

Metamorphoses

VISAP'16, the IEEE VIS Arts Program

Oct 23 - Oct 28, 2016

Baltimore, Maryland

Urban Radiance

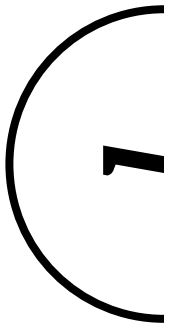


What do global datasets that estimate population density, economic productivity, measles outbreaks, rural poverty, resource footprints and electrification rates, urbanization and suburbanization, or average wages have in common? They are all based on nighttime imagery of city lights captured by the Operational Line Scanner (OLS) sensor on the satellites from the US Defense Meteorological Satellite Program (DMSP).

What should later become the workhorse of geographers and economists was initially a completely accidental by-product: of

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Urban Radiance



Dietmar Offenhuber

Northeastern University

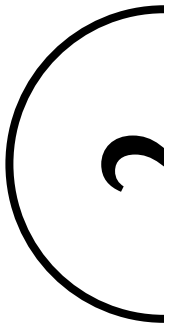
<http://offenhuber.net>

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What do global datasets that estimate population density, economic productivity, measles outbreaks, rural poverty, resource footprints and electrification rates, urbanization and suburbanization, or average wages have in common? They are all based on nighttime imagery of city lights captured by the Operational Line Scanner (OLS) sensor on the satellites from the US Defense Meteorological Satellite Program (DMSP). What should later become the workhorse of geographers and economists was initially a completely accidental by-product: of a cold-war era military satellite program—launched in the 1950s by the US Air Force for estimating cloud cover and precipitation for reconnaissance missions. Army engineers discovered that the sensors were sensitive enough to capture artificial radiance of cities during moonless nights without cloud cover.

In 1978, Thomas A. Croft published the first global composite of night-time images in the Scientific American. At that time, the image data had to be manually stitched together from analog films ejected in capsules from the satellite, which had to be laboriously recovered by the military. Today, the Black Marble data set has become one of the most popular motifs of space imagery. While DPMS images are usually used to show regional differences, Urban Radiance visualizes the temporal change in radiance from 1992 until 2015, along with a comparison to country-level GDP and population data from the UN. It is the first interactive visualization of radiance time series data.

Roads to Rome



At least for Europe it is obvious: All roads lead to Rome! You

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Roads to Rome

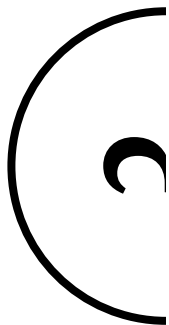
Benedikt Groß
Raphael Reimann
Philipp Schmitt

moovel Group
<https://lab.moovel.com>

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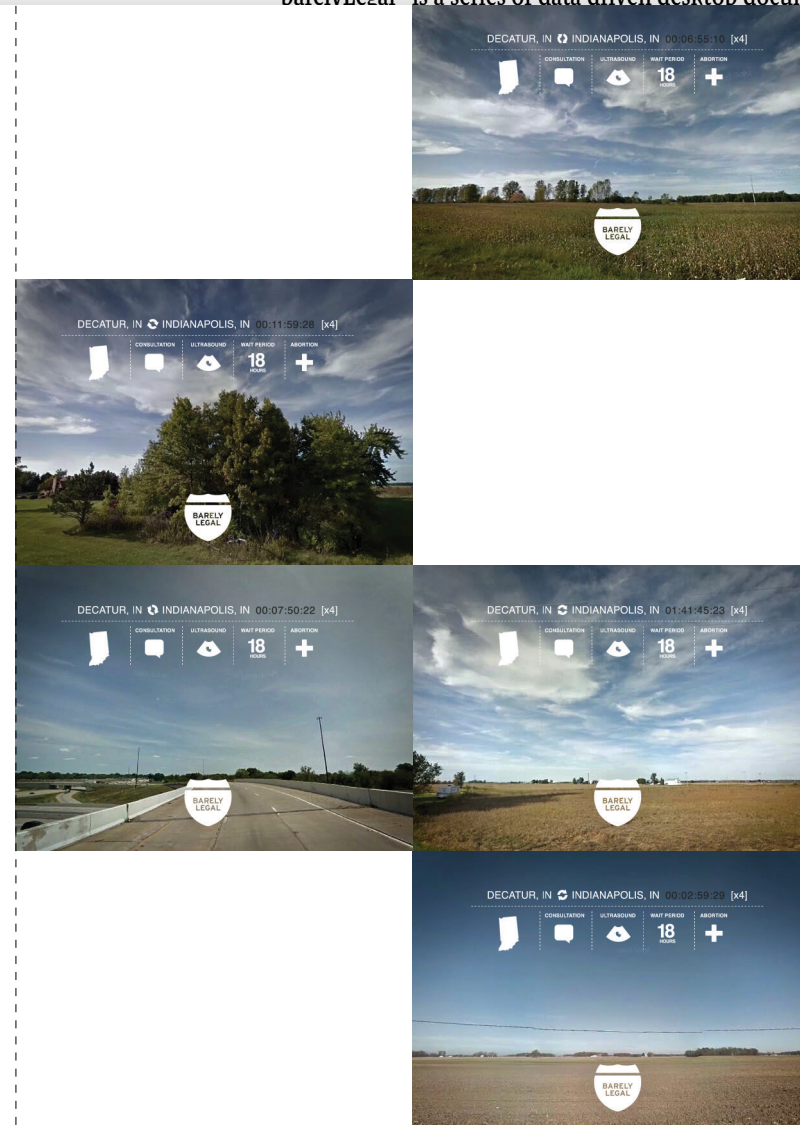
At least for Europe it is obvious: All roads lead to Rome! You can reach the eternal city via almost 500,000 routes from any point across the continent. Where do you start, when you want to know every road to Rome? For the Roads to Rome project, we aligned 486,713 starting points within a 26,503,452 km² grid covering all of Europe and created an algorithm that calculates one route for every trip. We developed the “Urban Mobility Fingerprint” and the “Street DNA” diagramming techniques to explore different methods of visualizing routes to a single location from a multitude of starting points. The more often a particular street segment is used in the routes, the more strongly it is indicated on the map, revealing interesting mobility patterns.

barelyLegal_



barelyLegal_ is a series of data-driven desktop documentary “drives”

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barelyLegal_

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Jessica Parris Westbrook

Adam Trowbridge

DePaul University

<http://onchanneltwo.com>

barelyLegal_ is a series of data-driven desktop documentary “drives” tracing actual routes to obtain safe legal abortions for women in the United States. barelyLegal_ is data visualization or experiential data, in the spirit of very long form conceptual video art. Each piece plays the entire duration of the trek so that viewers can consider real barriers and real distant in real time. Each complete video runs the length of time it takes to drive to and from a location where a person can receive a safe and legal abortion. barelyLegal_ combines social and physical landscape. The project is ongoing and was begun in January 2015, seven months before the anti-Planned Parenthood propaganda videos once again put abortion in the media spotlight.

California Drought Impact



California Drought Impact visualizes and sonifies California's

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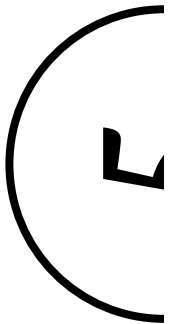
Yoon Chung Han
Shankar Tiwari

California State
University, Fullerton
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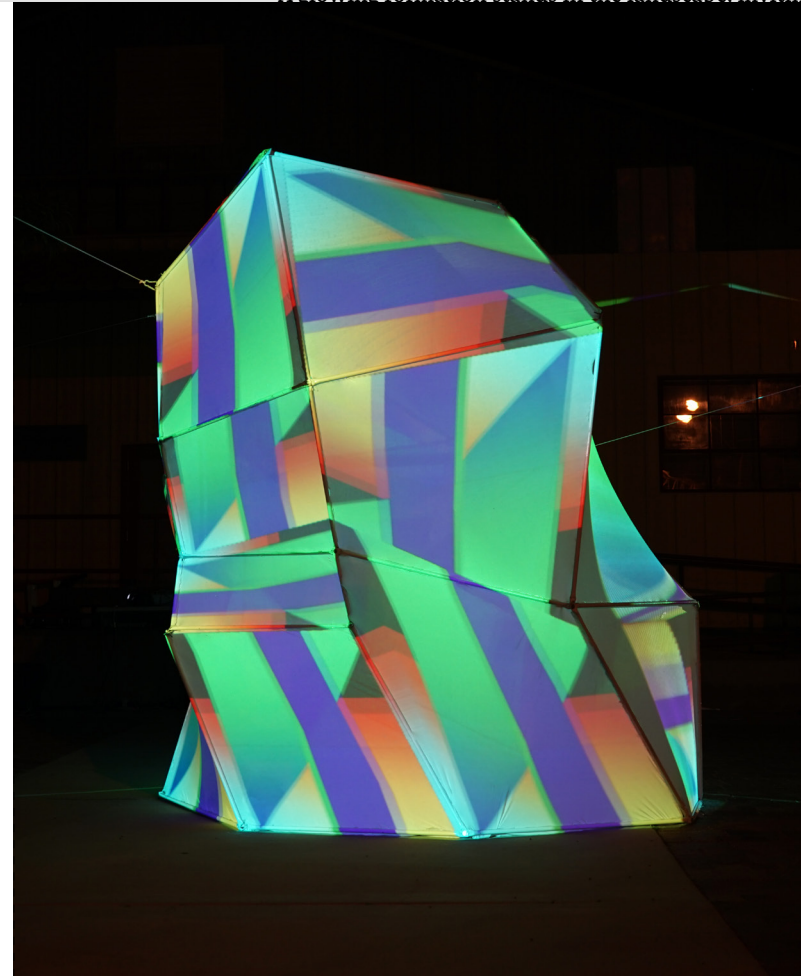
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California Drought Impact visualizes and sonifies California's drought using physical data sculptures and projection-mapped images. It depicts the causes and impact of the drought and promotes awareness of water consumption. The installation offers the viewer an opportunity to experience a metamorphosis of water morphology and its impact on the drought, caused by climate change. Viewers can explore how the drought has been created over time and can simulate its behavior. California Drought Impact encourages good environmental stewardship using the hybrid practices of art and design.

Geode



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Esteban Garcia Bravo

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Aaron Zernack

Jorge Garcia

Purdue University

<http://carlsonsgarcia.com>

A glowing formation stands in the landscape, inviting viewers to reach out from the distance. Geode is a video mapped sculpture that results from our analysis of improvisational geometry in three-dimensional space. The project departs from a neo-concrete inspiration, asking us about the aesthetic potential of emotive geometry, utilizing non-orthogonal shapes and mathematical models based on points and infinite planes. However, Geode takes neo-concrete art to a new dimension by integrating digital geometry in response to audio synthesis. In this way, we accomplish a crystal-like organic shape that glows like a geode. The surface variations are the result of real-time sound synthesis. We visualize soundscapes by transforming analog signals into digital data in real-time. The sculpture's metamorphosis is experienced visually by sound-driven generative geometries. Geode is a collaborative effort to fuse public sculpture, soundscape, and visual projection into one immersive experience.

cf. city flows



Cycling is increasingly recognized as critical component of future urban mobility. Riding a bike is largely independent of other traffic and unaffected by road congestion, and has health and

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cf. city flows

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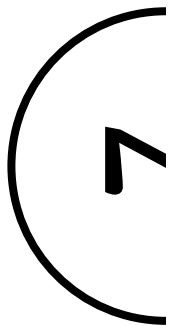
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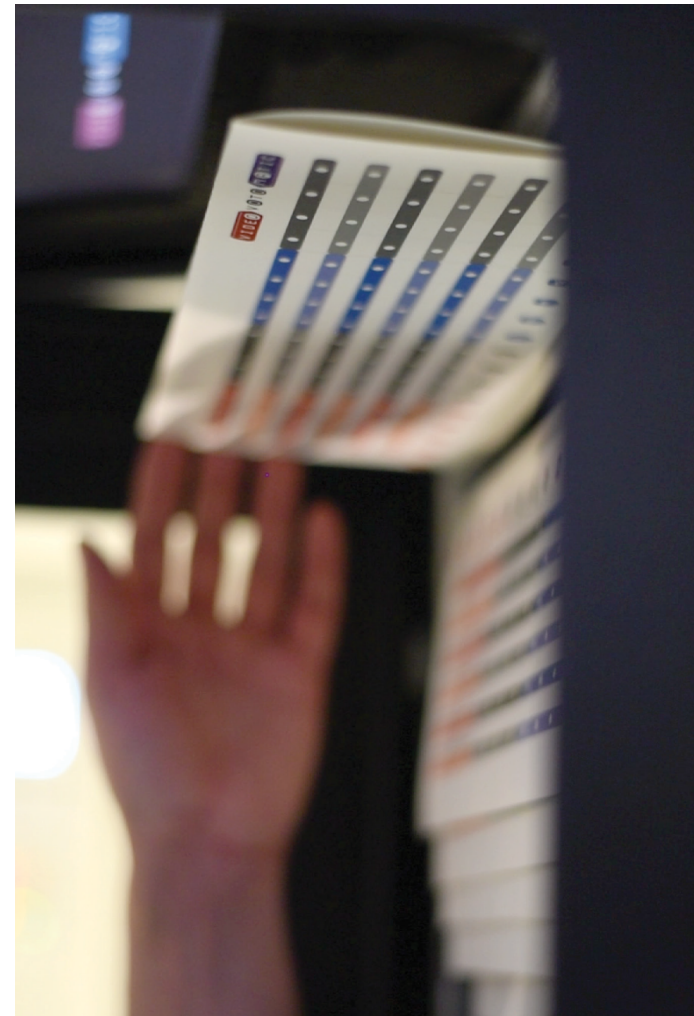
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Cycling is increasingly recognized as critical component of future urban mobility. Riding a bike is largely independent of other traffic and unaffected by road congestion, and has health and environmental benefits. In the last few years, many cities around the world installed bike-sharing systems in order to stimulate casual use of bicycles by locals and visitors alike. cf. city flows is a comparative visualization environment of urban bike mobility designed to help citizens casually analyze bike-sharing systems in the context of a public exhibition space. Three high-resolution screens show the space of flows of New York City, Berlin, and London. By showing the flow of multiple cities side by side, we can compare their extent and dynamics. Tracing urban movements accentuates different urban structures and enables us to observe similarities and differences in various bike-sharing systems. cf. city flows applies established mapping and visualization techniques within a highly aestheticized framework in order to encourage visitors to engage with the spatiotemporal complexity of urban mobility. Through our visualizations, we can better understand the pulse of urban mobility and create portraits of a city defined by its transient dynamics.

Video Voto Matic



Video Voto Matic encourages voters to generate rhythms with



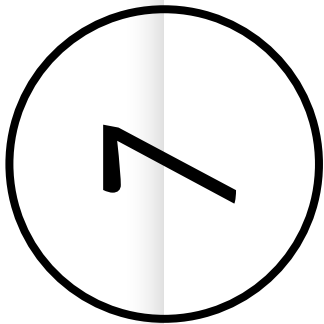
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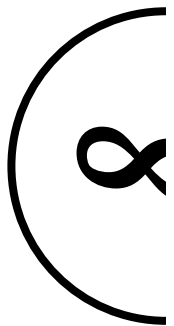
Monmouth University

<http://www.mikerichison.com>



Video Voto Matic encourages voters to generate rhythms with video clips sampled from the current presidential race. A sequence of segments from extracted from candidates' speeches and other election-related footage is used to create custom video loops. Instead of the voting machine providing the names of candidates, the voting booklet is filled with sample drum patterns. Voters can follow the patterns suggested by the booklet or they can punch in their own, choosing samples of words, phrases, breaths, pauses, and other sounds and silences in order to build percussion tracks, melodies, and solos. Video Voto Matic is an installation that presents a mashup of the legendary Roland TR 808 drum machine and the punchcard-style Votomatic voting booths that were used during the 2000 Bush vs. Gore Florida election debacle.

Microbiome Selfies



The human microbiome is a plastic metagenome that changes according to body site, environment, and health status. It varies within and between individuals, to such a degree that the metagenomes at each body site (e.g., skin, gut) are more similar

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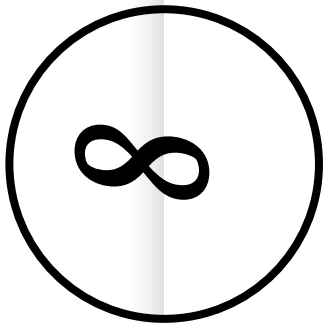


Microbiome Selfies

François-Joseph Lapointe

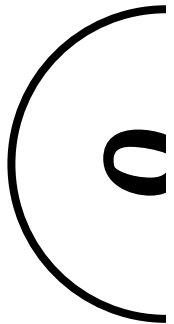
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<http://www.fjlapointe.ca>



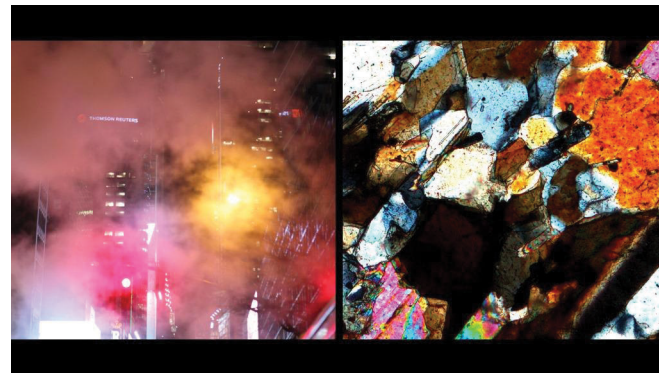
The human microbiome is a plastic metagenome that changes according to body site, environment, and health status. It varies within and between individuals, to such a degree that the metagenomes at each body site (e.g., skin, gut) are more similar across the human population than they are to metagenomes present at other sites in the same individual. The ability of bacteria to interact with one another raises questions related to specific disease states in different organs and tissues. Can bacterial genomes communicate with the human genome? How often and under what conditions? How to detect such lateral gene transfer events between genomes? What are the implications for human health? As an art-scientist, I am addressing these important questions, and others, by transforming the bacterial communities on my body to illustrate the metamorphosis of my bacterial self. I want to assess whether my microbiome is affected by my behavior, if my microbiome is changing in response to the people I meet, or how my microbiome is affecting my relation to the outside world. I use my own skin as a laboratory, and I monitor the transformation of my personal microbiome in various experimental conditions. The data collected during my performances are then used to generate portraits of my microbial self, or so-called Microbiome Selfies. These self-portraits illustrate the intricate relationship we have with the microbes living on us, in us, and around us.

Mineral Machine Music



Mineral Machine Music is an aesthetic exploration of the fabric

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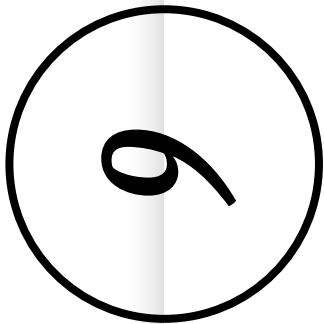


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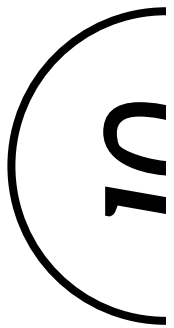
Clement Fay

<http://mitchgoodwin.com>



Mineral Machine Music is an aesthetic exploration of the fabric of the earth as seen from the stage of the microscope and the lens of the industrialized city. The work juxtaposes the man-made structural textures of the New York cityscape with the geological mineral formations from the South Australian outback. Blending cityscape with substrate, Mineral Machine Music compliments the imagery with layers of sonic noise — musical representations of tectonic activity, echoes of the universe from deep space, and the groans of the restless earth juxtaposed against the industrial machine ambiance of a New York City subway.

Northern Polar Studies



Northern Polar Studies animates a time-series of climate data

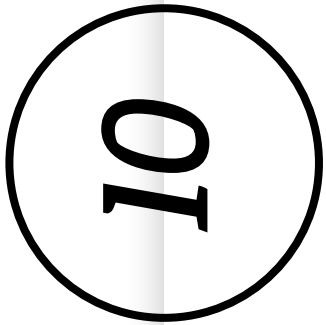
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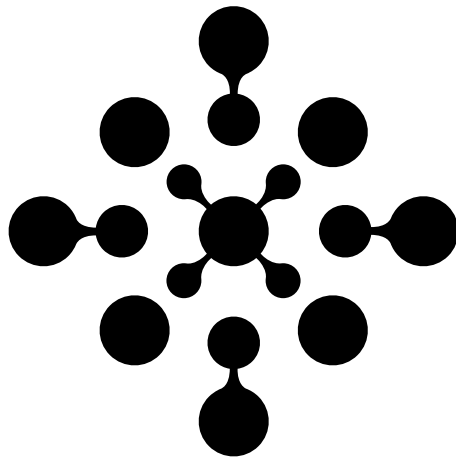
Northern Polar Stu

Tom Corby,
Gavin Bailly,

Reconnoitre
<http://www.reconnoitre.net>



Northern Polar Studies animates a time-series of climate data depicting sea ice age and retreat between 1984 and 2012. The data is derived from drifting buoys and satellite measurements. The work presents an uncanny vision of phantasmagoric shapes and figures and tendrils of environmental ruination that is in equal part disturbing and fascinating. The yearly summer-winter fluctuations of arctic sea ice (minima-maxima) show how ice coverage in the region has become increasingly denuded, with the brightest tones in the work indicating the oldest formations of 10-years or more, and the darkest indicating the most recent ice. The work shows how climate data sets can reveal landscapes, sites, and environments as extended temporal forms, re-made and re-shaped via the effects of global warming and ultimately our own behaviors.



The IEEE VIS 2016 Arts Program, or VISAP'16, showcases innovative projects that explore creative and pragmatic intersections between art, design, and visualization research. Through a dedicated papers track and an exhibition that run concurrently with the IEEE 2016 VIS conference, the Arts Program aims to foster new thinking, discussion, and collaboration between artists, designers, technologists, visualization scientists, and others working at the intersection of these fields.

The theme for VISAP'16, the IEEE VIS 2016 Arts Program, is Metamorphoses. For this year's program, we encouraged artists, designers, and researchers to think about transformation as a fundamental component of the pipeline from raw data to meaning. In Ovid's epic poem—our thematic inspiration—transformations are often capricious occurrences, arising from the whim or wrath of a Greek god, yet nonetheless serve to explain the mysteries of the natural world and social order. In the realm of science, the movement from observation to hypothesis to measurement is, ideally, quantifiable and reproducible. Yet visualization researchers are also explorers, investigating new types of visual encodings and interaction techniques on ever new technologies in order to augment our understanding of the modern world. Similarly, artists often emphasize the metamorphosis of subjective experience through conceptual lenses to create artifacts that transform our understanding of culture and technology.

The installations, performances, and demonstrations featured in the VISAP'16 exhibition explore the relationships between visualization research and arts and/or

design practice, and present creative visual techniques that emphasize transformative aspects of scientific or cultural exploration. The featured installations include work by both established and emerging media artists from across the globe, including Gavin Baily, Maxwell Carlson, Duncan Clark, Tom Corby, Clement Fay, Esteban Garcia Bravo, Mitch Goodwin, Benedikt Groß, Yoon Chung Han, Paul Heinicker, Robin Houston, François-Joseph Lapointe, Sebastian Lay, Dietmar Offenhuber, Raphael Reimann, Mike Richison, Philipp Schmitt, Weili Shi, Tristan Smith, Shankar Tiwari, Adam Trowbridge, Jessica Parris Westbrook, and Aaron Zernack. Additionally, a wide range of creative visualization projects are demonstrated on the opening night of the exhibition. Each of these projects are not only aesthetically compelling, but include a critical component that wrestles with complex questions about the uses and misuses of data and the role of data visualization in contemporary society.

We would like to acknowledge all those who made this year's Arts Program possible, including everyone on the IEEE VIS Organizing Committee, and especially Terry Yoo, Jesus Caban, Gautam Chaudhary, Meghan Haley, Loretta Auvil, and Maria Velez. Additionally, we thank Sheelagh Carpendale, Andrew Vande Moere, and Lyn Bartram, our VISAP '16 Steering Committee. The exhibition would not have been possible without the extensive contributions of Samuel Huron, Jeremy Boy, and Heather Bradbury. Finally, we thank the large pool of expert reviewers who graciously volunteered to serve on the VISAP'16 Program Committee.

Angus Forbes and Fanny Chevalier
Co-chairs, VISAP'16

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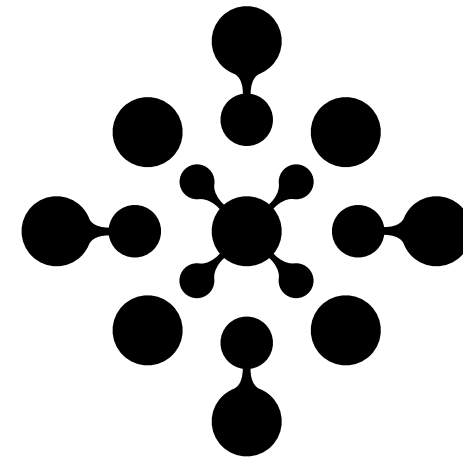
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Passim

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Passim

Paul Heinicker

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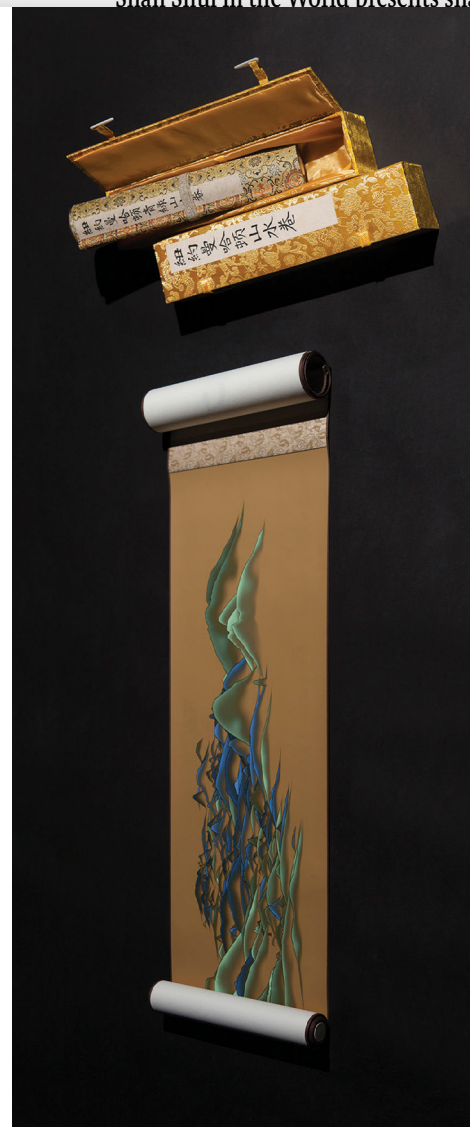
Passim is a visual reflection of the humanistic discourse regarding space that connects the elements of design sciences and cultural theories. By research and implementation of four major spatial theories (absolute, relative, relational, and topological), the project proposes to understand space through a sociopolitical lens. The installation explores the relationship of these four notions by projecting visualizations of geopolitical data (collected from the Heidelberg Institute for International Conflict Research) onto physical sculptures. The result of these reflections creates different world-views that represent self-aware images, in contrast to the usual biased techno-positivism of visualizations. These reflections demonstrate how notions of space directly influence recent geopolitical events (such as the refugee crisis), and how spatial theory can be used to rethink global political constellations.

Shan Shui in the World

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Shan Shui in the World presents shanshui paintings of selected

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Shan Shui in the World

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Parsons School of Design

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Shan Shui in the World presents shanshui paintings of selected places in the world generated by a computational process. This project revisits the ideas implicit in Chinese literati paintings of “shan shui”: the relationship between urban life and people’s yearning for the nature, and between social responsibility and spiritual purity. For an audience living in an urban area, a traditional shanshui painting provides them with spiritual support through the depiction of the natural scene of elsewhere. With generative technology, however, Shan Shui in the World has the ability to represent any place in the world—including the city where the audience is—in the form of a shanshui painting based on geography-related information of the place. The notion that “shan shui” can exist right here (though in a generative parallel world) not only underscores the contrast between the artificial world and nature, but also reminds the audience of an alternative approach to spiritual strength.

Shipmap.org

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Shipmap.org

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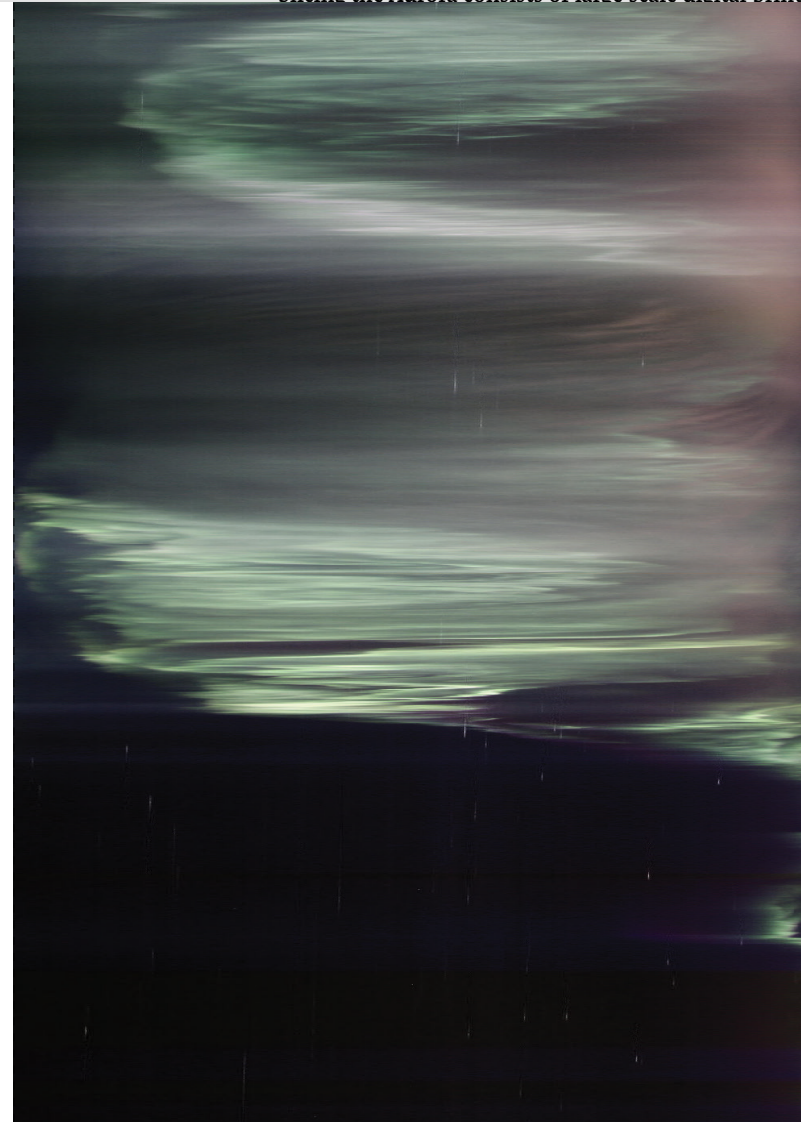
Shipmap.org is an ambitious interactive map of commercial shipping movements based on hundreds of millions of data points from throughout 2012 (the most recent year for which all the raw input data was available). The project's aim is to highlight for a broad audience the extraordinary scale of modern commercial shipping, the routes these huge vessels take around the world, the geographic spread of different types of cargo boats, and the amount of carbon dioxide they produce. The unique base map shows ocean depth and major rivers, while the ships can be viewed as a high-resolution animation of movements over time (the "ships" view) or as a plot showing all the positions at once (the "routes" view), optionally color-coded by ship type. A Talkie voiceover with music introduction sets the scene and provides an explanatory tour of the map.

Slicing the Aurora

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Slicing the Aurora

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Jo Vermeulen

Charles Perin

Eric Donovan

Raimund Dachsel

Sheelagh Carpendale

University of Calgary

Technische Universität Dresden

<http://innovis.cpsc.ucalgary.ca>

Slicing the Aurora consists of large-scale digital prints generated from a sequence of photographs of the northern sky taken over the course of one night. Each image is aggregated across time creating visually appealing and intriguing images – or Keograms – that visualize Aurora Borealis (Northern Lights) activity as well as interesting movements of clouds and stars that occurred that night. The word “Keogram” is derived from “Keoeit,” the Inuit-word for the Aurora Borealis. A Keogram is an image that represents a series of images taken over the course of one night. Keograms are a type of timeline that start with the evening on the left and end with the next morning on the right. Like the nights themselves, the Slicing the Aurora Keograms differ in length.

Triple Fluid Collision

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Chaotic Escape #3 and #4

Triple Fluid Collision 1/50 and Chaotic Escape #3 and #4 originated

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Triple Fluid Collision

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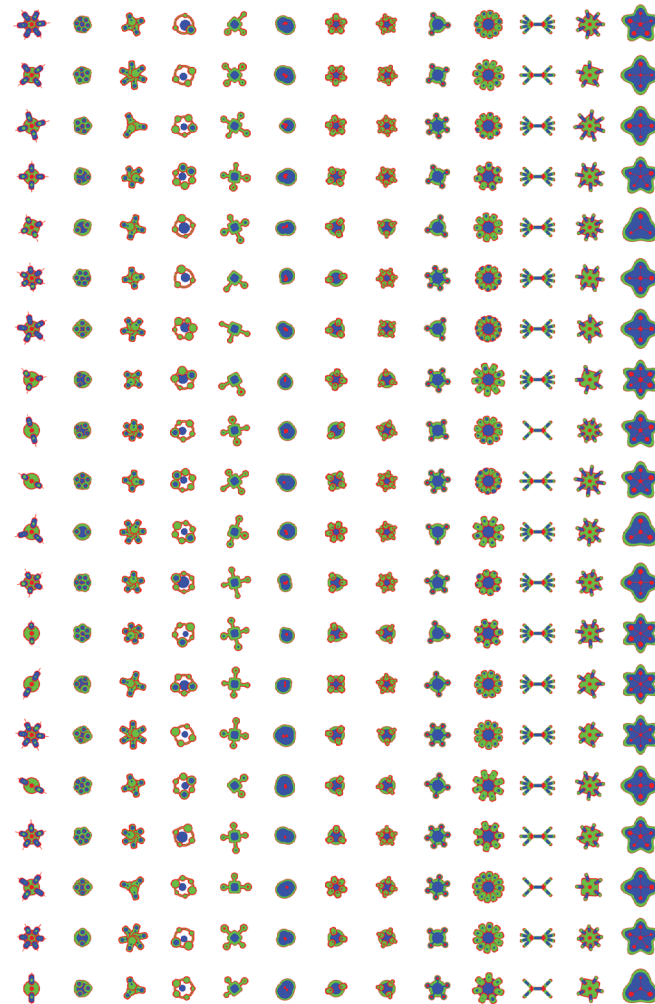
Triple Fluid Collision 1/50 and Chaotic Escape #3 and #4 originated as simulations of interfaces in fluids. In the Chaotic Escape series, a density interface reacts under the influence of radial gravity, where minuscule imperfections in the initially-spherical surface grow and expand, reaching ever outward, as the enclosing fluid seeks the center. Triple Fluid Collision is a series of Selective-Laser-Sintered 3D printed sculptures, each representing the turbulent collision of three spheres of fluid. In crashing together, the smooth shapes stretch, fold, and entangle themselves in one another, leaving an inseparable mass. The rigidity of the print and the planar nature of its construction stand in clear opposition to the ephemerality of the phenomenon and its virtual origins.

A Body Has Many Members

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A Body Has Many Members is a public installation developed

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A Body Has Many Members

Kristoffer Ørum

Anders Bojen

Marcin Ignac

David Gauthier

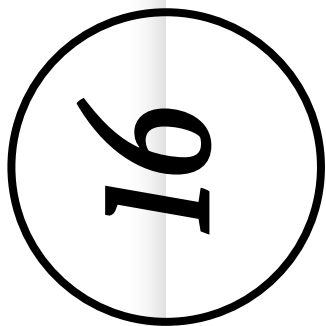
RasmusErik Voel Jensen

<http://anders-kristoffer.dk>

<http://variable.io>

<http://ciid.dk>

<http://solsort.com>

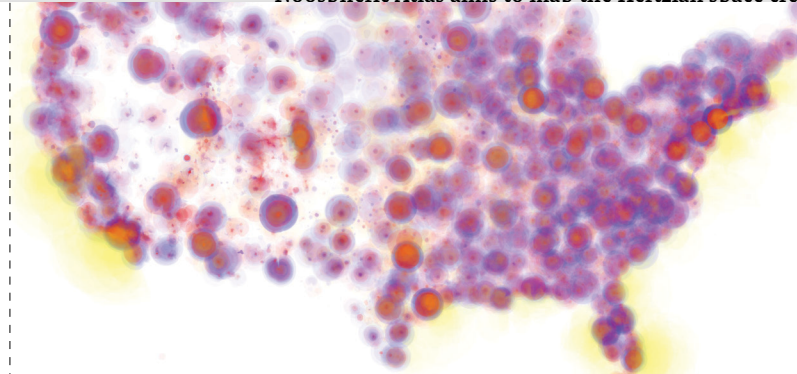


A Body Has Many Members is a public installation developed for the University College Capital (UCC) Campus Nordsjælland, commissioned by the Danish Agency for Culture and the UCC. It consists of over 30 screens scattered across all parts of the campus that show a real time visualization of the College's institutional infrastructure. On these screens the invisible flows of economy, knowledge, and power are made visible in a visual language akin to computer games and scientific visualizations. Individual members of staff and students appear as avatars travelling through a cell like structure of the school corridors. Each agent has its appearance driven by its occupation, gender, age, and number of years at UCC. Agents are autonomous but their goals are data-driven. The project proposes a new visual metaphor through which to consider the institution: as an organic and ever-changing organism, defined not by its physical dimensions but rather by the activities that happen within, and around it.

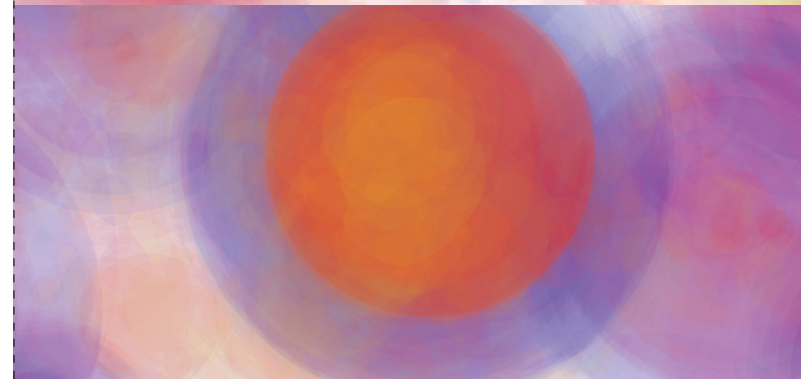
A Noospheric Atlas of the United States

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Noospheric Atlas aims to map the Hertzian space created by the



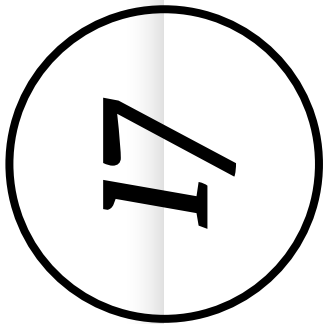
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A Noospheric Atlas of the States

Brett Balogh

<http://www.brettbalogh.com>

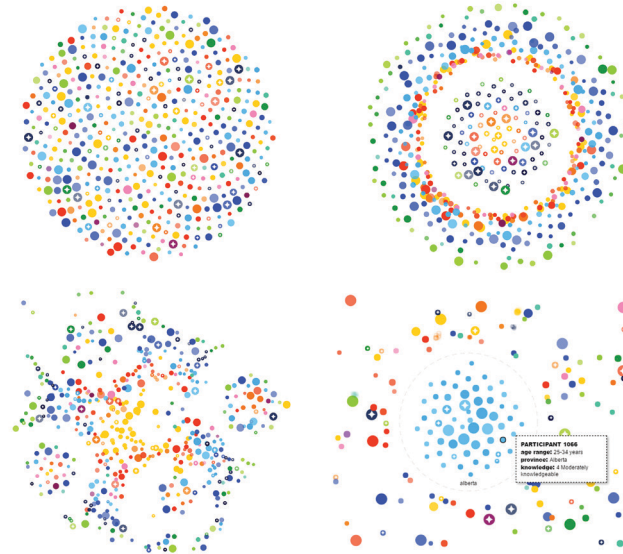


Noospheric Atlas aims to map the Hertzian space created by the United States' mass media broadcast stations. This space is not definable in traditional terms of surveyed boundaries of state and local territories, but rather by electrical fields and consumer markets in the air around us. This layer of networked communications represents an expression of Vladimir Vernadsky's notion of a Noosphere, or sphere of human consciousness. Geospatial data provided by the FCC is rendered as translucent shapes whose color is determined by the type of service (AM/FM/TV). The resulting image depicts a landscape formed by our collective communications.

Fireflies

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Fireflies is an exploration of how inspiration from nature can be
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Fireflies

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Bon Adriel Aseniero

Charles Perin

Marjan Eggermont

Sheelagh Carpendale

University of Calgary

<http://bonadriel.com>

<http://innovis.cpsc.ucalgary.ca>

Fireflies is an exploration of how inspiration from nature can be leveraged in order to encode data using visual representations that enable curious exploration. In Fireflies, each data-point becomes a character—a firefly—expressing aspects of its personality through visual variables such as motion and color. Like swarming animals, fireflies can move across the visualization space, creating groups with other similar fireflies. In groups, fireflies position themselves into beautiful phyllotactic patterns resembling how seeds grow within sunflower heads. We applied Fireflies to visualize data from a survey regarding Canadians' attitudes towards HIV/AIDS. Fireflies representing people express their discomfort towards HIV/AIDS through jittering motions. More jittering means greater discomfort. Consequently, the visualization becomes an ever-changing spectacle of colors and motion.

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terature. As we compared importance is visible, and other are put locations." perspective the unfamiliar they discover the spatial

Novel City Maps

Jan-Erik Stange

Urban Complexity Lab,

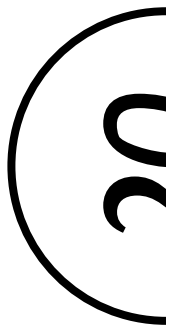
FH Potsdam

<https://uclab.fh-potsdam.de>

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Novel City Maps explores new ways of visually representing the construction of fictional and geographical space in literature. As each fictional text produces a distinct map that can be compared with other Novel City Maps of a particular city, the importance of places and locations and their connection becomes visible, and the influence determined by story, author, time and other factors becomes accessible to visual analysis. Readers are put into the position to explore and read a novel “by the locations.” People already familiar with a novel can gain a new perspective and possibly a deeper engagement with a book. People unfamiliar with the novel could be compelled to read it when they discover a connection to certain locations or are intrigued by the spatial patterns our Novel City Maps visualization produces.

The Rhythm of Consump- tion



The Rhythm of Consumption represents the consumption



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The Rhythm of Consumption

Catarina Maças,
Penousal Machado
University of Coimbra
<http://cdv.dei.uc.pt>

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The Rhythm of Consumption represents the consumption characteristics of shoppers in 729 Portuguese hypermarkets from the SONAEs chains over the course of two years. Our visualization changes and morphs in response to the dynamic changes in the data, emphasizing its transformative aspects, creating movement, so that the viewer can understand the pattern and evolution of consumption. We highlight the rhythm and pulse of transactions at times of the year when there are disruptions in the normal consumption patterns.

The Whispering Station: Test 1

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Utilizing animistic design principles, the Affection Research Lab

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The Whispering Station Test 1

Salvador Orara

Affective Research Lab

<http://affectionstations.org>

Utilizing animistic design principles, the Affection Research Lab (ARL) introduces the post-mythical object framework through the contemporary device of the smartphone. ARL harnesses the intrinsic nature of electromagnetism as a source of raw data; and transforms this raw data through the lenses of noise and sound. Situated within a landscape saturated with task-oriented utilitarian devices, ARL provokes a paradigm shift in the development of digital objects to create deeper connections and explore the poetic possibilities we can have with them. The Whispering Station: Test 1 is a prototype exploring alternative ways of exposing a smartphone's electromagnetic activity through sound. By creating a human-proximity detection system; a smartphone's incidental sound becomes the true voice of device as auditory feedback and pure sonification of affect.

Credits

1 • Urban Radiance

Dietmar Offenhuber

2 • Roads to Rome

Benedikt Groß

Raphael Reimann

Philipp Schmitt

3 • barelyLegal_

Jessica Parris Westbrook

Adam Trowbridge

4 • California

Drought Impact

Yoon Chung Han

Shankar Tiwari

5 • Geode

Esteban Garcia Bravo

Maxwell Carlson

Aaron Zernack

Jorge Garcia

6 • cf. city flows

Till Nagel

Christopher Pietsch

7 • Video Voto Matic

Mike Richison

8 • Microbiome Selfies

François-Joseph Lapointe

9 • Mineral Machine Music

Mitch Goodwin

Clement Fay

10 • Northern

Polar Studies

Tom Corby

Gavin Baily

11 • Passim

Paul Heinicker

12 • Shan Shui in

the World

Shi Weili

13 • Shipmap.org

Duncan Clark

Robin Houston

Tristan Smith

14 • Slicing the Aurora

Sebastian Lay

Jo Vermeulen

Charles Perin

Eric Donovan

Raimund Dachsel

Sheelagh Carpendale

15 • Triple Fluid

Collision 1/50

Chaotic Escape #3 and #4

Mark Stock

16 • A Body Has

Many Members

Kristoffer Ørum

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Marcin Ignac

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RasmusErik Voel Jensen

17 • A Noospheric Atlas

of the United States

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Sheelagh Carpendale

19 • Novel City Maps

Jan-Erik Stange

20 • The Rhythm of

Consumption

Catarina Maças,

Penousal Machado

21 • The Whispering

Station: Test 1

Salvador Orara

