as full as even cage knew • in love as in art we pay for our tongues • the words are sticky • the words are sung • the bearings are clear • the straits well known • the lover has spoken • a seed well sewn • the one who tempted the action • spoken in whispers, in vespers and code • the painter of sound invested in the word • as an actor of being • as building a world • as generative as a tongue • touching tongues it is told • the analog of code, the vocal chord • the autocatalytic space • the parallel space of focused fires • the flight into new territories • the distributed space of a thought • the signal sets flowed across the twilight of language • the translation forming a new life • spoken in the crystalline jewels of mathematical logic • the clicks and drums also formed a conversation • the dance of multi-value logic was in play • silence spoke in its own gesture language • hands circling • the touch of fingers on the hand of the other became her sensual description space • the absence of spoken words • formed the images of the landscape • not unlike sung maps • the flower of her lips shown even if still • the messenger of the facial expression mirrored the landscape of fire • the light danced through the dense smoke as it built moving lines • touching the senses • the voice of gestural intonation spoke warmly of this abstracted vision • in slow motion • the color of light shown again as blue • as they gathered their thoughts • across the waves • again stood still • breathing • and banked on quiescent gestures • chance and change motioning • predictably arcane • the luminous hands • the books were encoded and airborne • the voices cast shadows • and from the distances of silences • a plural and parallel • a set of worlds was born • the cover was in a different key • highly abstracted • pleasantly reformed • a number of rooms, a room of numbers • they spoke with clicks and popping tongue touches • against the roof • coming to know the longing vocabulary • and the melting away of the words written in steam • the fountain was penned but was never captured fully • the train of thought is always in the now • the now is always delayed • time buffers and biological frames • he followed his intention of random walks and i-ching driving for the finds • and treated this like drifting on the tides • cycling back and forth • here painted light was revolving code • painted sound and painted text • words made luminous • and the lines lived beneath the surface of the sound • the piano was quietly restructured • becoming furniture for the guests • holding the music in his fingers • the body of the text was strewn to the wind, left hanging in the air • this founding of words was later elegantly scattered and deeply reflective • yet merging with the landscape • the sound was entrained • the lines focusing flows • out from the straits • the drunken train strayed from the tracks • and found rooms for sensual play • the library at alexandria became luminous • and still a motioning toward quiescence • the waves were sold as code and the code was sold as waves • the reviver was rewritten • nosing out the ambivalences • the eskimos kissed • the apartments are numbers performed and recast • chance fell across the doorway • providing the mix • the tenuous movements of the dance formed the evening • and betting on musical chairs, the furniture was encircled • the circular route • a rotation of records and drives • the investment was clothed in an erudite air • the circle became the cycle of night and day • tarkovsky's waters are always close • and lovers are soon to be found • the chance of meeting • in sound all full of heat, emotion, and light • the record revealed • a revolution etched with urgency • it isn't what I say it is • the double bind was danced and played so many times it skipped • against the volume of the sea • and ears were ringing off the hook • the least likely line was followed • and jumped from time to time • the memory was strong and the odor recalled it • like wax cylinders in cyphers • the surface noise remained • ada's visions were displayed with the operative music machine she wrote • the dead man's switch stopped the long line • and the steam still spoke • etched on the mirror • through the cycle of paradox • all became clear • nothing was moved • actioning a rotating schedule • code words formed the surface of the sound • shimmering and shifting • the blue sound was well known • the loop pools flowed as if to become one • the field of codes • the cypher was spun • all was one in continuous blue • luminous hands wrote the code in taps • night fell everywhere simultaneously • overtaken by deep blue • the angle of the lips • spread the soft dark news • in this nook this frigid look • and the ice appeared blue • electricity was conducted • until energy was lost • as displaced in uncertainty • as the words of the day • the memory theatre shifted to code • and the code words passed away • the ambassador of light • distributed the lines • the straits and places and bearings all fell away • roussel's stateroom was certainly the place • and descartes' doll could not be traced • flung overboard as poetic justice • chance words fallen on deaf ears • distributed and displayed • the quiescent eye around which winds of high velocity move • one addresses with song • the sadness of the day • with taps and somber tones • muted trumpet would play • the straight tune played drunkenly • passed through the readymade • gesture to blue • and floats a line that puns as it plays • the double bind bristling with the life of the day • the fall had broken • where the code was spoken • leaving the lips to play • the code was broken where the lips had spoken • the floors shifting • the furniture was splayed • holding its breath the silence shimmered • her lips for a moment mouthed the lines • the fabric of her code was woven in song • at the end of the mouth • on the tip of the tongue • one notices what one has forgotten • the code from beneath drives the lines • mercurial as the light ••• recombinant text after the poem "straits" by kenneth koch — bill seaman (2012)

The Emergence Lab

undergrad classes & workshops:
experimental interface design
experimental sculpture
experimental drawing
physical computing workshop

graduate seminar:
generative arts

Generative and Interactive Systems

Exploring sound, image, text and behaviors

Duke Media Arts + Sciences

Bill Seaman
John Supko
Scott Lindroth

31

DIRECTOR: VICTORIA SZABO

The Information Science + Studies Program and Center focuses on the study and creation of new information technologies and the analysis of their impact on art, culture, science, commerce, society, policy, and the environment. We are a campus hub for interdisciplinary digital humanities practice as well as for exploration of emerging technologies such as digital archives, mobile apps, and extended reality systems. We offer undergraduate and graduate Certificates in ISS, as well as provide support and advising for CMAC-related courses and students. We work closely with the Libraries, Bass Connections Information, Society & Culture, and Computer Science and coordinate the ISS Lab and the XR Studio in Smith Warehouse. We are also a curricular hub for the Duke Games Initiative in Trinity, and co-sponsor workshops and events with the Digital Humanities Initiative at the John Hope Franklin Humanities Institute. ISS pre-dates CMAC, the MFA in Experimental and Documentary Arts, and Visual and Media Studies as a major in AAHVS, and to some extent helped incubate and shape the development of all of these.
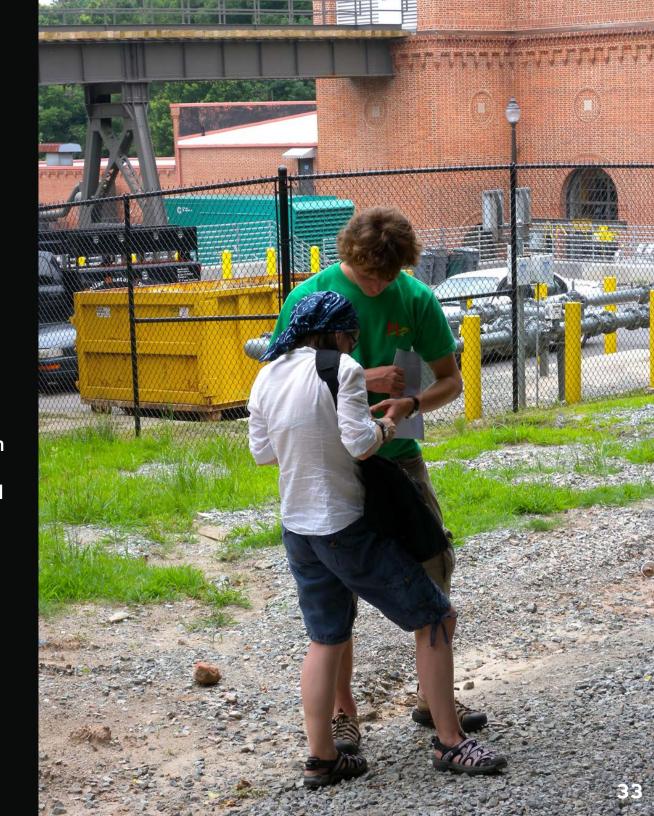

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Our lab is combines study of new technologies with implementation through collaboratively produced projects that involve undergrads, grads, faculty, staff, and community partners. We explore the theoretical and critical aspects of the technologies we engage as well as providing how-to guidance on using them effectively. We are focused on teaching and fostering connections amongst disparate communities to facilitate new kinds of authorship.

ISS draws students from a wide variety of disciplines. We are currently coordinating the effort to formalize an interdepartmental undergraduate major between Computer Science and Visual and Media Studies, as well as a Computational Media, Arts & Cultures interdepartmental minor. Students from public policy, market and management, and innovation and entrepreneurship are also attracted to our programs and courses, as are students from engineering. Our emphasis on seminars, ongoing digital projects, and engagement with traditional disciplinary interests in the arts and humanities, as well as with the potential of new media, make us a site of open exchange and communication around new technologies and their effects.

ISS has originated courses and workshops in a variety of technical areas. These include: web development, mobile apps, physical computing, data visualization, digital storytelling, virtual and augmented reality, and games. We offer courses in these topics as well as support projects in the Wired Lab, Bass Connections and at the grad level in CMAC and Digital Art History. We also teach the gateway Information, Society & Culture course, as well a course on the Googleization of Knowledge.

SHARING DURHAM, ONE STORY AT A TIME

Durham Stories is the final project for the 2015 Information Science and Information Studies certificate at Duke University. Our capstone project seeks to foster the relationship between Duke students and the Durham community through an interactive experience with originally curated content.

We present original media about Durham created for Duke students and by Duke students in a mobile application employing augmented reality technology. Try it out at https://www.layar.com/layers/test1liv8u. A companion website houses all of our audio, video, and photo content at durhamstories.info.

Through the Layar application and the website we connect Duke students with the stories of Durham, cultivating a deeper understanding of the place we live and encouraging exploration and interaction.

TRY THE MOBILE APP

Explore Durham through unique geolayer technology in an interactive augmented reality experience with our Layar mobile app.

To open this layer, scan the QR code to the left using any AR-link compatible browser, such as Layar, Wikitude or Junaio.

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Critical thinking, social responsibility, and ethics are a part of what we do. Our longstanding research project on Digital Durham serves as a way into the application of these concerns into an ongoing digital history and archiving project. The courses we teach also touch on these topics. We also support inquiries into the downside of new technologies, such as the digital divide, privacy issues, the social effects of online communications, and the erosions of authority and expertise as well as of historical awareness. Creativity is an essential part of the process. Traditionally the ISS Capstone has focused on a student-driven, group final project undertaken over the course of a semester.

Digital Durham – archives, history, cultural heritage, representation, including historical context for contemporary controversies in the city. Has been supported by Bass Connections. Multiple courses, ongoing digital archive and apps projects. (Co-Leads: Trudi Abel and Victoria Szabo)
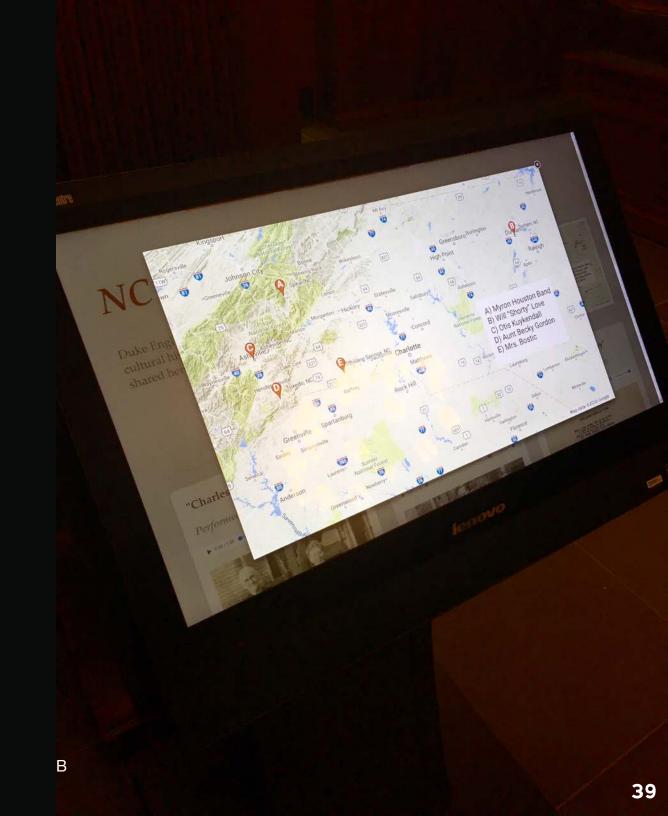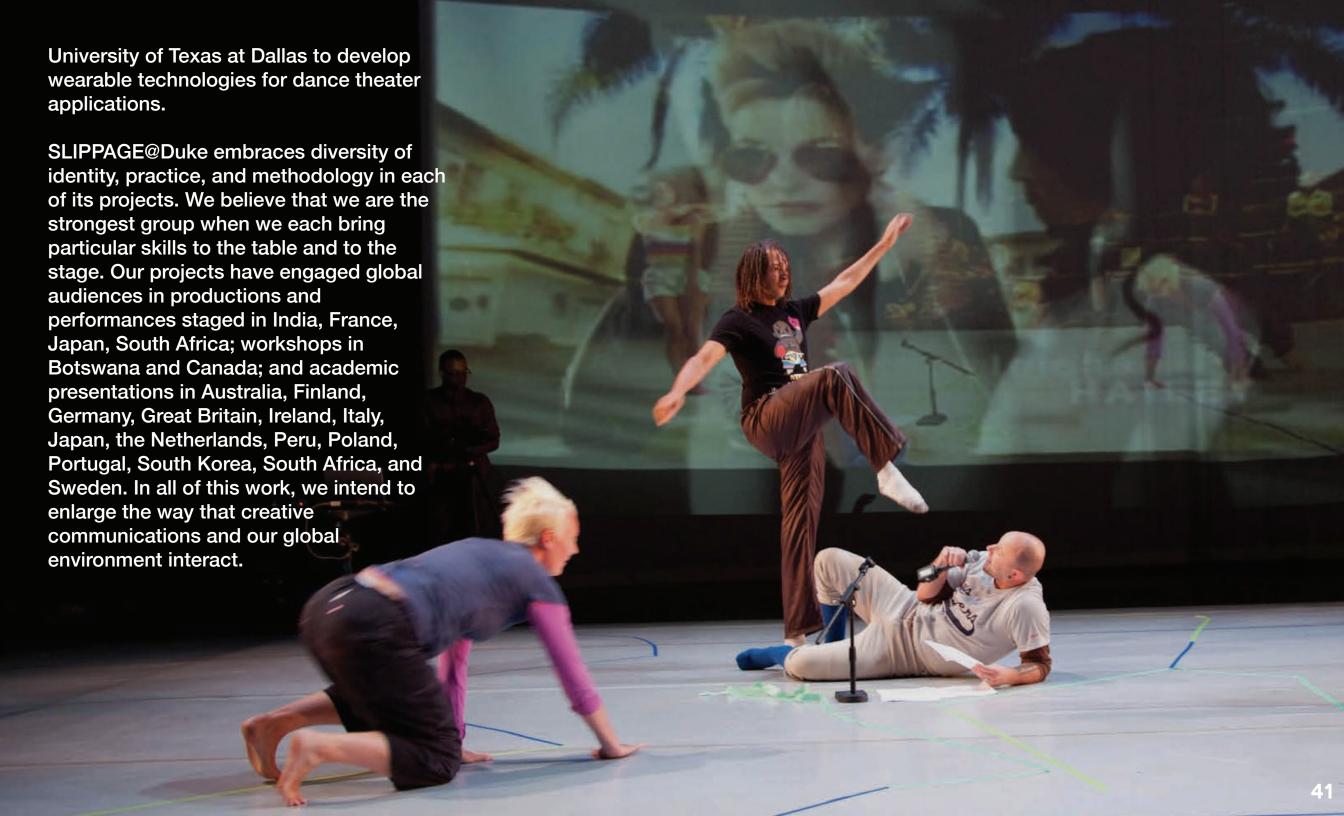

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SLIPPAGE

PERFORMANCE CULTURE TECHNOLOGY

DIRECTOR: THOMAS F. DEFRANTZ

SLIPPAGE@Duke is a think-tank, an interdisciplinary performance research group that explores connections between performance, history, theater, and emergent technology. SLIPPAGE@Duke builds on the urgent need for intentional, critical, and timely interaction among artists, researchers, audiences, engineers, faculty, students, and general publics in the arts. Located in the Rubenstein Arts Center on the Duke campus, SLIPPAGE@Duke has a special imperative to organize cultural events that help us all imagine how creativity and expression operate at the core of artistry, humanity, technology, and social possibilities. SLIPPAGE@Duke produces conferences, symposia, workshops, and artist exchanges in events that mark social progress via research in performance. Recognized globally, SLIPPAGE@Duke remains at the forefront of innovative thinking and reinforces Duke University's status as one of the leading research universities in the world.

SLIPPAGE collaborates with leading artists drawn from a wealth of creative practices: polymedia artists, choreographers, performers, theorists, historians, directors, technologists. Highlights of the first seven years include a "Best of the New" award from the Boston Globe (2005); grants for new creation from the National Performance Network for Project Development and Touring; and a collaboration with the
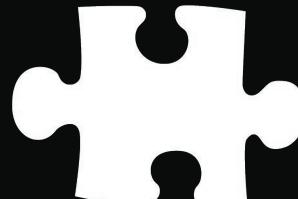

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University of Texas at Dallas to develop wearable technologies for dance theater applications.

SLIPPAGE@Duke embraces diversity of identity, practice, and methodology in each of its projects. We believe that we are the strongest group when we each bring particular skills to the table and to the stage. Our projects have engaged global audiences in productions and performances staged in India, France, Japan, South Africa; workshops in Botswana and Canada; and academic presentations in Australia, Finland, Germany, Great Britain, Ireland, Italy, Japan, the Netherlands, Peru, Poland, Portugal, South Korea, South Africa, and Sweden. In all of this work, we intend to enlarge the way that creative communications and our global environment interact.

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SOCIAL PRACTICE
DUKE UNIVERSITY

FRANKLIN HUMANITIES INSTITUTE

DIRECTOR: PEDRO LASCH

In the last two decades, socially engaged art has entered the life of museums, universities, corporations, and even governments. Described as participatory art, relational aesthetics, and social practice, to name a few, the variety of terms and definitions for the phenomenon is as rich as its prolific and at times contradictory manifestations. Early champions like Tom Finkelpearl, Anne Pasternak, or Nicholas Bourriaud now hold top positions in official institutions.

While this is all cause for celebration, the mainstream embrace of these practices is rarely accompanied by a deeper understanding of their history, or an appreciation for the complexity of their methods. Universities are best equipped to provide a remedy by strengthening the impact and scope of social art with the rigorous structures so characteristic of the sciences and humanities at research institutions. Socially engaged art, on the other hand, may provide more traditional academic disciplines in those very institutions with fresh and unexpected approaches to interdisciplinary work and collaboration, a higher degree of public engagement, as well as deeper student involvement through a full range of knowledge production that intentionally balances intellectual, cognitive, and affective dimensions.

Ultimately, the promotion of social art practice and its integration to the university is only the first step towards the more relevant goal of reevaluating the notion of 'arts and sciences' and also creating a more socially engaged humanities. Regardless of any existing connection to art, social practice may in fact be restored to its rightful place as a core mechanism of intellectual life, extending far outside the art gallery, the university classroom, or the research lab. By its very name, the Social Practice Lab thus resists and complements traditions that see individualist introspection as the main access to scientific and artistic discovery. We will attempt to know the world through each other and each other through the world, even as others still prefer to know themselves.

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S-1 SPECULATIVE SENSATION LAB

CO-DIRECTORS: MARK HANSEN AND MARK OLSON
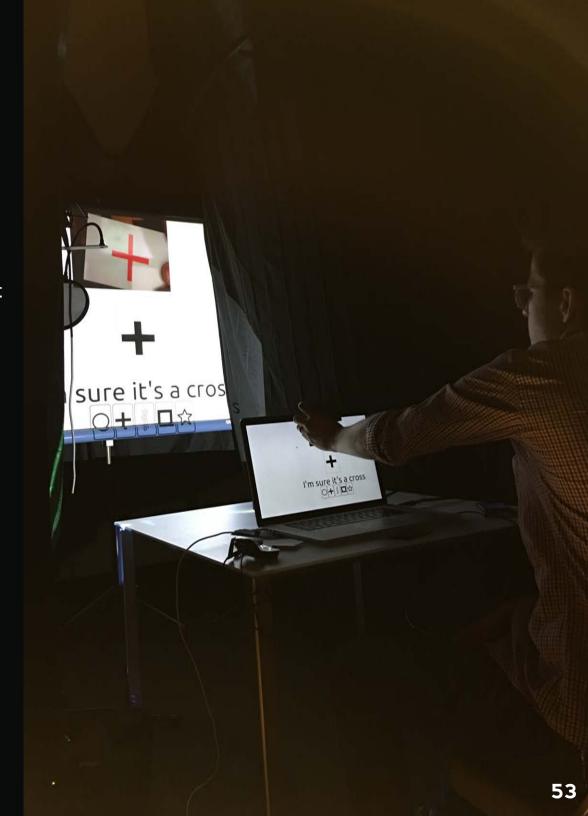
Our collaborative work uses biometric and environmental sensing technologies to expand our access to sensory experience beyond the five senses. Our work is informed by the premise that digital technologies have opened new vistas for accessing and conceptualizing our robust embodied contact with the sensory environments in which we live. Our projects aim to explore this enhanced contact and to make the sensory experience it involves more intense. As we see it, digital technologies allow us to access our complex and robust embodiment and our coupling to the environment in ways that evade introspection, perception through the five senses, and other subject-centered modes of experience; assisted by the array of biometric sensing devices that can report on the states of such bodily functions as heartrate, galvanic skin response, eye movement, and brain wave activity, we can gain indirect, technically-mediated insight into the bodily states that – following arguments from philosophers like Spinoza, Whitehead, and Deleuze as well as neuroscientists like Damasio and Edelman – inform our bodily activity within larger sensory environments as well as the higher-order conscious representations that emerge on the basis of that activity.

Our artistic projects and research endeavors – which range in form from large-scale installations to data visualizations, internet applications, game platforms, and sensor interfaces – aim to occupy the spacetimes between these bodily states and their technical mediations in order not simply to gain more information about our embodiment and environmental coupling but to empower such information as the agent of future embodied experience and the intensification of our contact with the environment. Our effort to redirect biometric and environmental information toward the future is guided by our conviction that enworlded embodiment, despite its vague and opaque epistemological status, is the exemplar of concrete experience, meaning that it is always implicated in concrete culturally- and politically-inflected situations. By exploring the concrete agency of "worldly" sensation beyond the five human senses and prior to the separation of body and world, we hope to better understand and to experiment with what we believe to be at issue in today's (and tomorrow's) "smart" environments: the dispersal of subjectivity across scales and the shift in its locus from closed systems to complex, multi-tiered environmental processes.

The S-1 speculative sensation lab is a space for artistic experimentation with emerging digital technologies and their impact on sensory experience.

Projects
• Networked Synesthesia™
• Somameter
• Manifest Data
• MindWave
• Network(ed) Metabolism™
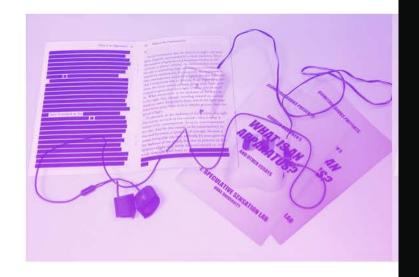• The Biometric Selection Engine™
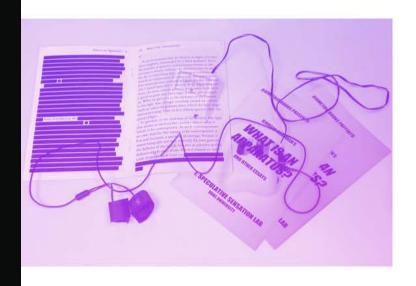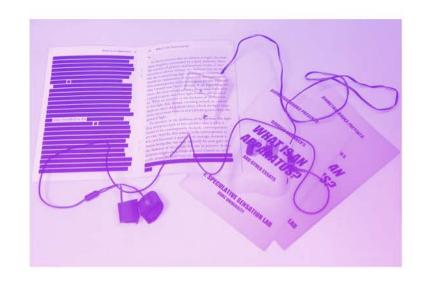
NETWORKING SYNESTHESIA™

We do not limit the modules to thinking things. Whether breath and speech, light and heat, or heart and hardware, speculative sensation takes into account the insensible just as much as it does the ordinarily sensible.
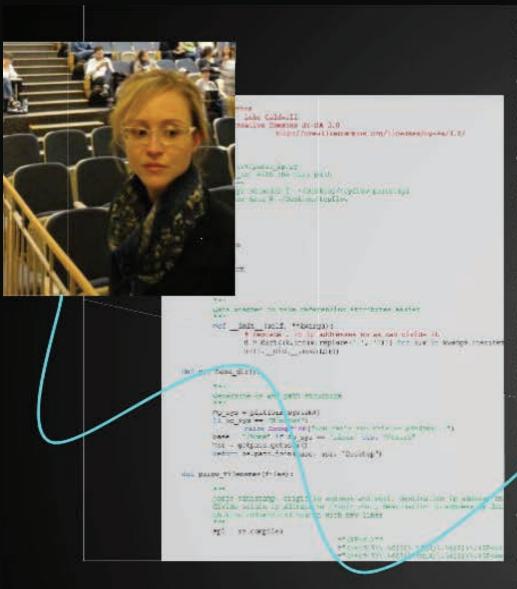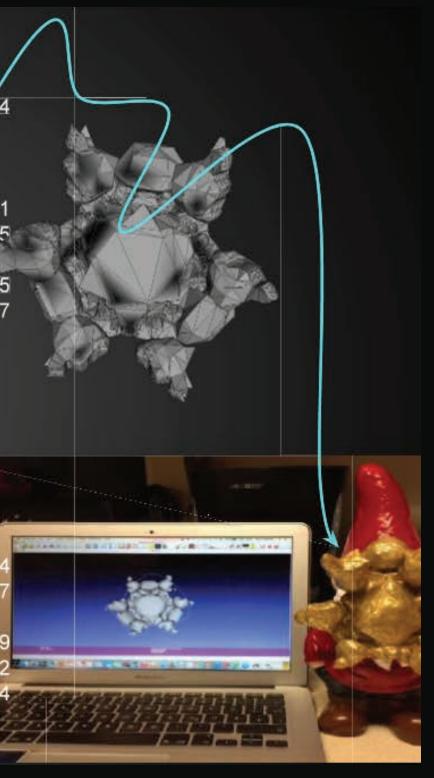
We speculate synesthetically...

BIOMETRIC BOOKS®

THE BIOMETRIC SELECTION ENGINE™

The Biometric Selection Engine™ is designed to supplement attenuated attention within today's information-rich environments. The Engine™ reroutes attentional circuits using biometric indexing of our total sensory attunement to an ever-changing world. As a flexible platform synthesizing GSR, heart rate and EEG, the Engine™ can be adapted to any situation of attentional overload where massive yet personalized compression of information becomes necessary.

S-1 SPECULATIVE SENSATION LAB

```python
        base_dir = get_base_dir()
        tcp_flow_dir = os.path.join(base_dir, "tcpflow/*")
        files = glob.glob(tcp_flow_dir)
        if not files:
                raise Exception("No files to look at. Run tcpflow before parsing.")
        files = [os.path.basename(f) for f in files]
        output = parse_filenames(files)
        print output
        with open(os.path.join(base_dir, "tcpflow_parse.xyz"), 'wb') as f:
                f.write(output)


if __name__=="__main__":
        main()
```

Manifest Data (2014)

Twenty-first century digitally networked systems demonstrate a human-technology coupling that is not adjacent but contingent. S-1's *Manifest Data* is an artistic intervention that investigates this contingency. *Manifest Data* translates personal digital data into physical sculpture to show us that, far from straightforward or entirely distinct, the systemic connections between users and the digital network are deeply interdependent.

In *Manifest Data*, the S-1 Lab uses localized network analysis tools to capture the content and destination of user-scattered *cookie* crumbs dropped, most often unknowingly and unintentionally, during Internet browsing sessions. The code recipe for *Manifest Data* transforms the protocological underpinnings of networking technologies — specifically IP addresses and port numbers — into points defining a vector field that can be fed into a 3D printer or dynamically sculpted by a professional artist.
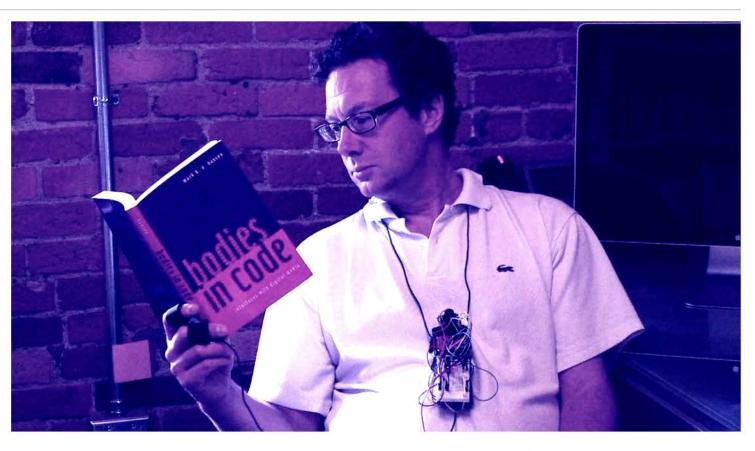
Leveraging the captured data for an analogue interpretation in the medium of hand-sculpted concrete, our artists (re)appropriate the figure of the garden gnome — which has become something of a symbol for 3D printing in general and has figured in demonstrations and marketing for MakerBot in particular — to produce a physical body or "portrait" of user activity that reinforces *Manifest Data*'s inversion of Marx's dictum that "all that's solid melts into air." A further "translation" or mediation between the digital and analogue/material realms is effected by "planting" the gnome digitally in physical space, where it can be viewed and interacted with through augmented reality programs such as Layar/Junaio.

Manifest Data theorizes and represents the cultivation of online social relations and activities for profit and the real effects of western expansion driven by the 19th-century USA ideology of Manifest Destiny. *Manifest Data* demonstrates the digital's metabolism. *Manifest Data* is a 21st century divination, a new phrenology, that connects our models to a set of predictive analytics that allows users to understand the image of their past data as a determination of future behavior.

Manifest Data is our digital double.

http://www.s-1lab.org

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SOMAMETER™

Wired!
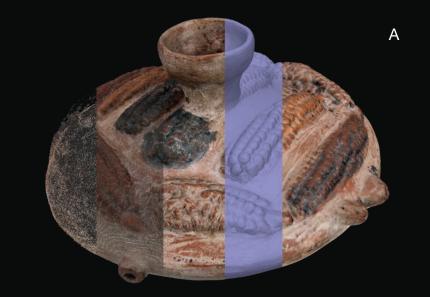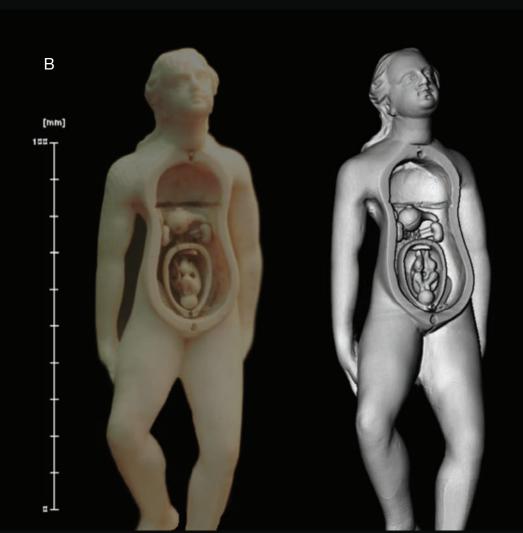## digital art history & visual culture

DIRECTORS: PAUL JASKOT

Celebrating ten years of research and teaching in 2019-2020, the Wired! Lab for Digital Art History & Visual Culture explores ways of thinking about visual and material culture through digital technologies. Wired! is a learning community of faculty, staff, and students. We engage visualization methods to prompt new approaches to pedagogy and scholarship in the study and interpretation of the visual arts, architecture, cultural heritage, and built environments. Wired! research teams are transdisciplinary, collaborative, vertically integrated, and long-term. As part of our intellectual process, we explore how critical engagement with digital tools can transform our capacity to interrogate and contextualize objects, buildings, data, and archival materials; to create narratives about works of art and architecture; to explore process and change over time and space; to redefine teaching and learning practices; to disseminate scholarship; and to engage the public in new ways.
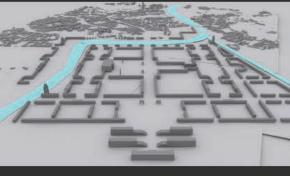
Wired is the leading lab in the country focused exclusively on digital art history and visual culture. We have in particular worked on many different areas of the spatial analysis of historical cities, including Athen, Paris, Venice, Krakow, and Durham itself. Our particularly expertise in 3D modeling and mapping as well as depth of interest in historical research have been widely acknowledged as a model in the broader discipline. Our projects have received funding from, among others, the Mellon Foundation, the Kress Foundation, the Getty Foundation, and the National Endowment of the Humanities.

Our lab research results in many different kinds of outputs, including at different levels of the curriculum. For example, students are currently engaged in the Building Duke project that will result in a website and research portal with modeling, mapping, and analyzing the architecture and urban planning of Duke University. In addition, the current exhibition on Venice at the Rubenstein library combines a long-standing faculty research initiative and expertise with student involvement in creative visualization of an exhibition. A related exhibition opened at the Nasher Museum two years ago, which also combined class work, student participation and the expert research of a faculty member. In addition to these vertically-aligned projects, we are also pushing outwards in a variety of other formats, including an anthology based on Visualizing Venice, articles that engage in the digital humanities (both visual culture and art history), as well as prestigious and competitive summer institutes (most recently sponsored by the Getty Foundation and the NEH).

In sum, Wired is a dynamic community that fosters looking at visual culture and art historical questions with digital methods that challenges students, scholars, and diverse public audiences to evaluate critically the culture around us in new ways.
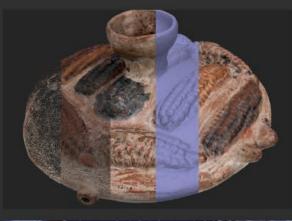
Wired!
digital art history & visual culture

A **community** of
students, staff, and faculty
using **visualization technologies**
to explore **visual and material culture**.

dukewired.org | @dukewired

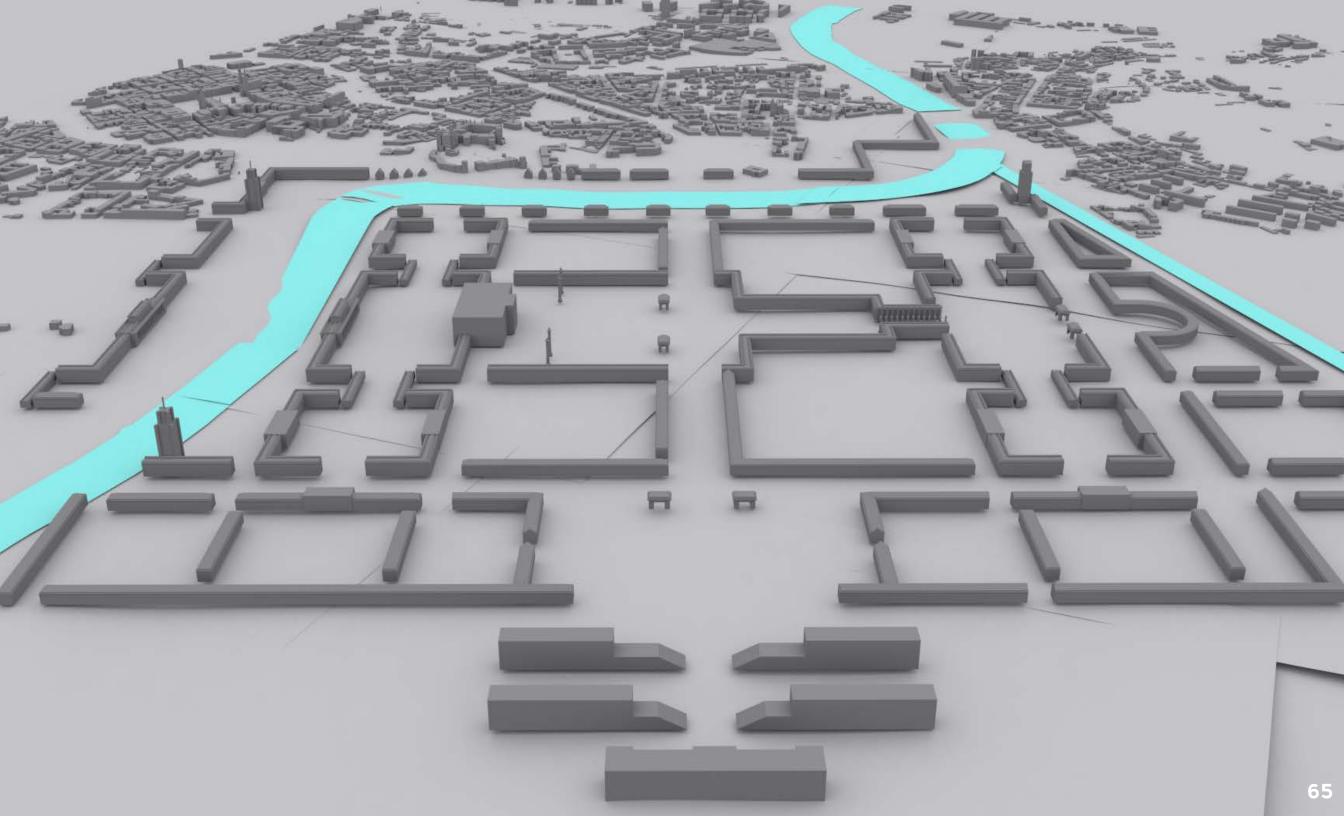# THE MEDIEVAL KINGDOM OF SICILY IMAGE DATABASE

A Visual Resource of Historical Sites c. 1100 - c. 1450

Home | Browse & Search | Map of the Kingdom | What's New? | Copyright and Reuse | Contact Us
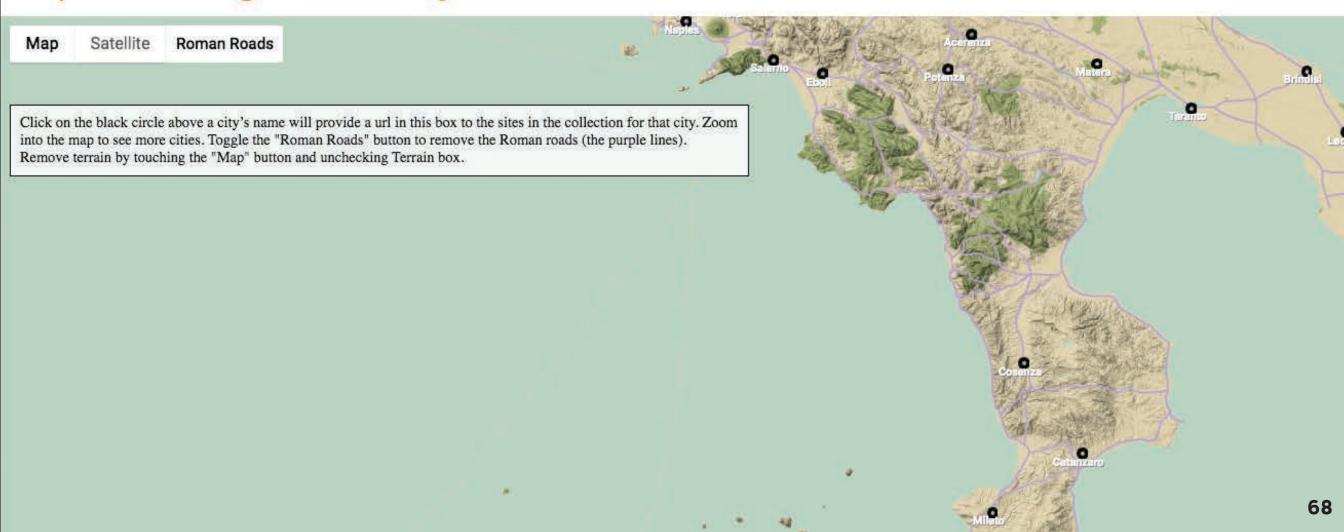
Map of the Kingdom of Sicily

Map | Satellite | Roman Roads

Click on the black circle above a city's name will provide a url in this box to the sites in the collection for that city. Zoom into the map to see more cities. Toggle the "Roman Roads" button to remove the Roman roads (the purple lines). Remove terrain by touching the "Map" button and unchecking Terrain box.

EXTENDED REALITY STUDIO

DIRECTORS: VICTORIA SZABO

Exploration of virtual and augmented reality for digital cultural heritage and media arts. Hub for the National Endowment for the Humanties grant (along with FHI) for the Advanced Topics Institute on this subject. (PI: Victoria Szabo; Co-PI: Phil Stern in History. Hosted by FHI.)

NC Jukebox – exploration of hidden collections of folk music archives once accessible only on glass disks, wax cylinders, etc. with the exception of a few recordings. Supporter of a CLIR/NEH Hidden Collections grant. (Co-Leads: Trudi Abel and Victoria Szabl)

Visualizing Cities – joint project with the Wired Lab in thinking about strategies for quantitative and qualitative approaches to representing urban history and heritage. Support for the Getty-sponsored Advanced Topics in Digital Art History: 3D Geospatial Networks institute grant. (PI: Victoria Szabo; Co-PIs: Mark Olson, Paul Jaskot)

PhD Lab in Digital Knowledge – FHI-sponsored activity. ISS support for graduate students from around campus interested in exploring the impact of the digital on their own work and disciplines. Events, workshops etc. that complement and expand (Co-Directors; Phil Stern and Victoria Szabo)

Data+ - coordination with Data+/iiD around engagement of arts and humanities faculty and students in proposals and project participation. (Liason: Astrid Guigni)

Co-sponsor of the AI and Art Competition, via Matt Kenney's involvement and planned course support for the future.
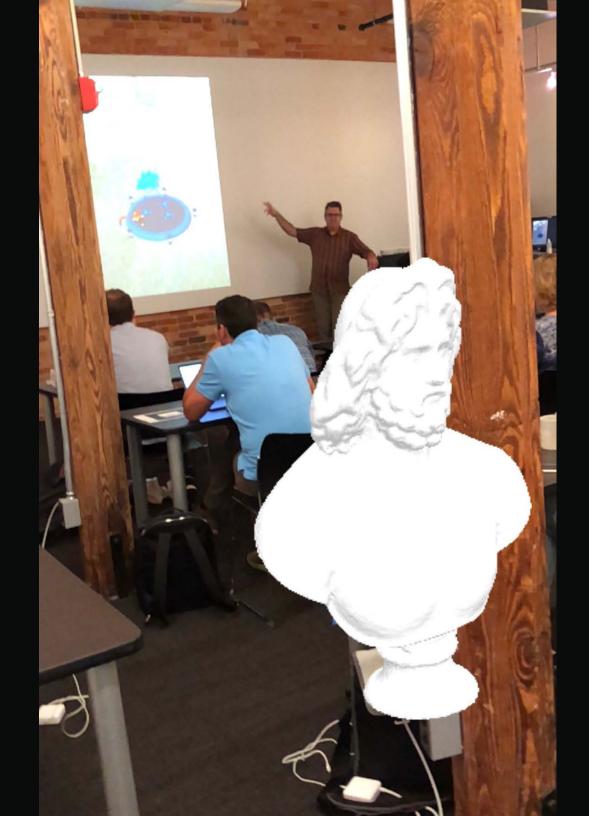
Supporter of the Digital Humanities Intiative at FHI. Events, workshops, activities around digital culture topics. (DHI Director: Victoria Szabo)

Curriculum – courses in various technology-practice topics that would otherwise not exist.

Bass Connections projects (Digital Durham, NC Jukebox, Wired Lab projects. Opportunities for graduate students to teach in these areas, as well as theoretical and critical topics in these areas. Strong link to Digital Art History/Computational Media MA and CMAC PhD through mentorship, advising, resources, and admin support.

Individual Students – mentorship in Program II, Distinction projects that cross these areas (Mentors: Mark Olson, Raquel Salvatella, Ed Triplett, Matt Kenney, Victoria Szabo, Dave Zielinski)
Lab outcomes have manifested more through specific projects such as the Visualizing Venice collaboration housed in the Wired Lab, which yielded an edited volume.

Exhibition for NC Jukebox at the Rubenstein Library and at the Orchards at Alta pass.

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APPENDIX

S.T.E.A.M. CLASSES

Information Science + Studies (ISS) and Visual Media Studies (VMS) have a number of course offerings you might want to consider as you pursue your interests in STEAM -- Science, Technology, Engineering, Art, and Mathematics. Some of these are also tied to the Computational Media, Arts & Cultures Labs in Smith Warehouse and beyond.

Fall 2019 STEAM-related ISS and VMS Courses

- ISS 110: Information, Society & Culture
- ISS 112: The Googleization of Knowledge
- ISS 198: Experimental Interface Design
- ISS 240L/ISS 740L: Web-Based Multimedia Communications
- ISS 305L: Virtual Museums
- ISS 320/ISS 720: Unity 3D Programming and Game Design
- ISS 366L: Data Visualization
- ISS 580S: Historical and Cultural Visualization

Spring 2020 STEAM-related ISS and VMS Courses

- ISS 125L: Foundations of Game Design
- ISS 268: Media History: Old and New
- ISS 270S/ISS 770S: Immersive Virtual Worlds
- ISS 294L/ISS 794L: Interactive Graphics
- ISS 316/ISS 715: Mapping HIstory with GIS
- ISS 356S/ISS 758S: Digital Durham
- ISS 366L: Data Visualization
- ISS 376: Performance and Technology
- ISS 390S: Algorithm and Ideology
- ISS 396: Graphic Design in Multimedia
- ISS 575S: Generative Media Authorship
- ISS 581S: Historical and Cultural Visualization Proseminar 2

AFFILIATED LABS

CAPTIONS (BY PAGE NUMBER)

2: Team members Tatiana Ermakova (Trinity '19), Erin McDermott (Trinity '20), Laura Ritchie (GLS), Marina Frattaroli (Trinity '19) and Jessica Chen (Trinity '20) at our weekly meeting for the DALMI Bass Connections project, "Creative Industries and the Urban Environment," on April 2, 2019.

3A: Visualization Friday Forum on March 29, 2019. Fiene Leunissen (AAHVS) discusses her course, "Theories & Practices of Data Visualization," and the use of the Rubenstein Libraries Special Collections.

3B: TIAMSA Session at CAA Conference 2019. Fiene Leunissen (AAHVS) discusses pedagogical approaches to teaching art markets on a panel organized by AAHVS alumna Sandra van Ginhoven (Getty Research Institute) and Clarissa Ricci (Iuav University of Venice)

4: Intermezzo Lecture on September 25, 2018. Fiene Leunissen (AAHVS), Felipe Álvarez de Toledo (AAHVS) and Laura Ritchie (GLS) present on DALMI Bass Connections project, "Creative Industries and the Urban Environment."

5: DALMI Director, Hans van Miegroet, and DALMI Research Assistants, Fiene Leunissen, Kaylee Alexander and Felipe Álvarez de Toledo at the Duke Reception for CAA 2019.

6: The Roman Forum of Regium Lepidi (virtual reality)

7: Virtual Museum of Regium Lepidi (Reggio Emilia): the Roman Forum

8A: Archaeological excavations in the Etruscan and Roman site of Vulci (Italy)

8B: Bass students engaged with an Oculus headset (virtual excavation of the archaeological site of Vulci)

8C: Virtual Babylon in Augmented Reality ("Virtual Museums" class 2017)

8D: 3D Laser scanning of a Roman mosaic

9A: The Roman Forum of Regium Lepidi (virtual reality)

9B: Roman The Forum of Regium Lepidi (Oculus headset, first release)

10: Regium Lepidi 2200 Project. Virtual Reconstruction of a Roman city

11A: A 3D hologram of the basilica Ulpia in Rome. Duke installation for the exhibit *Trajan: To Build the Empire, to create Europe* (November 2017 to 16 September 2018)

11B: Trajan Puzzle TITA (Tangible Interactive Table for Archaeology). Duke digital installation for the exhibit *Trajan: To Build the Empire, to create Europe* (November 2017 to 16 September 2018)

12: 3D prints of the Roman frieze of the Basilica Ulpia in Rome (2nd century AD)

13: Virtual Reconstruction of a Roman basilica

CAPTIONS (BY PAGE NUMBER)

16: The Oper&, by John Supko & Bill Seaman; dir. by Jim Findlay; perf. by Lorelei Ensemble; Commissioned by the Mary Duke Biddle Foundation, images courtesy the artists, https://vimeo.com/319379764

17: A China of Many Senses, Seaman with Todd Berreth, 2010, images courtesy Seaman and Berreth, https://vimeo.com/38184793

18: Generative Media Authorship Class, Graduate Seminar, Supko and Seaman, photos courtesy of the class

19: Generative Music Engine, John Supko

20: Insight Engine, Bill Seaman, Todd Berreth, Matthew Kenney, Olivier Perriquet, 2014 to present, Transdisciplinary Search Engine and Database – version 1.0 pictured, http://billseaman.trinity.duke.edu/projects/I_E/i_e.html

21: Passage Sets / One Pulls Pivots At The Tip Of The Tongue (Wall of Light Version) Bill Seaman with Todd Berreth. 2010, https://vimeo.com/38180854

22: Performance works by Rebecca Uliasz and Quran Karriem, 2018, 2019 – CMAC PhD students, image courtesy Uliasz (they have worked with both the S1 lab and The Emergence Lab)

23: Endings by Quran Karriem, 2015 – images courtesy Karriem

24: Flesh, John Supko, https://soundcloud.com/jsupko/flesh

25: The World Generator / The Engine of Desire, Bill Seaman with Gideon May – programmer, 1996 to present; Images courtesy Seaman from an exhibition at the Visualisation Portal at UCLA; updated version in progress.

26: The Engine of Many Senses, Bill Seaman with Todd Berreth, 2013, Images courtesy the artists, Auto-Generative Virtual Environment, http://billseaman.trinity.duke.edu/projects/ems/ems.html

27: Selected Publications and Collaborations: S_traits – Seaman and Supko, 2014; Light Folds, Seaman and Craig Tattersall; f(noir), Seaman, 2015; Divine the Rest, Supko, 2014; The Pale Catalog, Seaman remixing K. Leimer, 2015; Luminous Hands, Virtual Reality Work, Seaman with Todd Berreth, 2015, Image courtesy Seaman

28: Undergrad Classes – Experimental Drawing, Seaman, 2019, Images courtesy of class

29: A Free Invention for George Pritcher, John Supko, 2013, Generative Music Engine, image courtesy of Supko

30: S_traits, Bill Seaman and John Supko, 2014, audio CD, images courtesy Supko and Seaman, additional text by Jeffrey Edelstein

31: Undergraduate class/workshop and graduate seminar offerings in the Emergence Lab

32A: Florian Wiencek sets up for Digital Cities course jointly taught in Durham and Bremen, Germany

32B: ISS affiliated faculty/staff discuss program goals (Mark Olson, Paolo Mangiofico, Julian Lombardi, Robert Duvall)

CAPTIONS (BY PAGE NUMBER)

33: ISS students tag Durham locations using GPS coordinates

34A: ISS Certificate capstone project poster for the Durham Stories app

34B: Augmented reality application juxtaposing historic photos of campus activism with contemporary student demonstrations

35: Psychasthenia 3: Dupes art-game still created by ISS Lab Director Victoria Szabo and Joyce Rudinsky

36: Frank Clyde Brown exhibition

37: Wax Cylinder containing the Frank Clyde Brown collection recordings digitized for the NC Jukebox project

38: ISS students and instuctors working with primary archival source materials for the NC Jukebox class

39A: Prototype for the NC Jukebox app

39B: Digital Kiosk for the NC Jukebox exhibition at the Rubenstein Library

40: "CANE," (l to r) Kalin Morrow, Thaddeus Davis, Amber Mayberry, Tanya Wideman-Davis, Duke University, Sheafer Theater, 2013. Photo: Alec Himwich.

42A: "Paramodernities," by Netta Yerushalmy with Brittany Engel-Adams and Thomas F. DeFrantz. Photo: Paula Lobo.

42B: Thomas F. DeFrantz and Kenneth David Stewart, imnewhere, 2011. Photo: Duke University.

42C: Thomas F. DeFrantz, The Sleeping Beauty Notebook. Photo: Chris Bennion.

42D: Professor Thomas F. DeFrantz and Duke students, 2019. Photo: Duke University.

43A: Kyle Abraham and Thomas F. DeFrantz, Duke University, 2016. Photo: Duke University.

43B: SLIPPAGE Studio Performance, Collegium for African American Dance, Duke University, 2016. Photo: CADD Staff.

43C: "reVERSE–gesture–reVIEWed," Brittany Williams, Duke University, Nasher Museum of Art, 2018.

43D: Collegium for African Diaspora Dance, 2016. Photo: Duke University.

44: Judith Butler introducing Digna Rabbia for Bologna SPL, June 2017

45A: Black Block Guard performing for SPL's *Polit(t)ico* in Bologna, July 2019

45B: SPL's National Abstraction Ensemble performing in Bologna's historic Teatro Anatomico, July 2017

46: Security checkpoint at Museo Archeologico for Bologna SPL, July 2017

CAPTIONS (BY PAGE NUMBER)

47: Counter-institutions event at the Carrack in Durham for SPL's *Emergent Futures: Open Engagement* in NC, Sep 2019

48: SPL's human barrier at Bologna's Piazza Nettuno, July 2019

49: SPL's Digna Rabbia Committee Heads leading public procession to Piazza Verdi in Bologna, July 2019

50: Daniel Ruvalcaba and his installation on David Rubenstein called *Who Owns Poverty at SPL's Emergent Futures: Open Engagement in NC*, Sep 2019

51: SPL's Antonella De Francesco's breaking through human border with David Harvey and participants, July 2017

52 (background): Custom circuit board for the Networked Synaesthesia performance

53: Documentation of the Sensory Leakage projectt

54: Slide from Networked Synaesthesia performance

55: Components of the Biometric Book project, which employs the Biometric Selection Engine™, leveraging an individual's biometric signature to offer paths through information overload

56: Description of the Biometric Selection Engine™

57: S-1 Lab alumnus Amanda Starling-Gould presenting on Manifest Data.

58: A Manifest Data gnome

59A: Full poster for Manifest Data project

59B: Manifest Data on display at Rutgers University-Camden Digital Studies Center

60: The Somameter™, a biometric lifelogging camera

61: Wired!: A community of students, staff, and faculty using visualization technologies to explore visual and material culture. Image Credit: Wired! Lab

62A: Digitizing a Corn Pacha. Image Credit: Mark J.V. Olson

62B: Digitized anatomical figures. Image Credit: Mark J.V. Olson

63: Wired!: A community of students, staff, and faculty using visualization technologies to explore visual and material culture. Image Credit: Wired! Lab

64: Fridays in the Wired! Lab. Image Credit: Hannah L. Jacobs

65: Model of the Ideal Nazi Plan for Krakow. Image Credit: Davide Contiero

66: Historical GIS of the Kraków Ghetto. Image Credit: Christine Liu

CAPTIONS (BY PAGE NUMBER)

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