11AM

4PM in London (GMT), 1AM in Tokyo (GMT+9)

Panel: Engaging General Audiences

Moderator: Lisel Record, *Indiana University*

Panelists:

- Katy Börner, *Indiana University*
- Kim Albrecht, *metaLAB at Harvard and Berlin & Folkwang University of the Arts in Essen, Germany*
- Stephen Uzzo, *President and Executive Director, Cape Cod Museum of Natural History*

ENVISIONING INTELLIGENCES

Aurora Mititelu

Katy Börner

Victor H. Yngve Distinguished Professor of Engineering and Information Science in the Departments of Intelligent Systems Engineering and Information Science, Luddy School of Informatics, Computing, and Engineering; core faculty of the Cognitive Science Program; and founding director of the Cyberinfrastructure for Network Science Center (http://cns.iu.edu)—all at Indiana University in Bloomington, Indiana. She is a curator of the Mapping Science exhibit (http://scimaps.org), leads the international Human Reference Atlas effort (https://humanatlas.io), and co-directs the CIFAR MacMillan Multiscale Human program. Her research focuses on the development of data analysis and visualization techniques for information access, understanding, and management. She is particularly interested in the study of the structure and evolution of scientific disciplines; the construction and visualization of a human reference atlas; the analysis and visualization of online activity; and the development of cyberinfrastructures for large-scale scientific collaboration and computation. She holds an MS in electrical engineering from the University of Technology in Leipzig, and a PhD in computer science from the University of Kaiserslautern. Her book Atlas of Science: *Visualizing What We Know*, MIT Press won the ASIS&T best Information Science book award in 2011. The *Atlas of Forecasts*, MIT Press was awarded the PROSE award for excellence in physical sciences and mathematics in 2022. Börner is a Fellow of the American Association for the Advancement of Science (AAAS), a Humboldt Research Fellow, an Association for Computing Machinery (ACM) Fellow, Network Society Fellow, and a Stiftung Charité Visiting Fellow.

Excite

Humans need emotional engagement to change behavior. The emotional brain often decides first, and the rational brain justifies after.

Facts sit in the mind. Emotions energize (and sustains) action.

- Fear triggers urgency.
- Joy rewards progress.
- Empathy drives prosocial behavior.

Knowledge alone doesn't generate the internal drive **to do something**.

Changing behavior often means changing:

- self-concept,
- habits,
- social belonging.

Emotion triggers transformation.

Touch

Sensory memory. Sensory memory is based on sight, hearing, smell, taste, and touch; “lasts only milliseconds and is mostly outside conscious awareness.”

Motor memory. Motor memory consolidates a specific motor task into a long-term muscle memory through repetition. It helps us playing the piano, catching a ball, dancing, or riding a bike given practice—with little to no conscious effort.

Hans Rosling uses **everyday objects** to make income inequalities tangible.

Sensory nerve endings in different parts of the body—the more sensory nerves the larger the organ. Human hands have 17,000 nerve endings.

Number of neurons in the **motor cortex** of the human brain used to control movements of different organs. The more neurons, the finer control of movements, e.g., in fingers, lips and tongue.

Collaborate

No single form of intelligence can solve all problems. Human cognition alone struggles with complexity at planetary scale—climate systems, ecosystems, economies, genomics. AI excels at scale and computation but lacks human embodiment, ethics, emotional intuition, and context.

Black-swan risks require diverse cognitive strategies. A monoculture of intelligence—biological or synthetic—risks brittle failure. Diversity increases resilience, similar to genetic variation protecting species from collapse.

Innovation accelerates when multiple intelligences co-create. Humans generate creativity, meaning, stories, and purpose. AI accelerates research, exploration, simulation.

Ecological intelligence reminds us we are embedded in nature. Indigenous knowledge, environmental stewardship, biological intelligence of ecosystems offer lessons in sustainability.

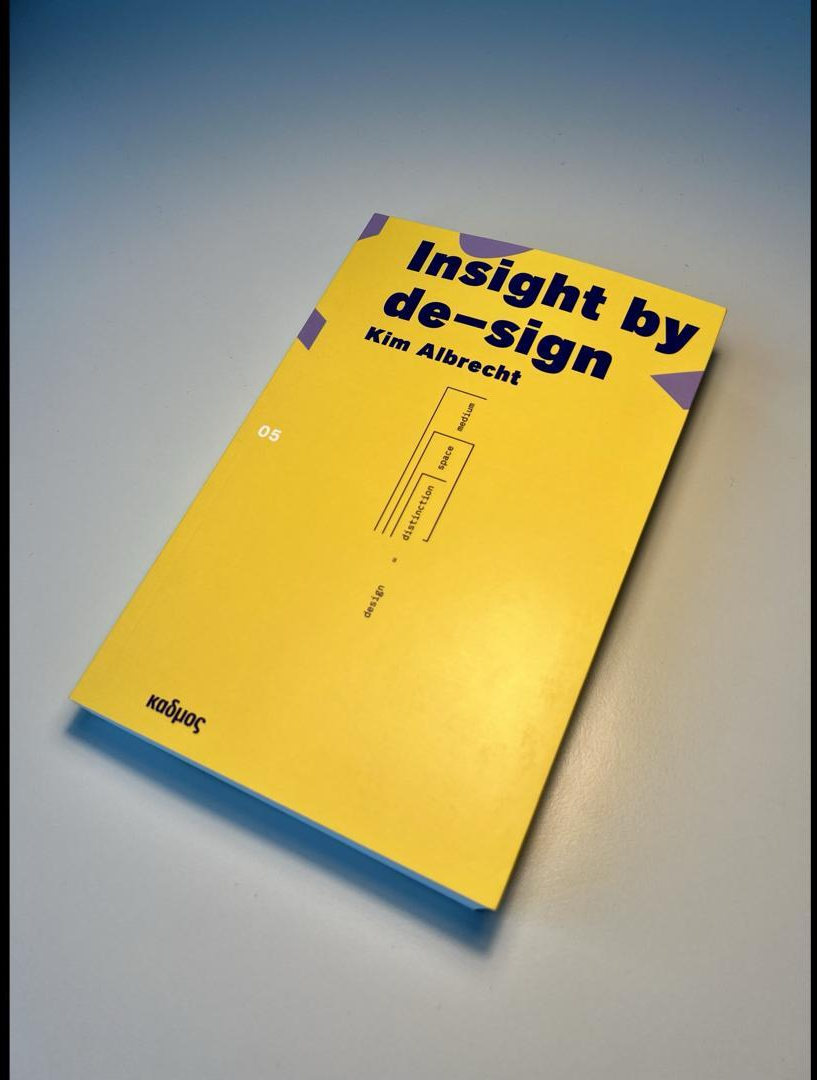
Cultural and social intelligence maintain cohesion. Technological evolution without cultural evolution leads to fragmentation and conflict. Collective intelligence—norms, cooperation, trust—holds civilizations together.

Intelligence diversity mirrors nature's strategy. Life thrived for billions of years because ecosystems consist of interdependent species with different abilities. A civilization of humans + machines + ecological systems mirrors the robustness of biological networks.

Kim Albrecht

Kim Albrecht conducts research at the intersection of data visualization, technology, and culture. He holds a Bachelor of Arts in Graphic Design, a Master of Arts in Interface Design, and a Doctor of Philosophy in Media Theory. He is a principal at metaLAB at Harvard and Berlin, a faculty associate at the Berkman Center for Internet & Society, and a professor of information design at the Folkwang University of the Arts in Essen, Germany. He is known for his exploration of the aesthetic properties of data, and his work spans teaching, research, and application.

Image Credit: Data | Art Conference (Jodi Hilton)


Insight by de–sign
Kim Albrecht
05
medium
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design
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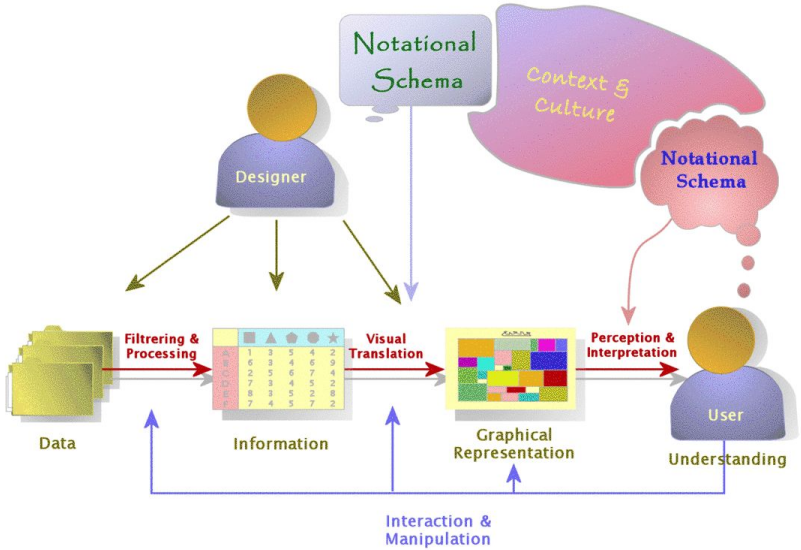
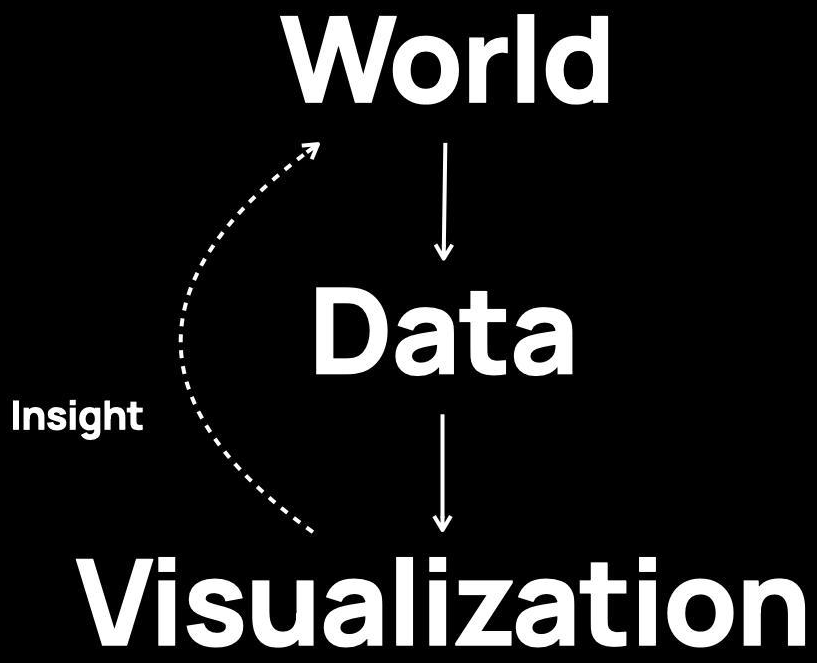
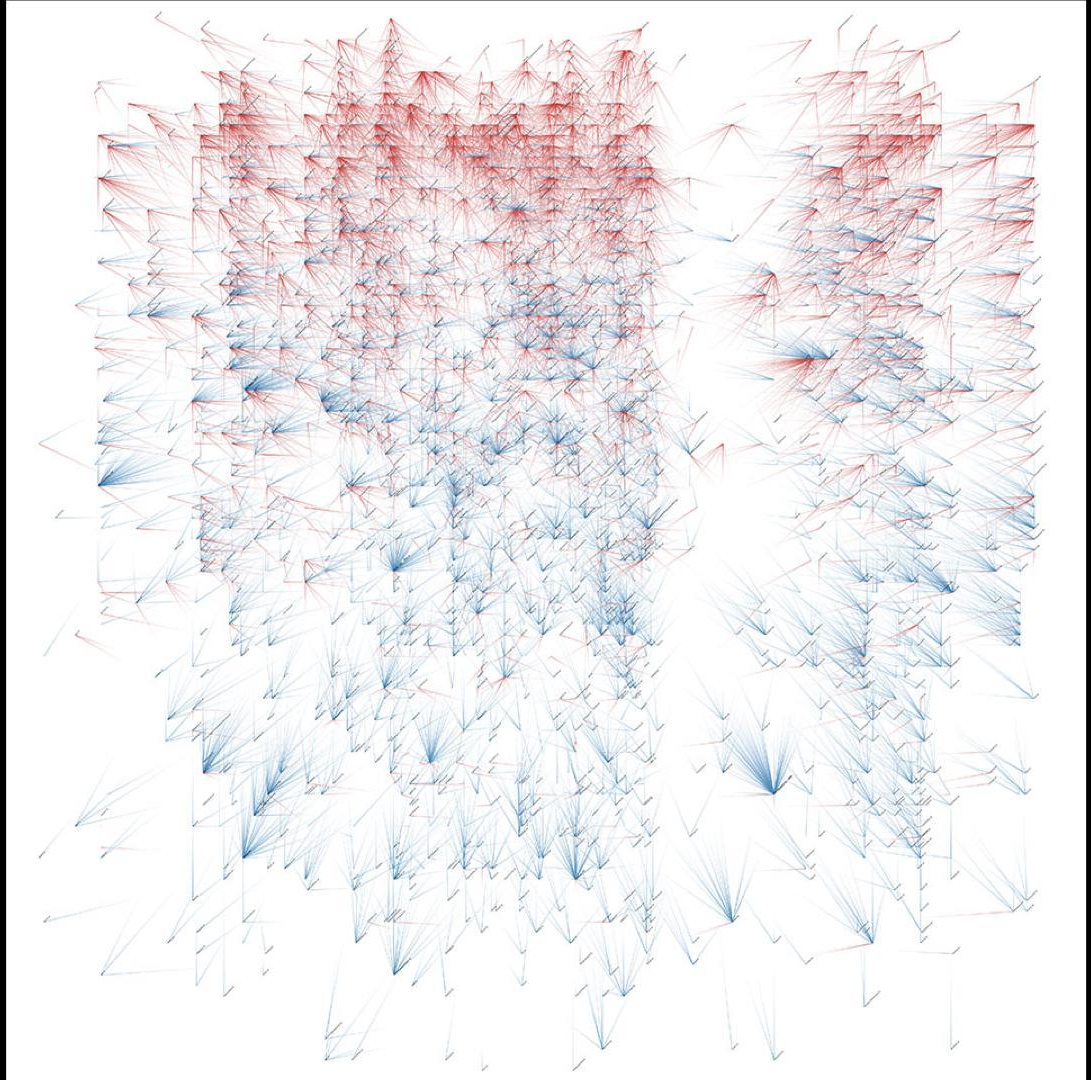
Conceptions of Data

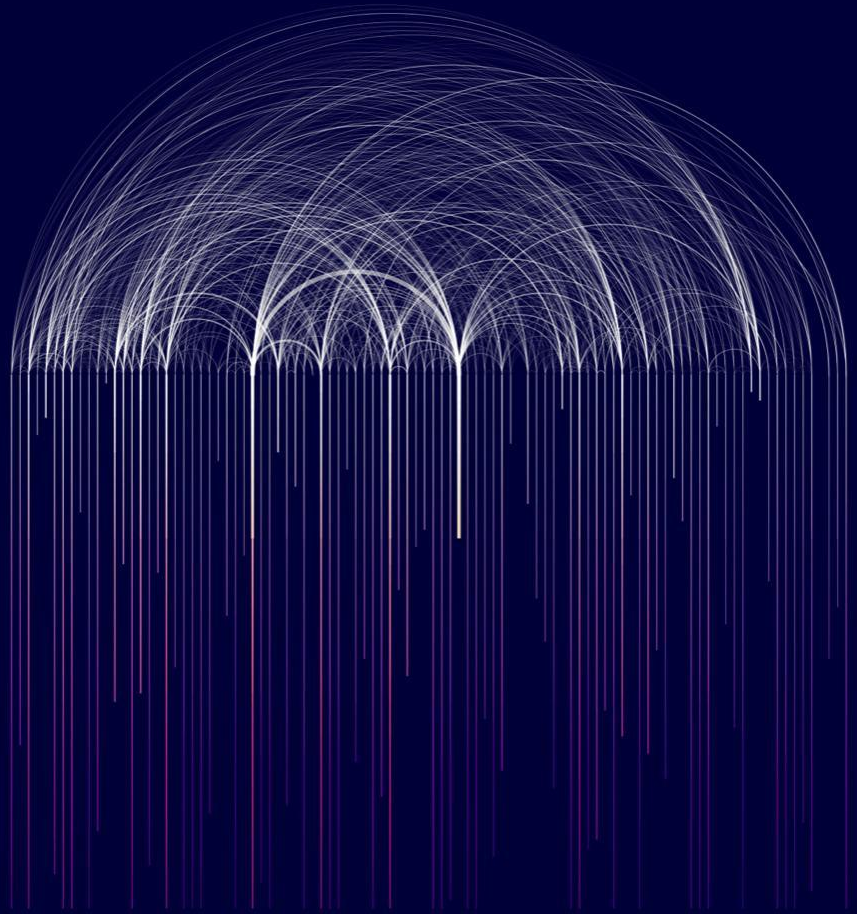
Visualization




World
Data
Visualization
Insight



Culturegraphy
2014



Network Resilience
2015

Trump Connections

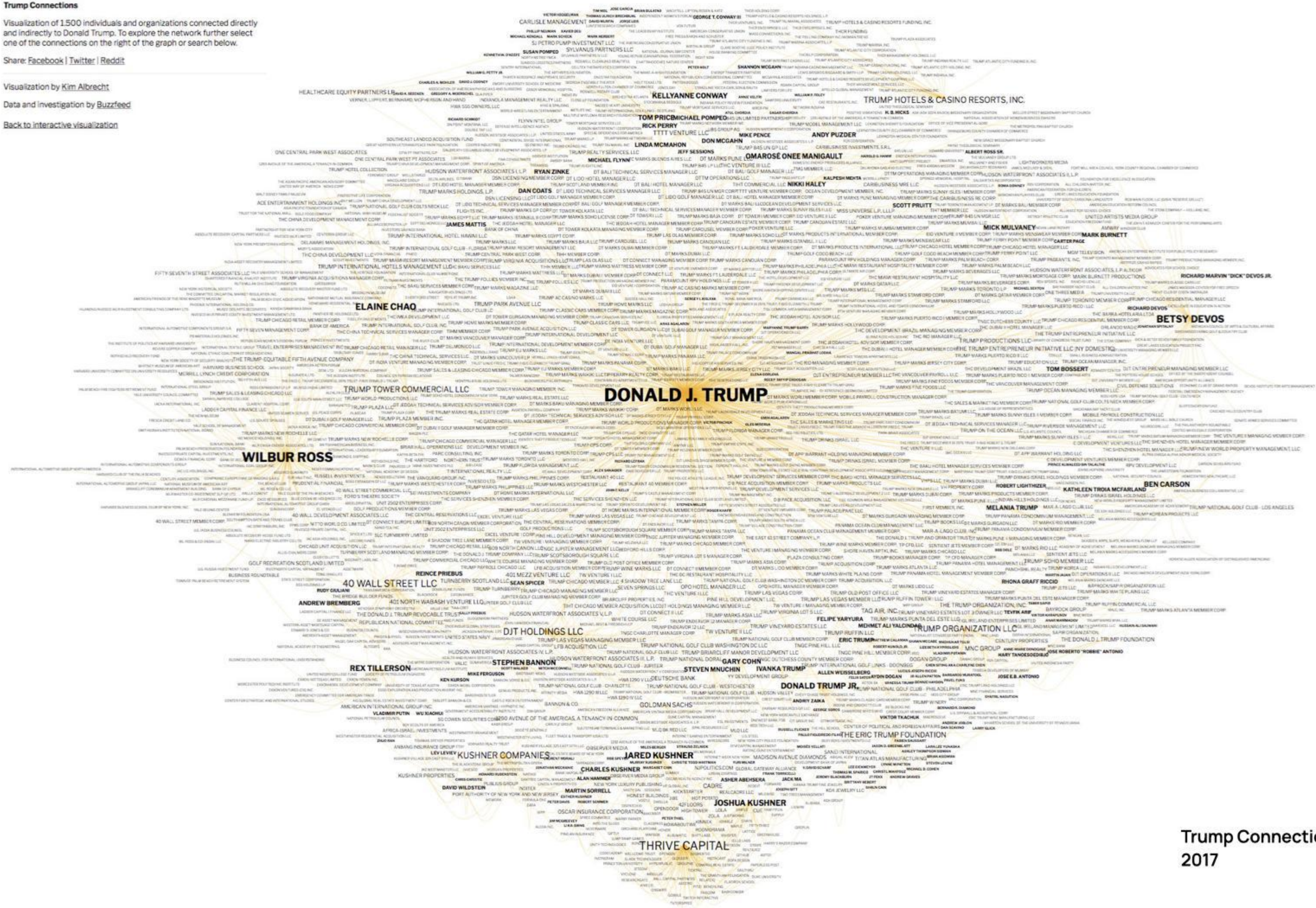
Visualization of 1.500 individuals and organizations connected directly and indirectly to Donald Trump. To explore the network further select one of the connections on the right of the graph or search below.

Share: Facebook | Twitter | Reddit

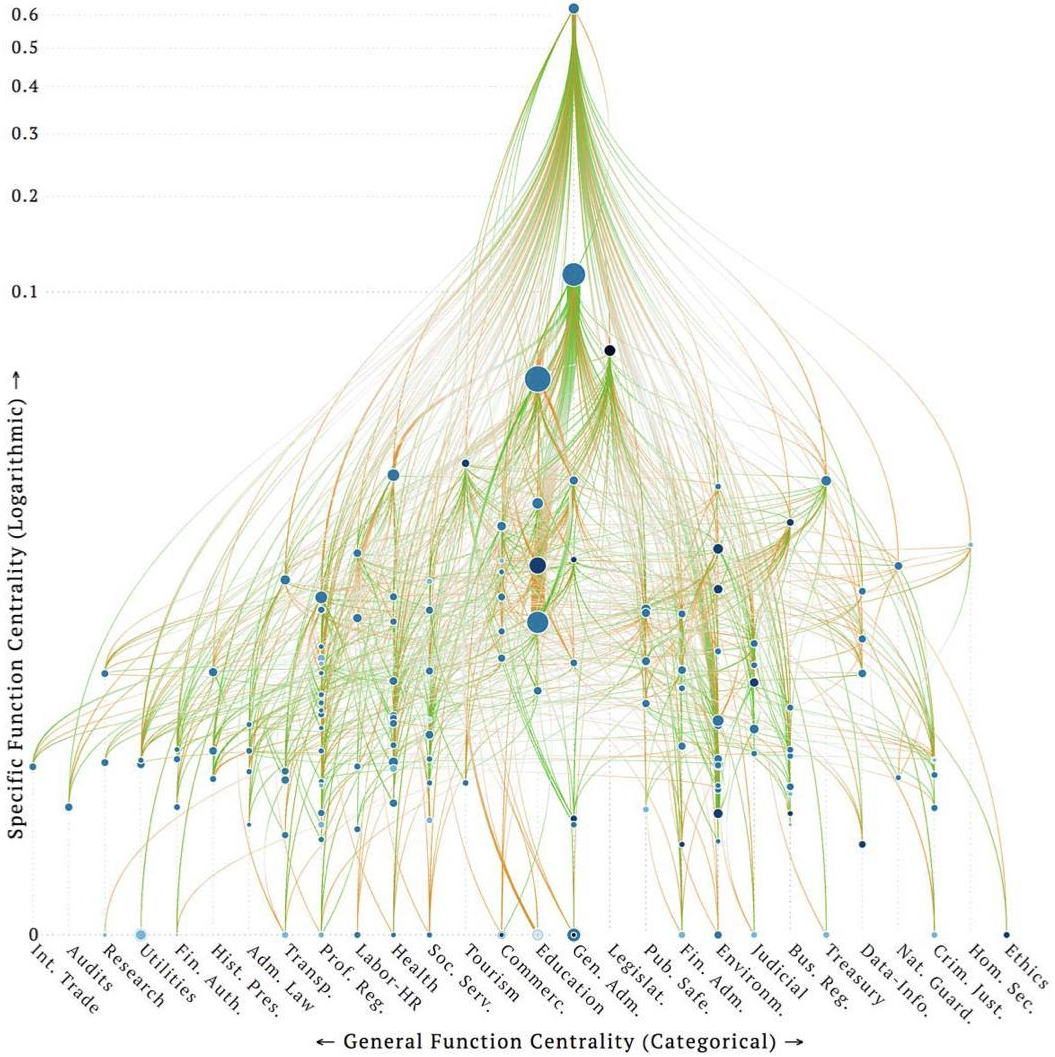
Visualization by Kim Albrecht

Data and investigation by Buzzfeed

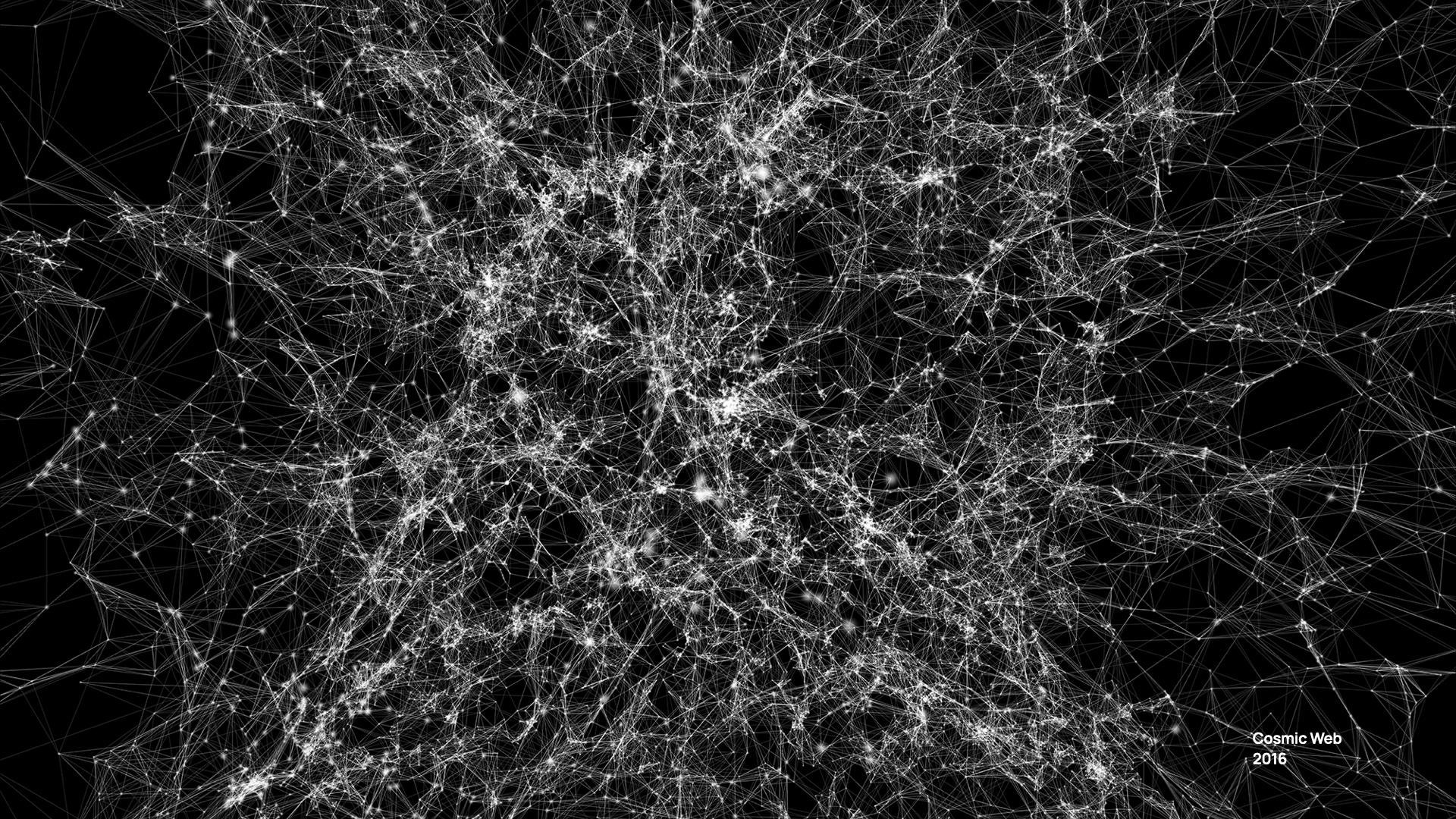
Back to interactive visualization



Trump Connections
2017

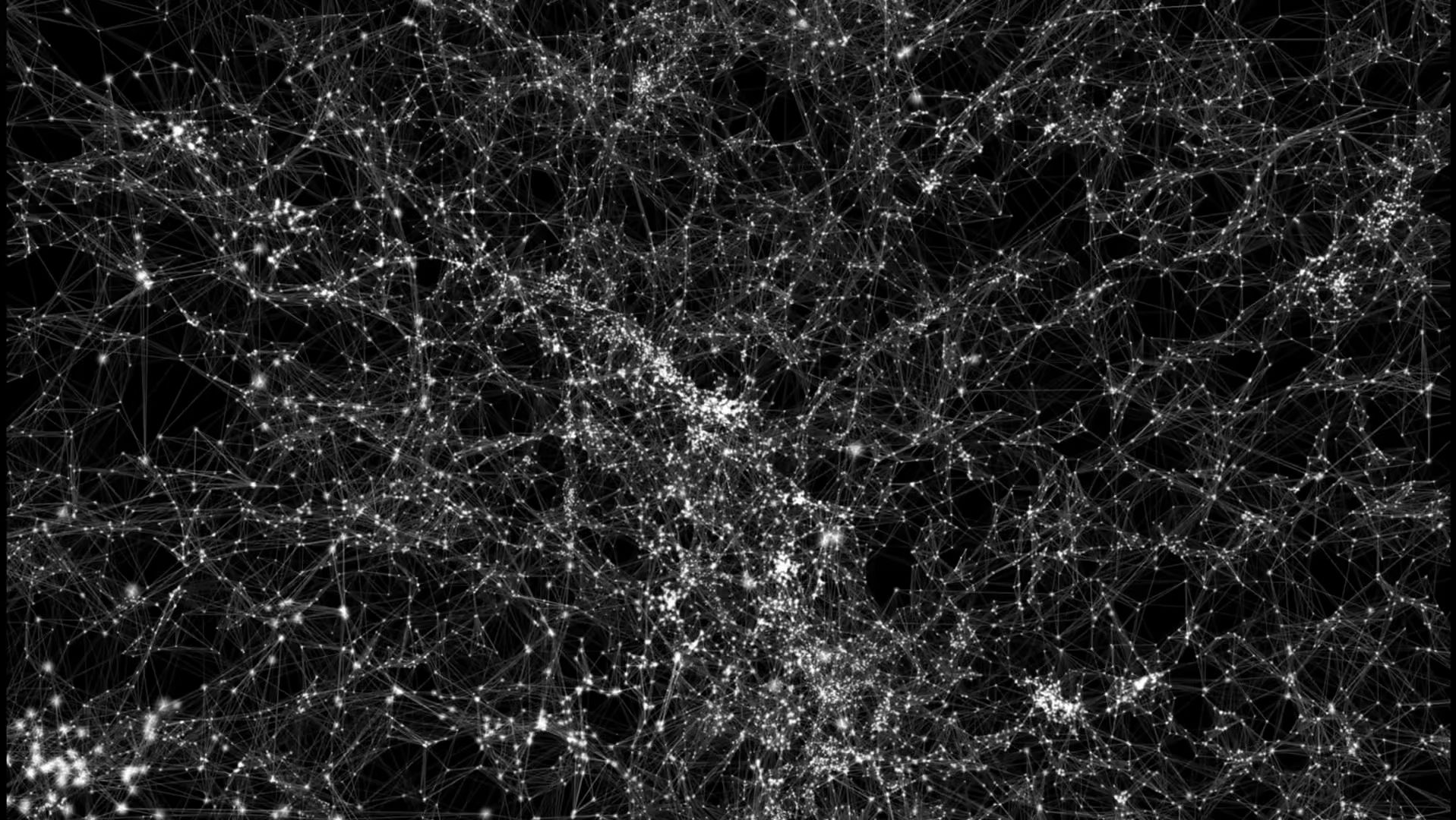


Government Networks
2018



Cosmic Web
2016

“… data nor visualizations are ever neutral.”



»Perhaps the Universe can be though of as God's Brain.«

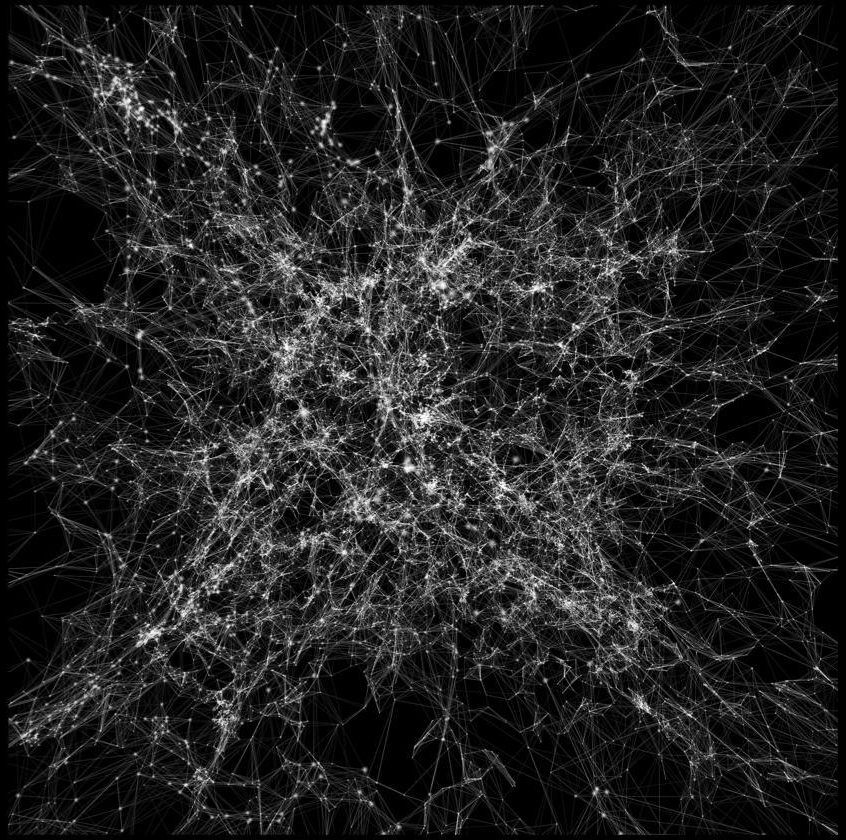
Comment by mkogrady
https://www.wired.com/2016/04/explore-cosmos-bonkers-interactive-model/#article-comments

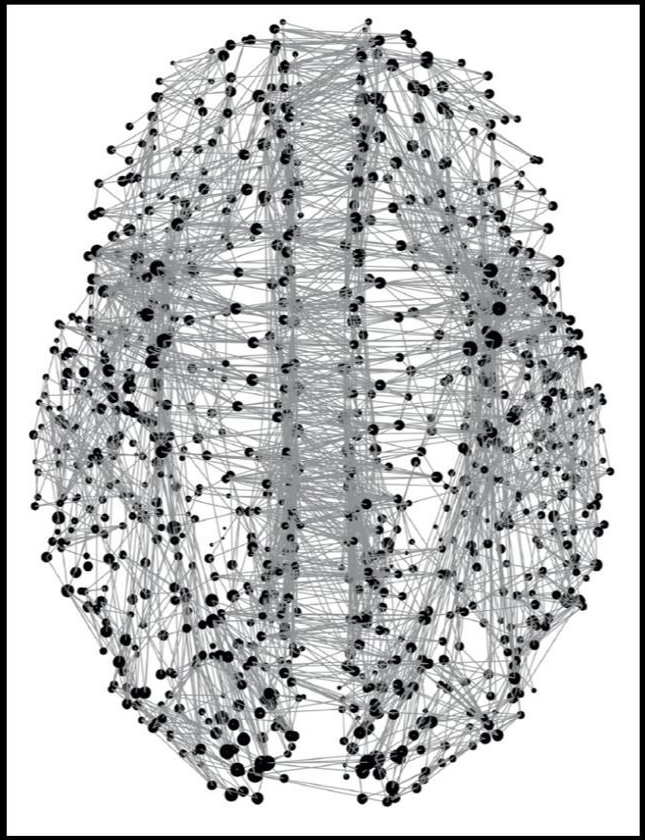
»we live in brain«

Comment by Łukasz Erm
youtube.com

»God apparently thinks he’s Jackson Pollock.«

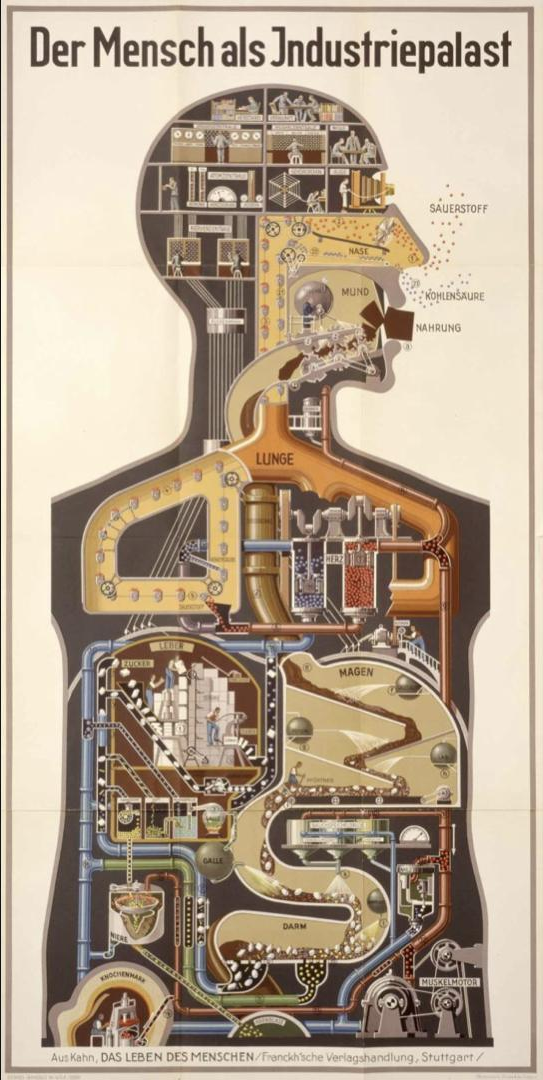
Comment by Data1001
http://gizmodo.com/breathtaking-visualization-of-the-universe-will-make-yo-1772363594





Communication dynamics in complex brain networks
https://www.nature.com/articles/nrn.2017.149


The Cloud
There is no cloud
it's just someone else's computer
CLOUD STORAGE
videos
music
documents
files
contacts
pictures
share
THE CLOUD
CLOUD BENEFITS
Cloud
The Cloud
Wi-Fi Powered by The Cloud


Der Mensch als Industriepalast
SAUERSTOFF
KOHLENSÄURE
NAHRUNG
NASE
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MAGEN
GALLE
DARM
NIERE
KNOCHENMARK
MUSKELMOTOR
Aus Kahn, DAS LEBEN DES MENSCHEN / Franckh'sche Verlagshandlung, Stuttgart /

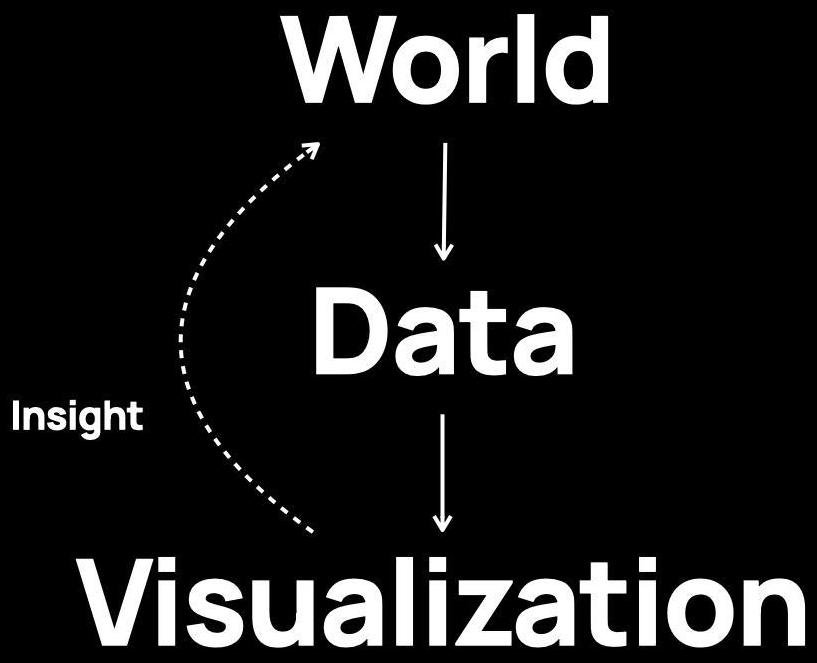
cultural layer

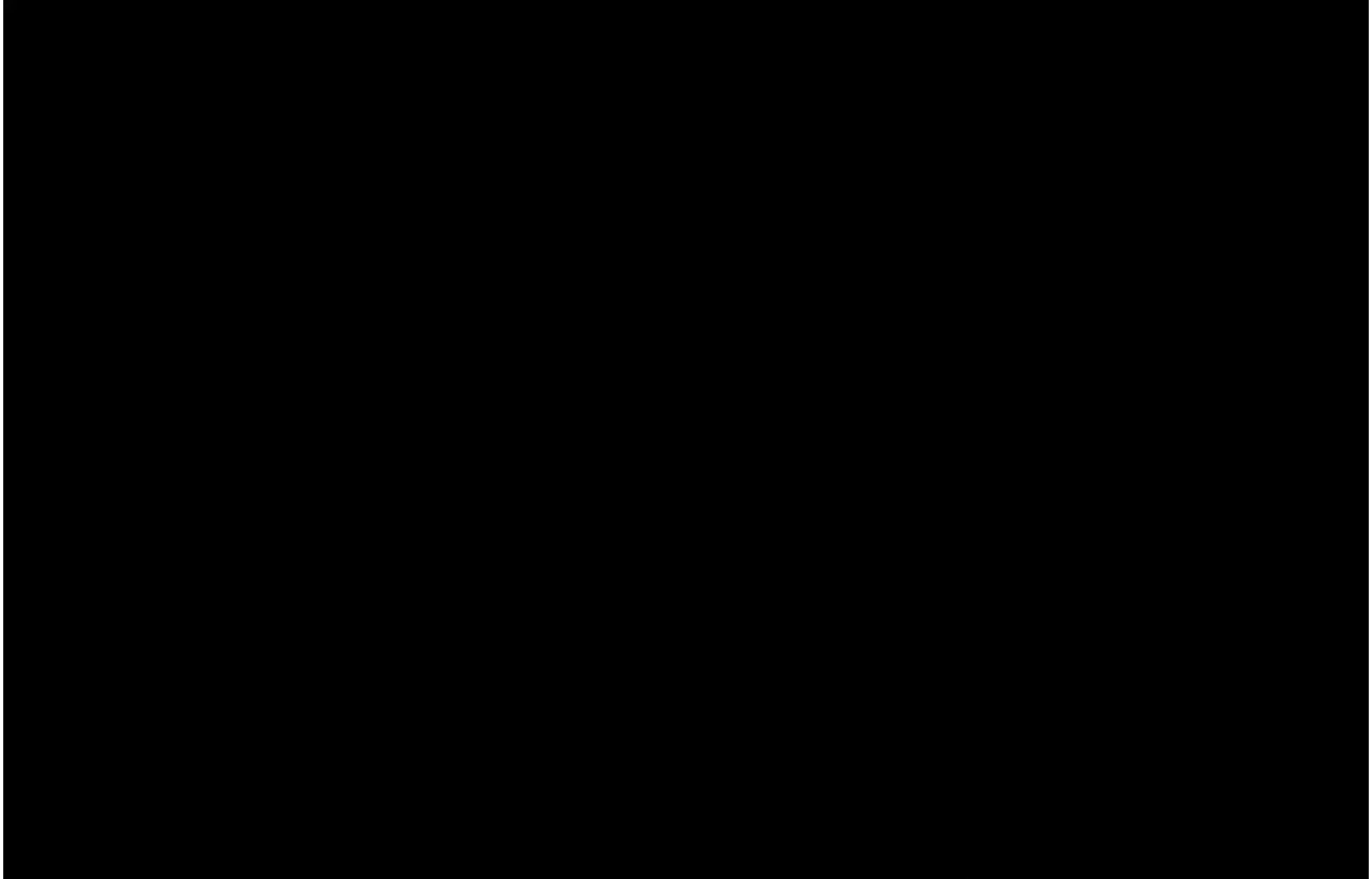
Mechanisation of the human

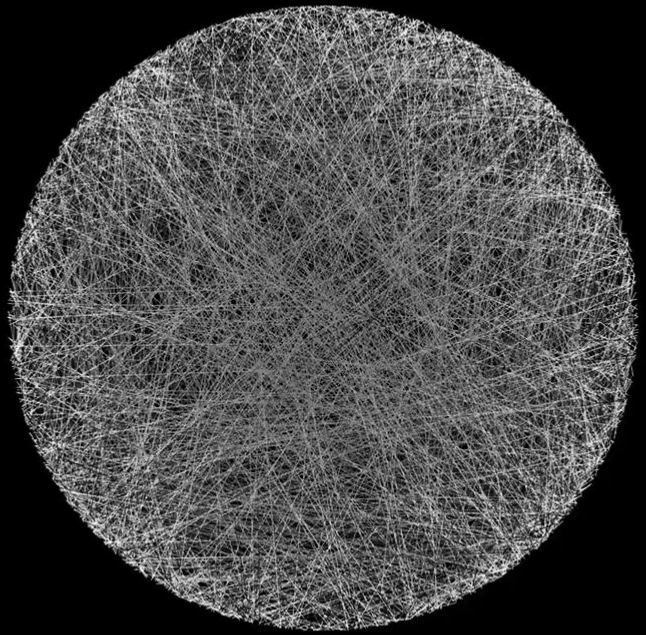
Interfaces

Naturalisation of the Machine

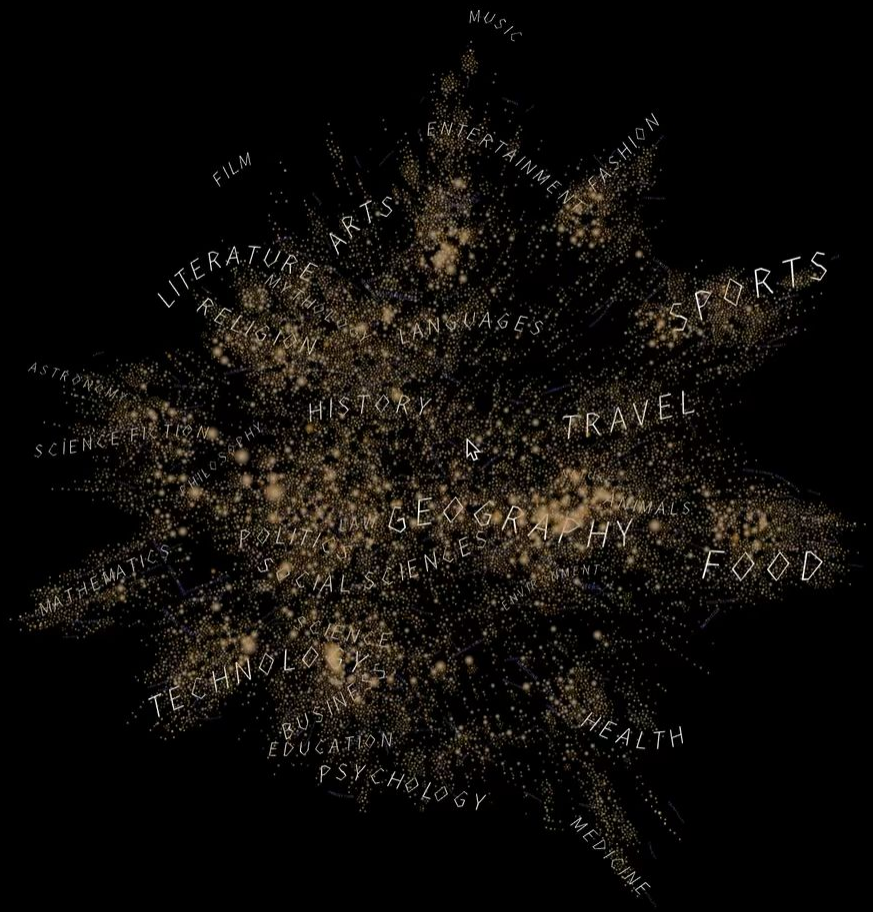
computer layer

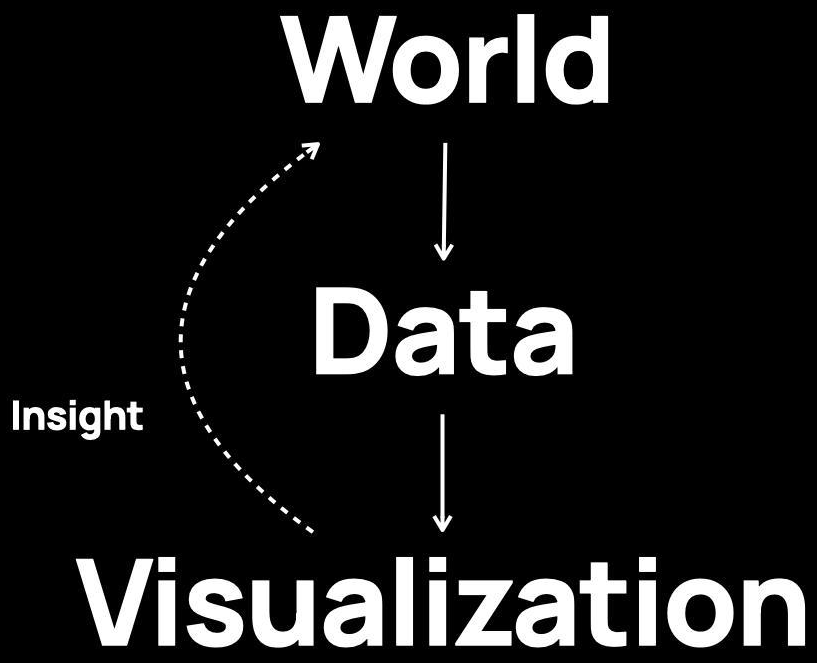

World
Data
Visualization
Insight



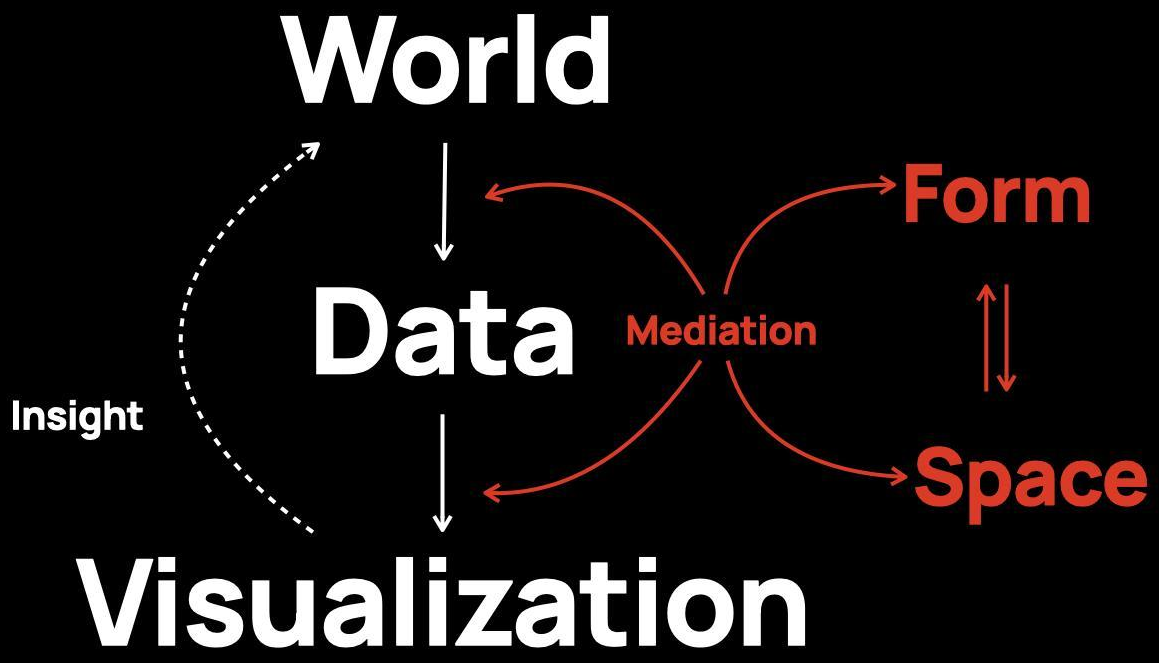


Artificial Worldviews

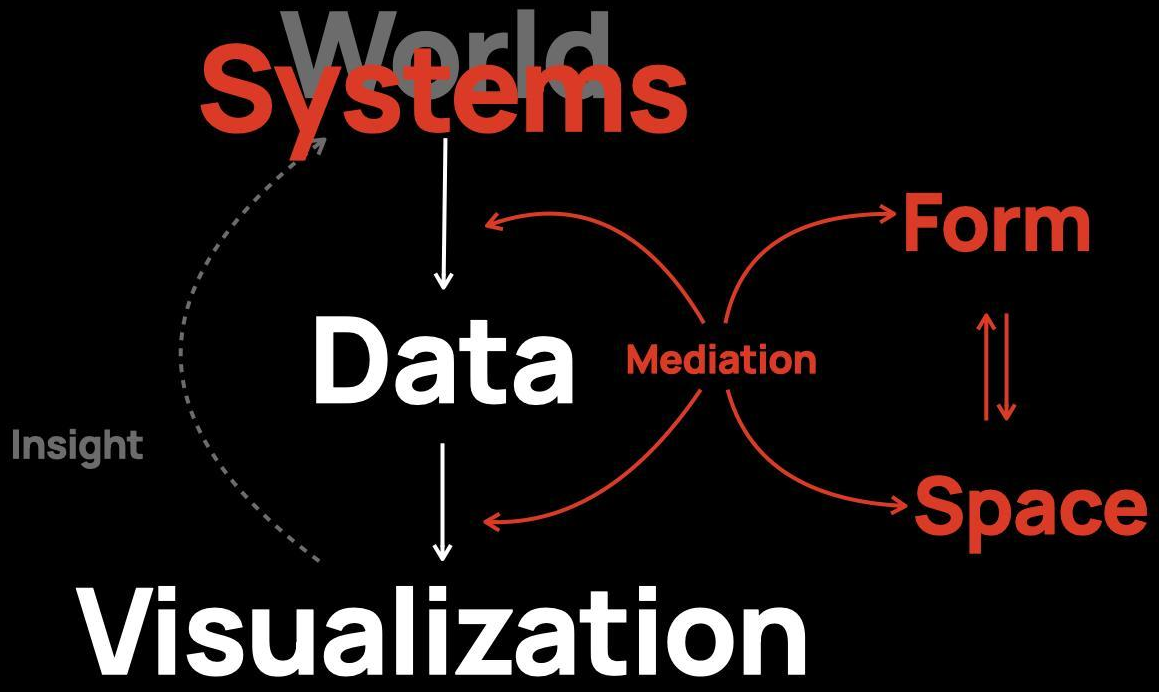



World
Data
Visualization
Insight

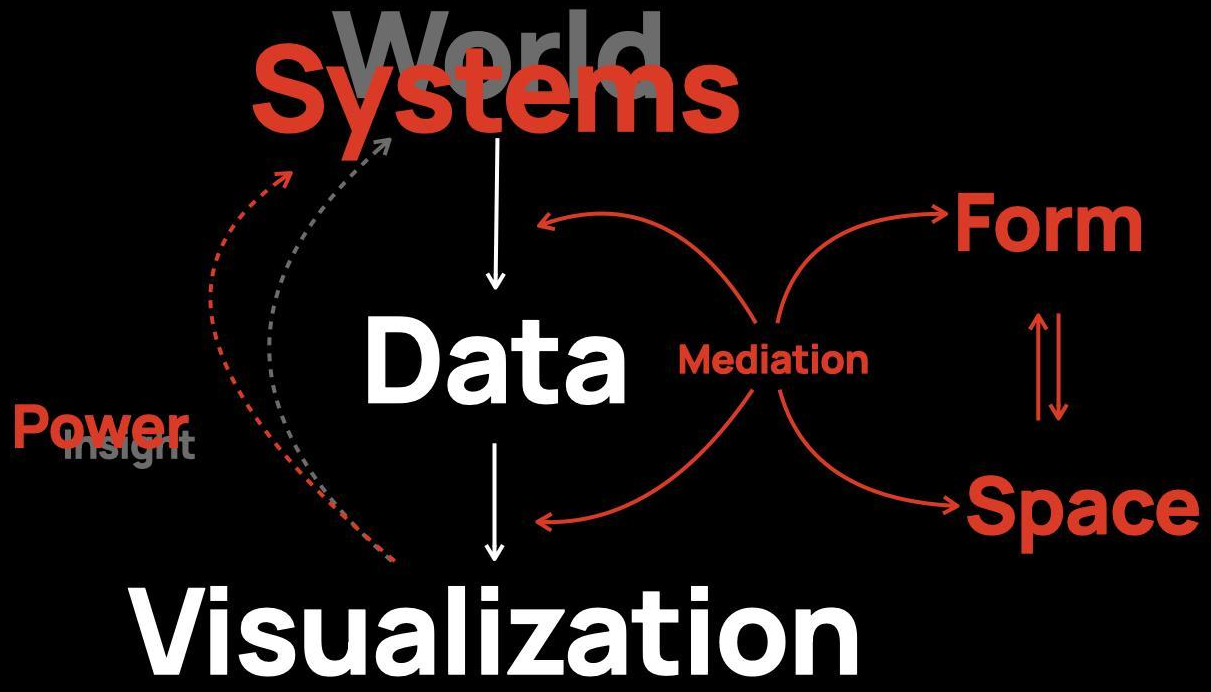
Conceptions of Data Visualization



Conceptions of Data Visualization

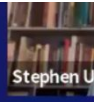


Conceptions of Data Visualization



Stephen Uzzo

Stephen Miles Uzzo is currently the President/Executive Director for the Cape Cod Museum of Natural History and a co-founder of the Woods Hole Institute. He develops and leads large-scale design and research initiatives to study and integrate new science into teaching and learning; building communities of practice at the intersection of socioenvironmental systems, complexity, data science and engineering. Dr. Uzzo is also active in science and education policy. His background includes over 20 years experience in the research of connected systems and science teaching and learning; and prior to that, 10 years in video and computer imaging and communication systems engineering. His work includes developing and teaching graduate programs in the integration of science, technology, engineering and mathematics in teaching and learning. Dr. Uzzo's research interests include the coupling of complex human and natural systems, evolution and scaling of complex networks, and the impact of big data on communities of need. He holds a terminal degree in network theory and environmental studies from Union Institute and serves on a number of institutional and advisory boards related to his interests. Having never lived very far from the ocean in New York, California and Massachusetts, Dr. Uzzo has been a lifelong advocate for marine conservation.



SCALE, SYNCHRONIZATION & WEBS

OPPORTUNITIES IN SCIENCE ENGAGEMENT

24 Hour “Envisioning Intelligences” Event | Panel: Engaging General Audiences

Stephen Miles Uzzo: Woods Hole Institute & Cape Cod Museum of Natural History

CAPE COD MUSEUM OF NATURAL HISTORY est: 1954

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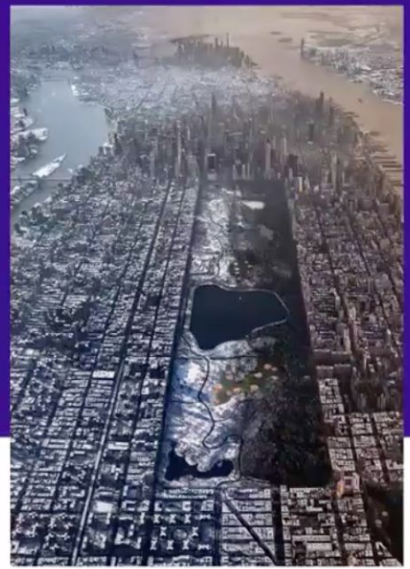
MICRO

Microscopic Cellular, or
Multi-Cellular Systems

MESO

Social Systems.



MACRO

Large-Scale
Ecological Systems

Left to Right: ISDR, BONNINSTUDIO & PetaPixel;

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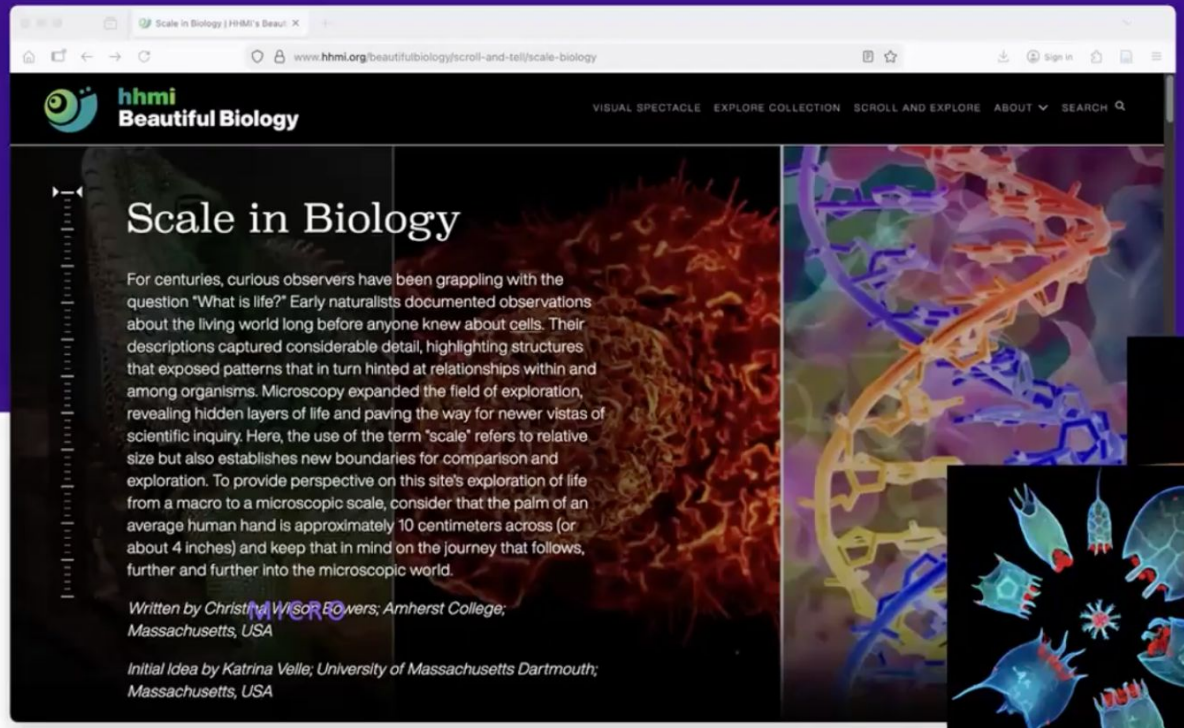

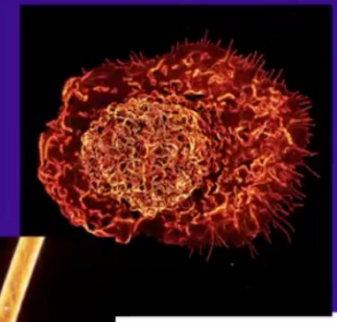

MACROPHAGE

HUMAN HAIR

ROTIFER

Howard Hughes Medical Institute

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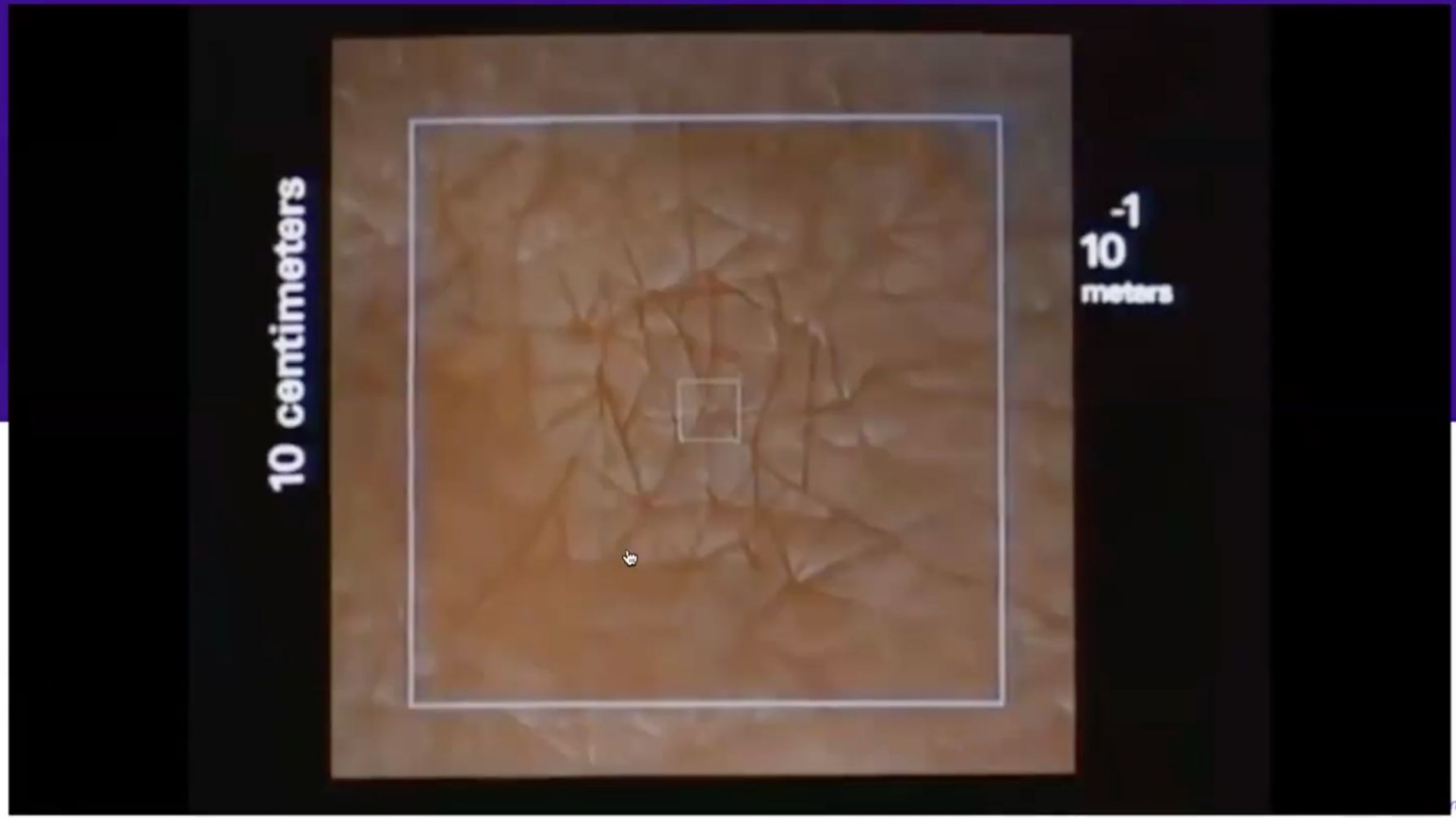
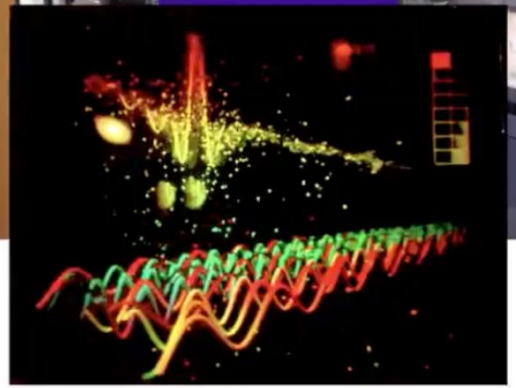


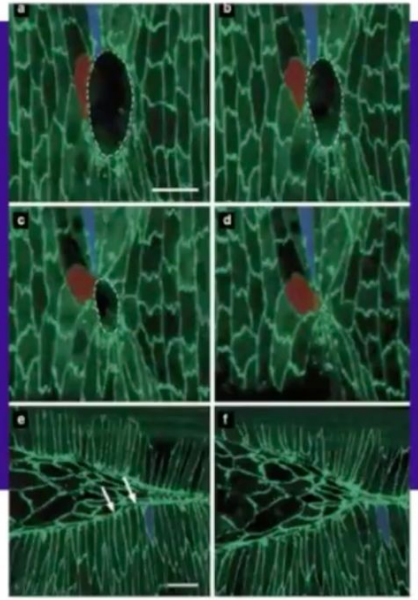
Marvelous Molecules

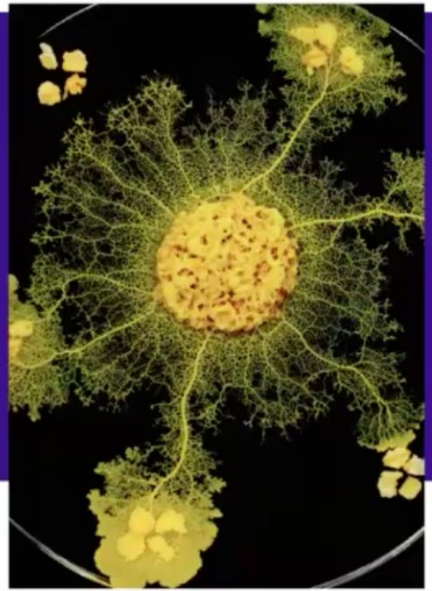


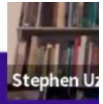
Realm of the Atom

Hidden Kingdoms

Left to Right: New York Hall of Science;

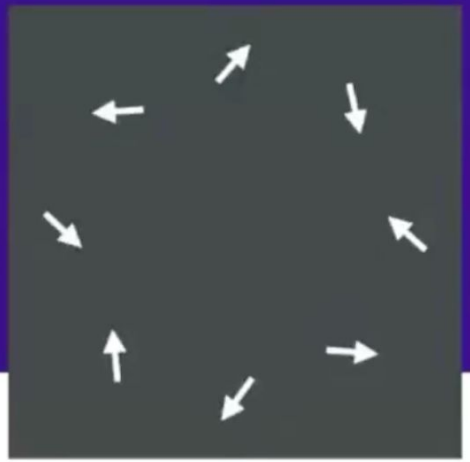


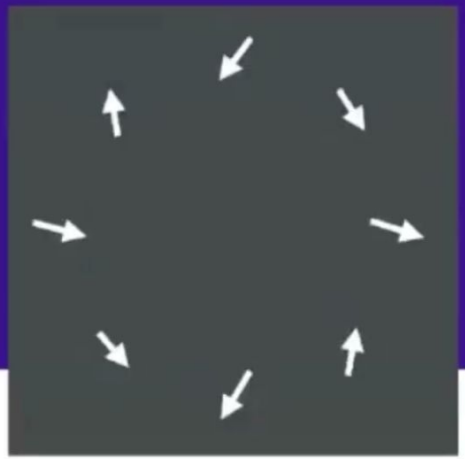


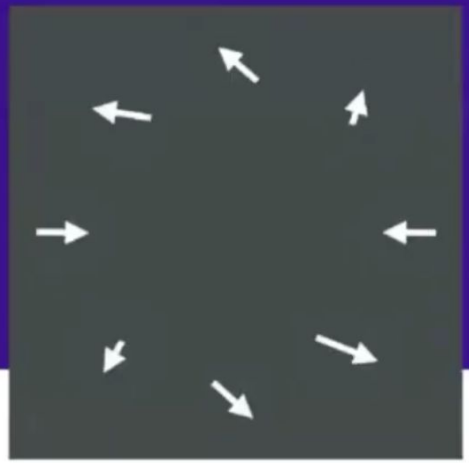


Left to Right: Wood, et al,, Prevention, Wikipedia

Oscillators are powerful regulatory mechanisms that, through synchronization, allow connections within and among living things







Matheny et al./Science

SPLAY STATE

TRAVELING WAVE

NOISE-DRIVEN CHIMERA

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Annamaria Talas, 2008

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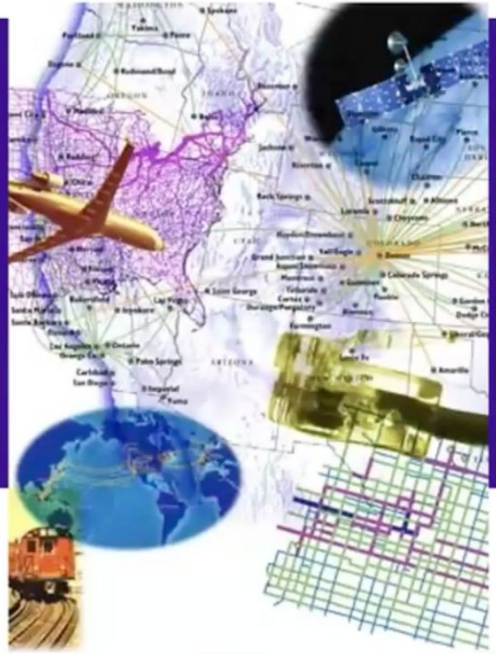
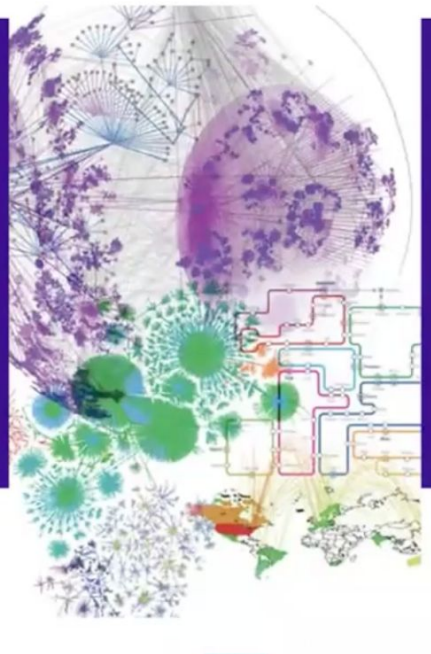
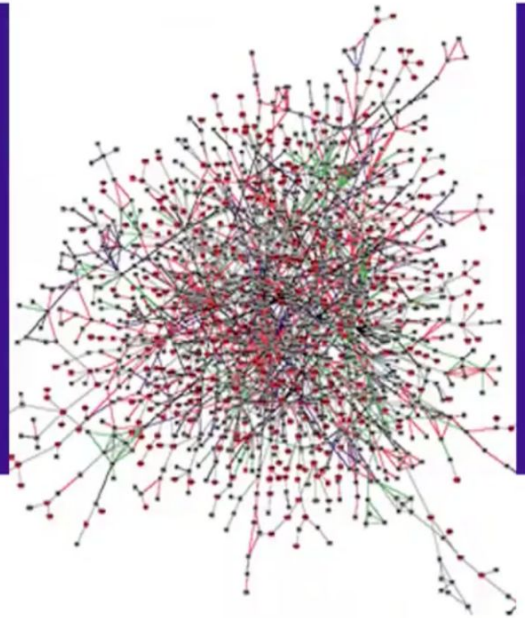
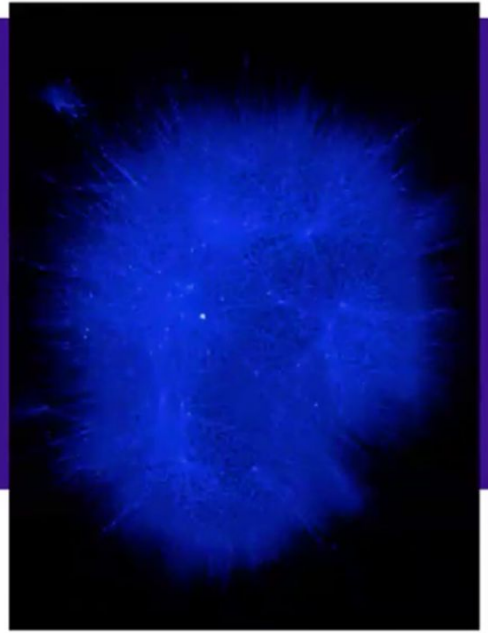
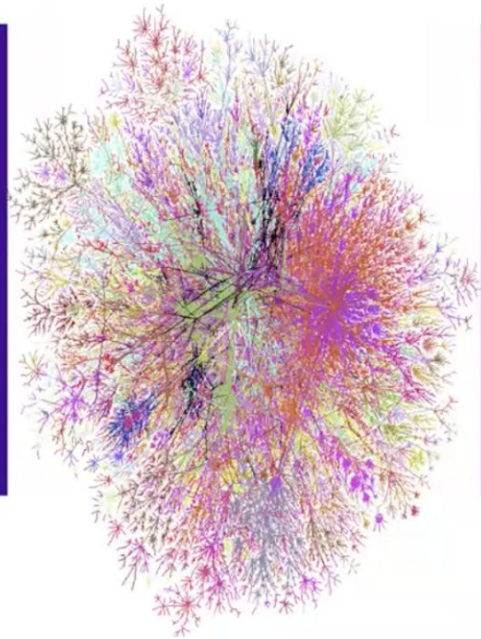




Networks are the Relationships That Connect Oscillator-Driven Systems







Left to Right: Wood, et al, Wikipedia, Lumeta

PROTEIN INTERACTIONS

SOCIAL NETWORKS

THE INTERNET

Networks are Ubiquitous in Nature.
They Connect Us to Each Other and All Living Things.

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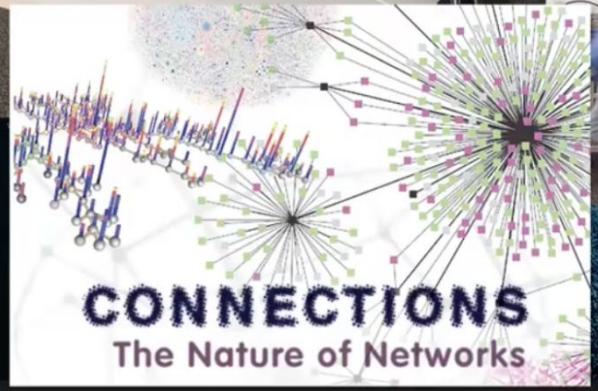
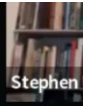
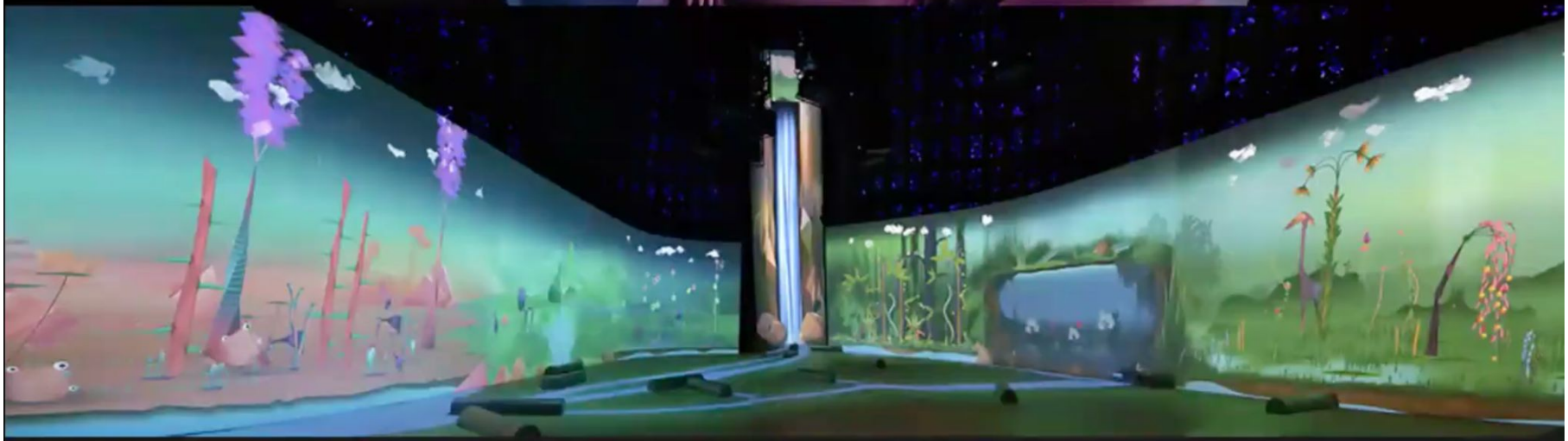




CONNECTED WORLDS

- Immersive Experience
- Embodied Learning/Social
- 4 Habitats (Biomes)
- 3 Water Sources
- Coordinated Actions



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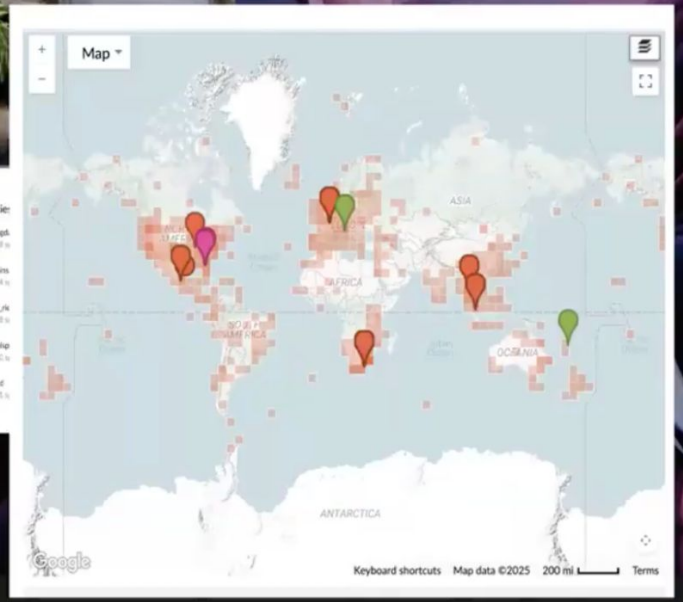
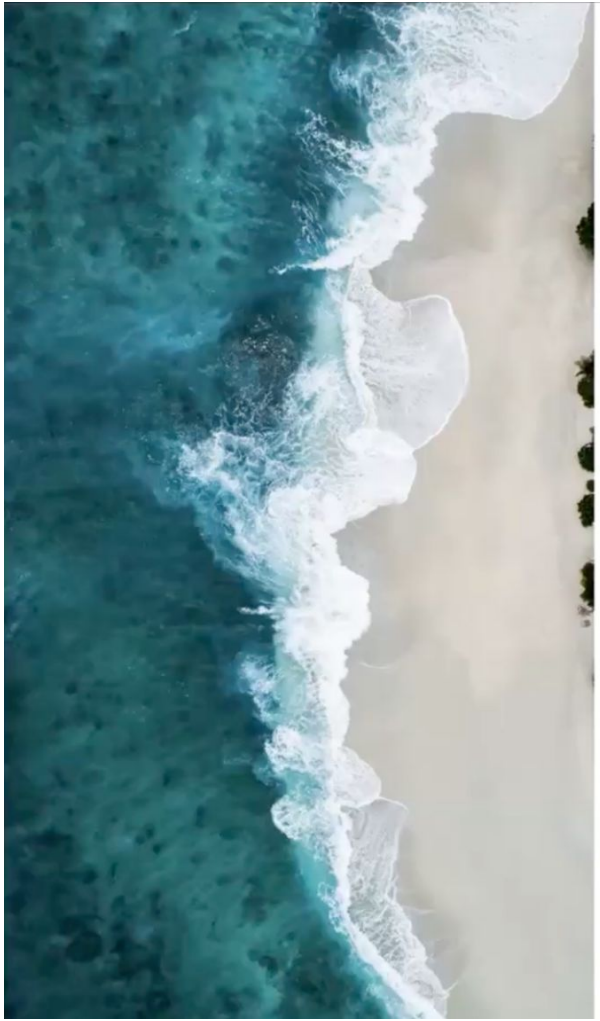
iNATURALIST



- A dedicated citizen science project for collecting predator-prey interactions
- Volunteers participate in the project by submitting images of wildlife feeding interactions (e.g. a deer eating a leaf, or a snake eating a lizard).



THANK YOU!

WOODS HOLE INSTITUTE

FOR ADDITIONAL INFO

www.WoodsHoleInstitute.org

Woods Hole Institute is a 501(c)3 non-profit organization.

24h Envisioning Intelligences
event slides and video recordings:

Call for exhibit submissions:
https://scimaps.org/call-for-submissions

ENVISIONING INTELLIGENCES

Aurora Mititelu