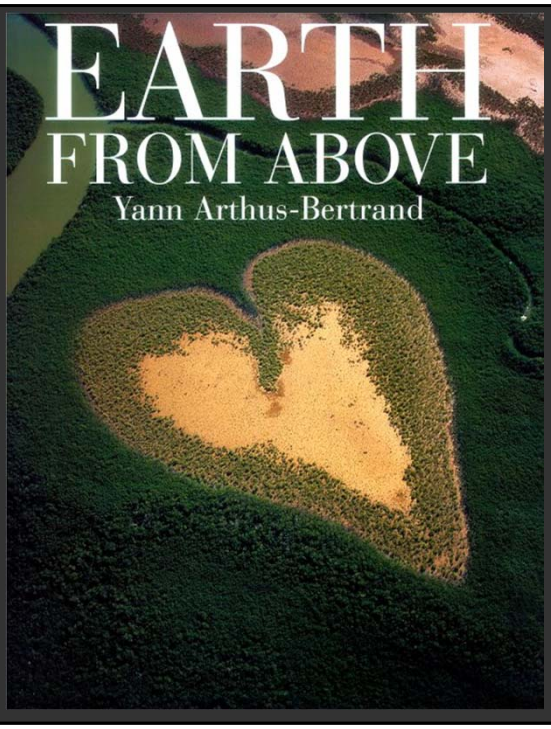
PLACES & SPACES

MAPPING SCIENCE

scimaps.org

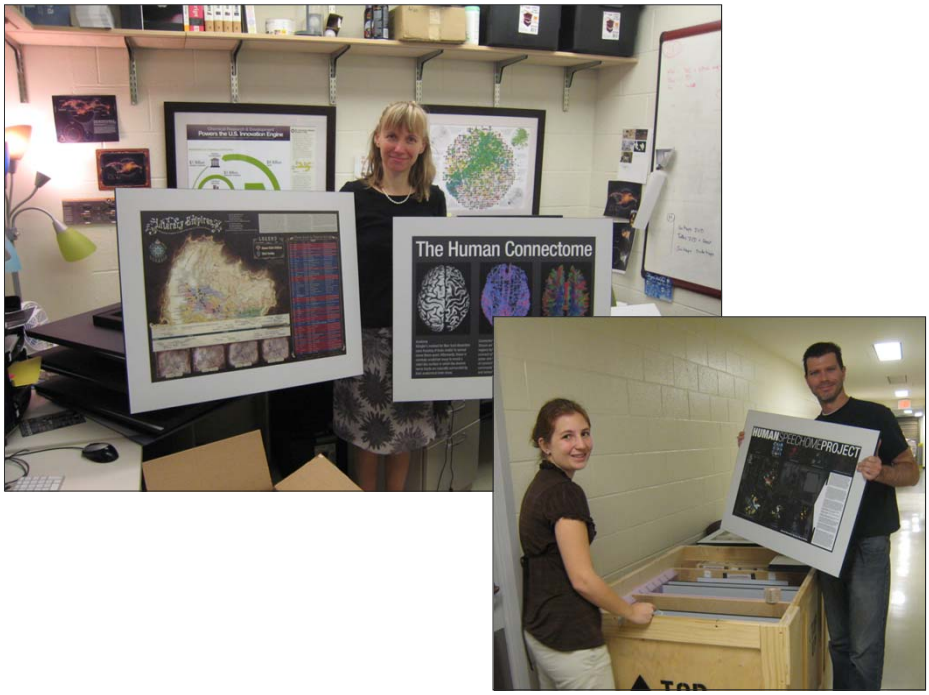


How can we communicate the beauty, structure, and dynamics of science to a general audience?

April, 2005: 101st Annual Meeting of the
Association of American Geographer, Denver, Colorado.


The Structure of Science
2005: 101st Annual Meeting o
American Geographer, Denv


INDIANA
UNIVERSITY
PLACES AND SPACES
EXHIBIT

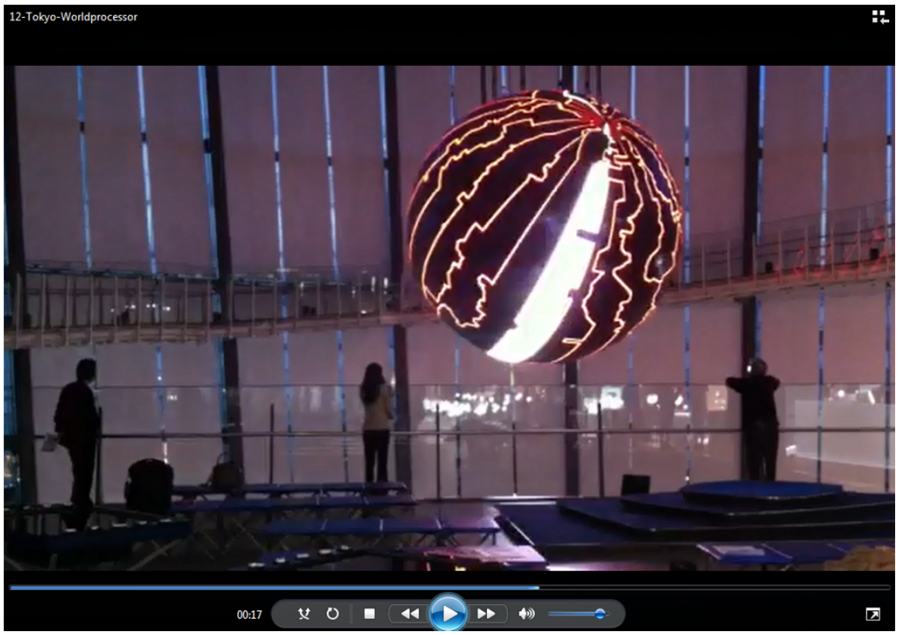


Debut of 5th Iteration of the Mapping Science Exhibit at MEDIA X was in 2009 at Wallenberg Hall, Stanford University.

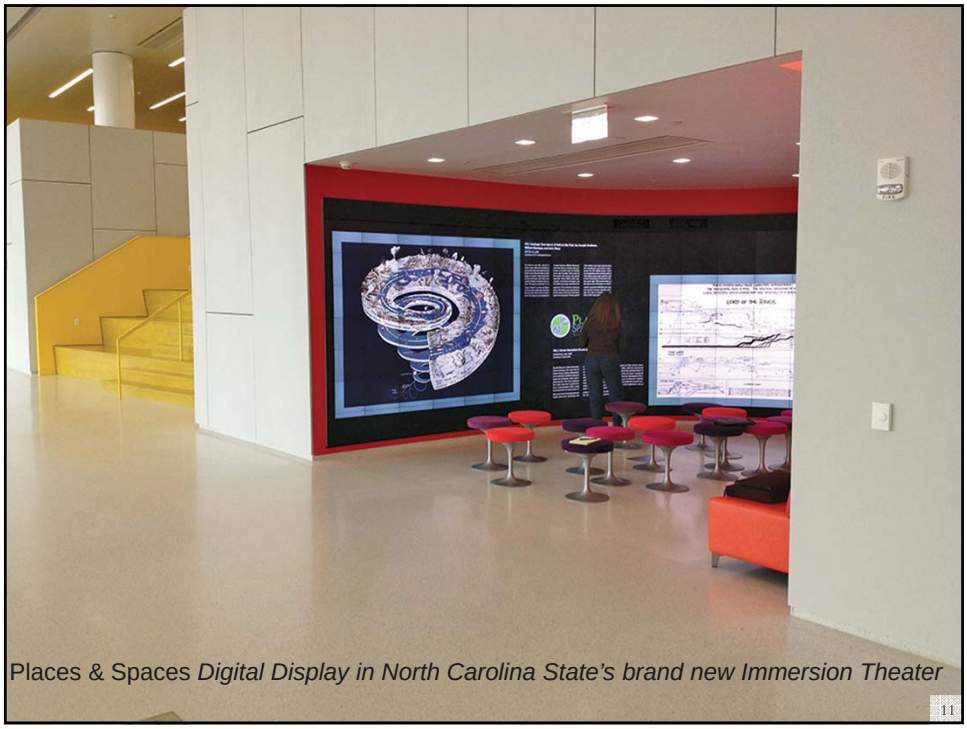
8

Science Maps in “Expedition Zukunft” science train visited 62 cities in 7 months. Opening was on April 23rd, 2009 by German Chancellor Merkel

9



Ingo Gunther's Worldprocessor globe design on display at the Museum of Emerging Science and Innovation in Tokyo, Japan



Places & Spaces *Digital Display in North Carolina State's brand new Immersion Theater*

11

Places & Spaces at Duke University
January 12 - April 10, 2015

13

Places & Spaces at Northwestern University
May 14 - September 23, 2015

14

10 iterations over 10 years

equal

10 x 10 = 100 maps!

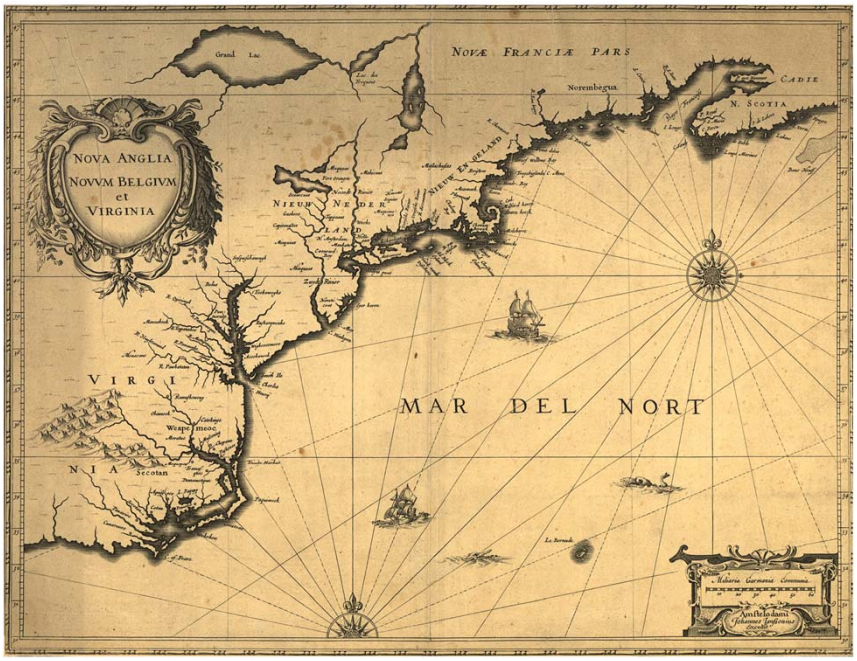
The Power of Maps 2005

Cartographic maps of physical places have guided mankind's explorations for centuries.

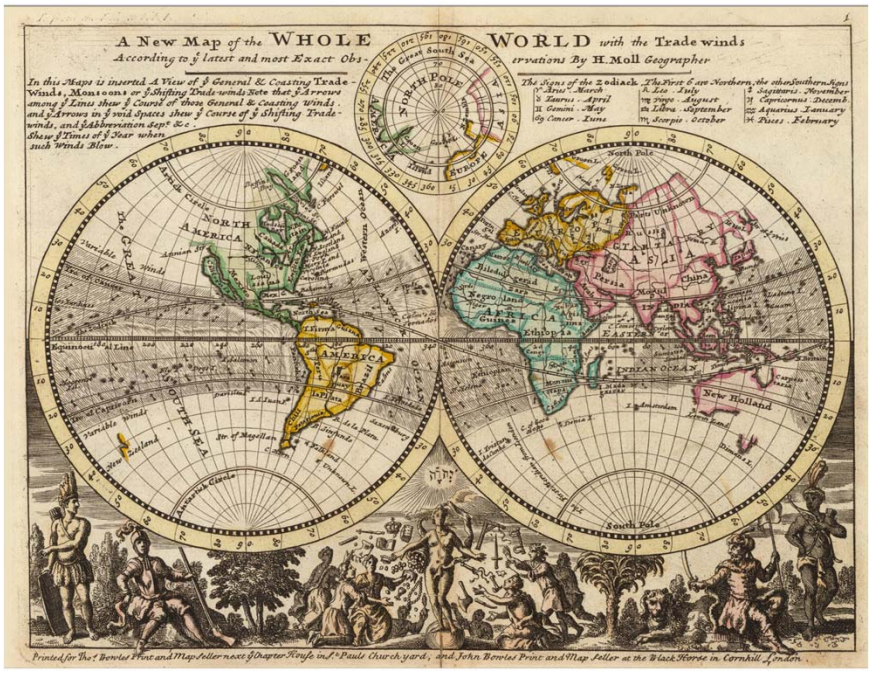
They enabled the discovery of new worlds while also marking territories inhabited by the unknown.

Without maps, we would be lost.

Cosmographia World Map - Claudius Ptolemy - 1482



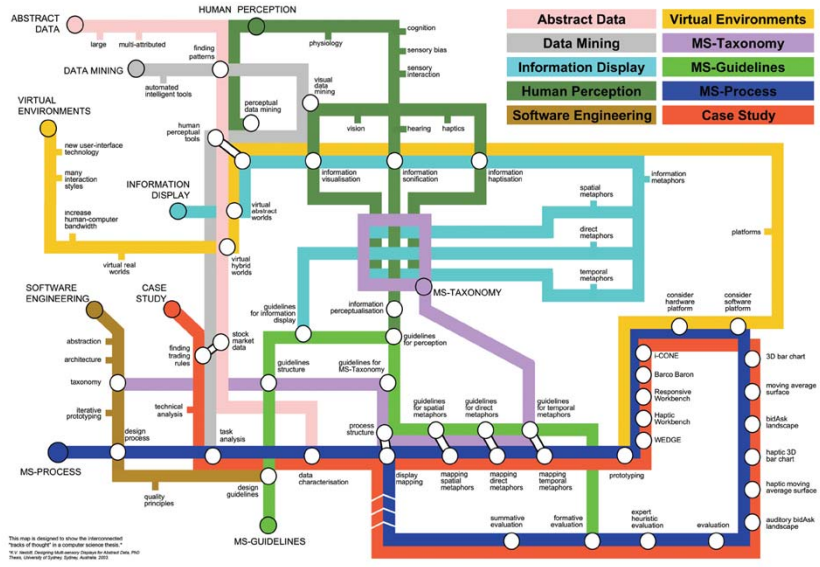
Nova Anglia, Novvm Belgivm et Virginia - Jan Jannson - 1642



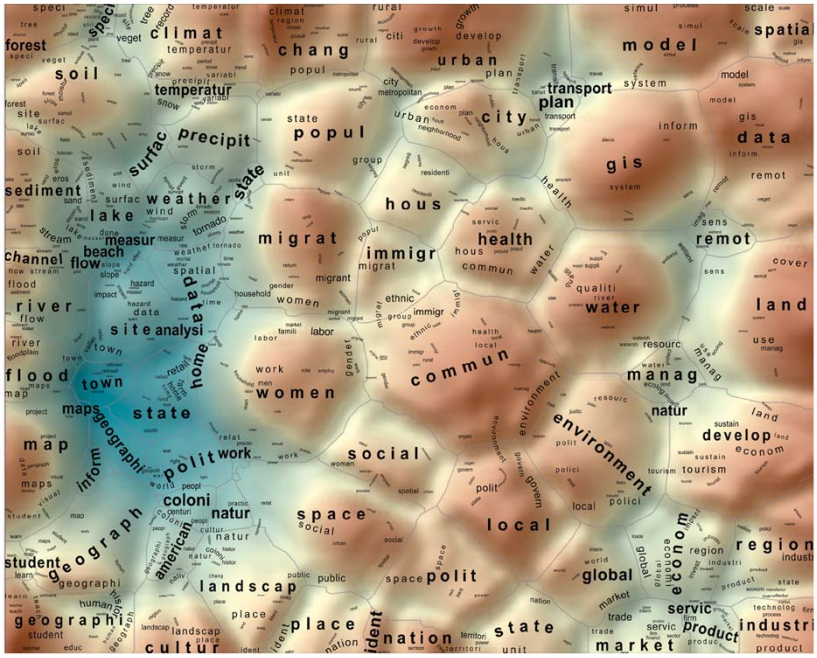
A New Map of the Whole World with Trade Winds According to the Latest and Most Exact Observations - Herman Moll - 1736

Science maps of abstract semantic spaces aim to serve today's explorers navigating the world of science.

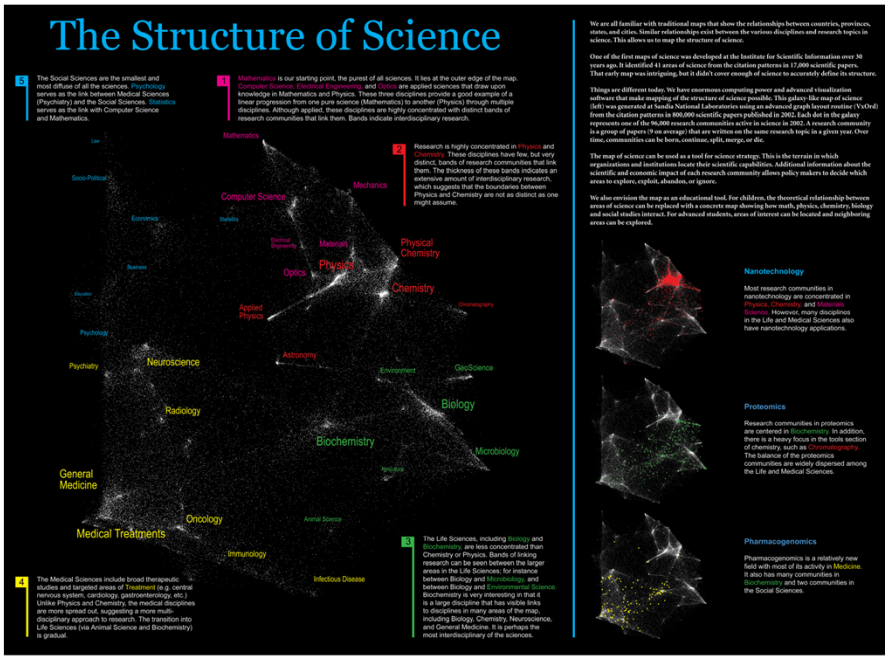
They can be used to identify objectively major experts, institutions, collections. They allow us to track the emergence, evolution, and disappearance of topics and help to identify the most promising areas of research.



Ph.D. Thesis Map - Keith B. Nesbitt - 2004

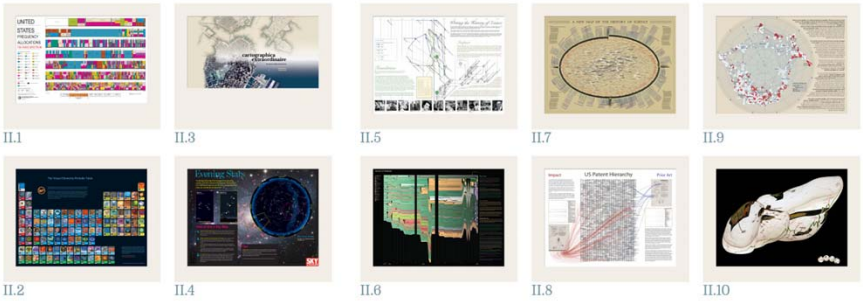


In Terms of Geography - Andre Skupin - 2005



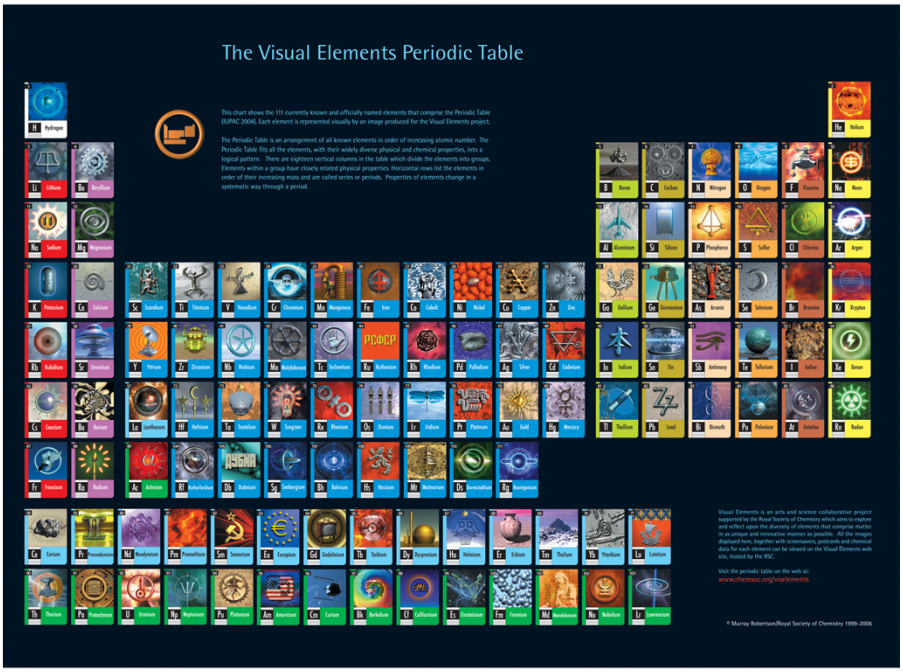
The Structure of Science - Kevin Boyack, Richard Klavans - 2005

The Power of Reference Systems 2006

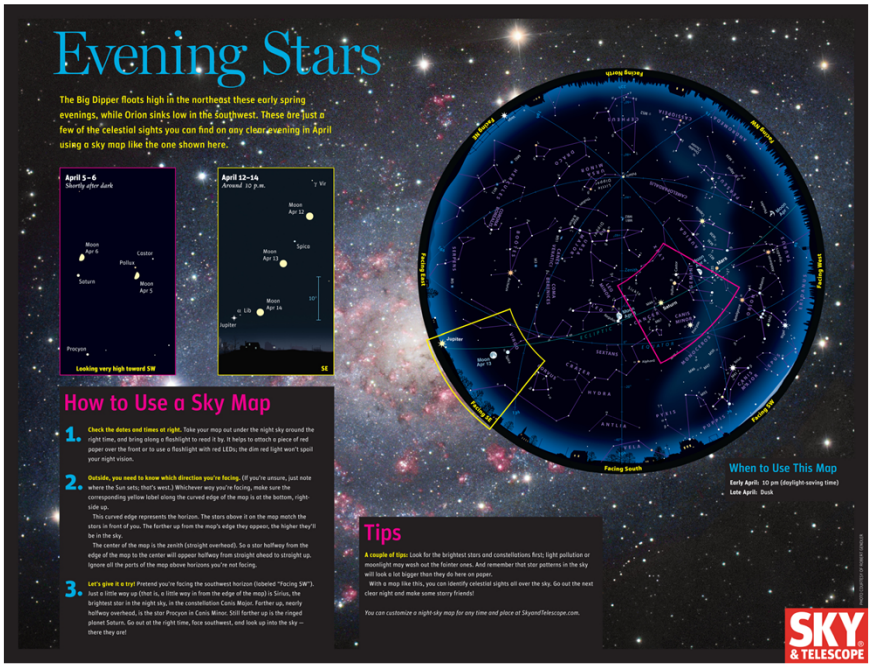


II.1 II.3 II.5 II.7 II.9

II.2 II.4 II.6 II.8 II.10



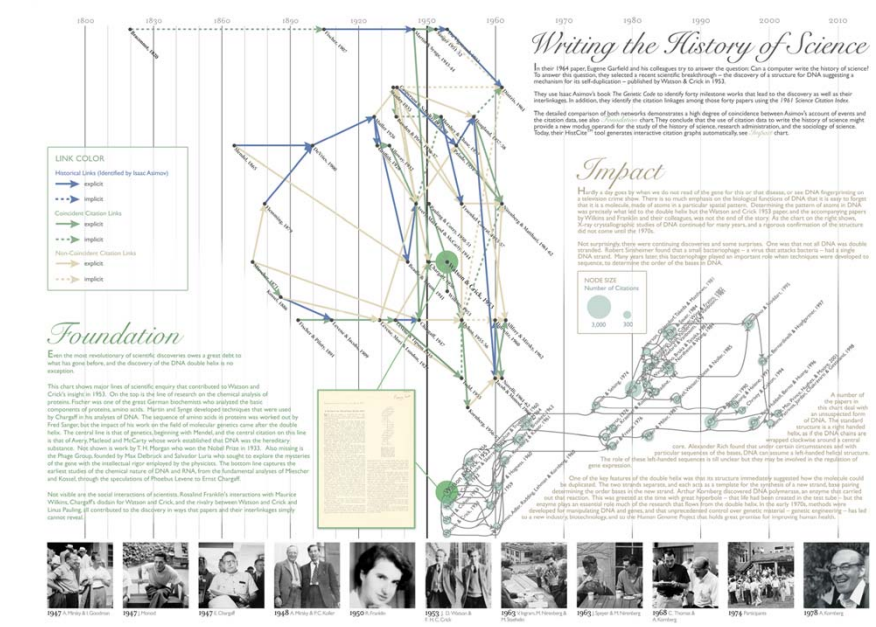
Visual Elements Periodic Table - Murray Robertson, John Emsley - 2005



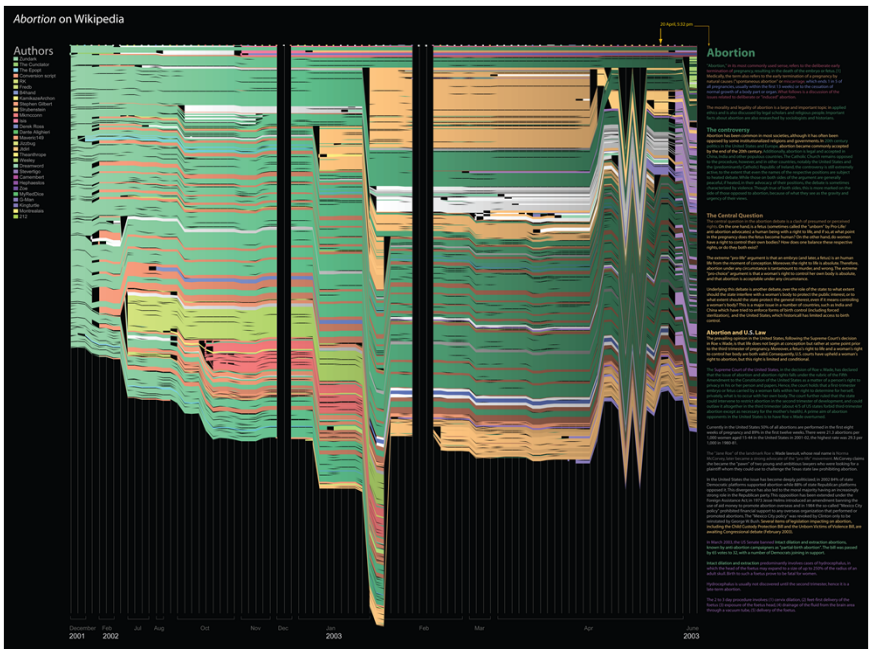
Sky Chart of New York City in April 2006 - Roger W. Sinnott, Interactive Factory - 2006

How would a reference system for all of science look?

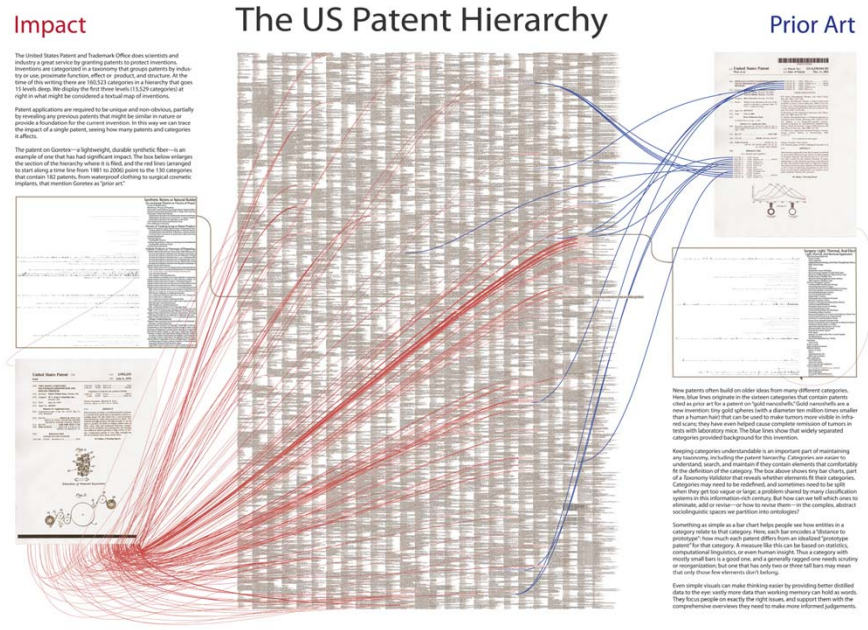
What dimensions would it have?



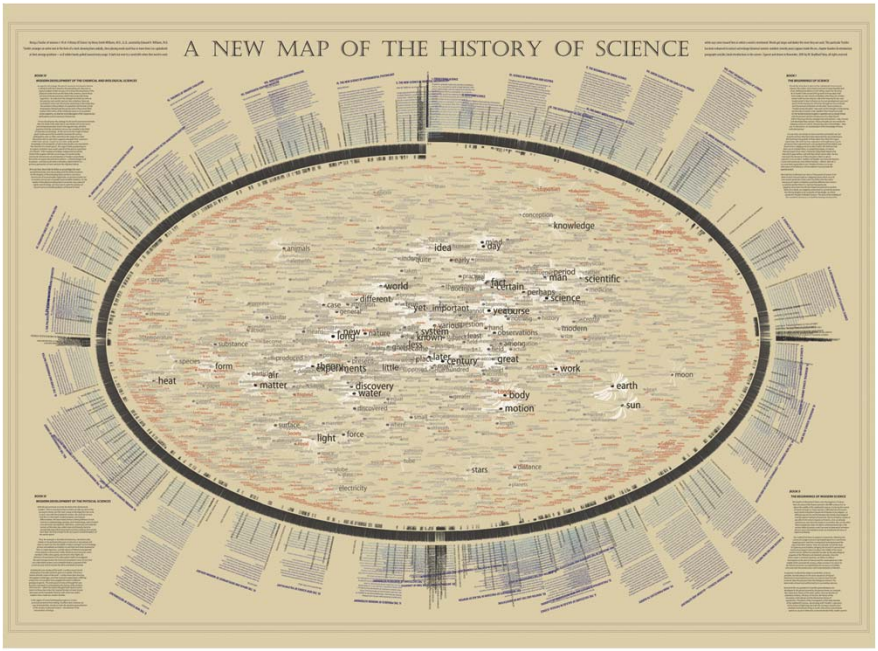
HistCiteTM Visualization of DNA Development - Eugene Garfield, Elisha Hardy, Katy Börner, Ludmila Pollock, Jan Witkowski - 2006



History Flow Visualization of the Wikipedia Entry on "Abortion" - Martin Wattenberg and Fernanda B. Viégas - 2006

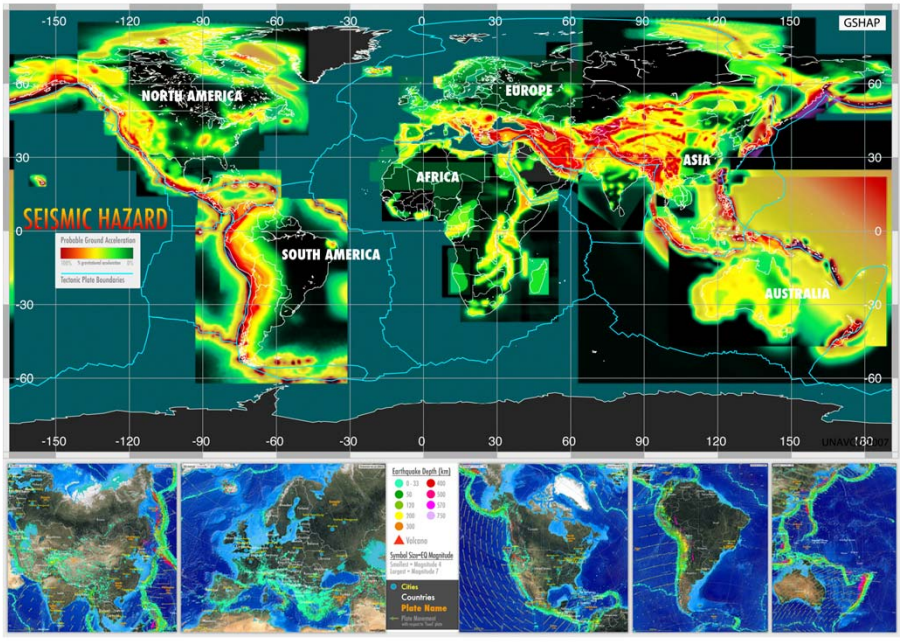


Taxonomy Visualization of Patent Data - Katy Borner, Elisha Hardy, Bruce Herr, Todd Holloway, Bradford Paley - 2006

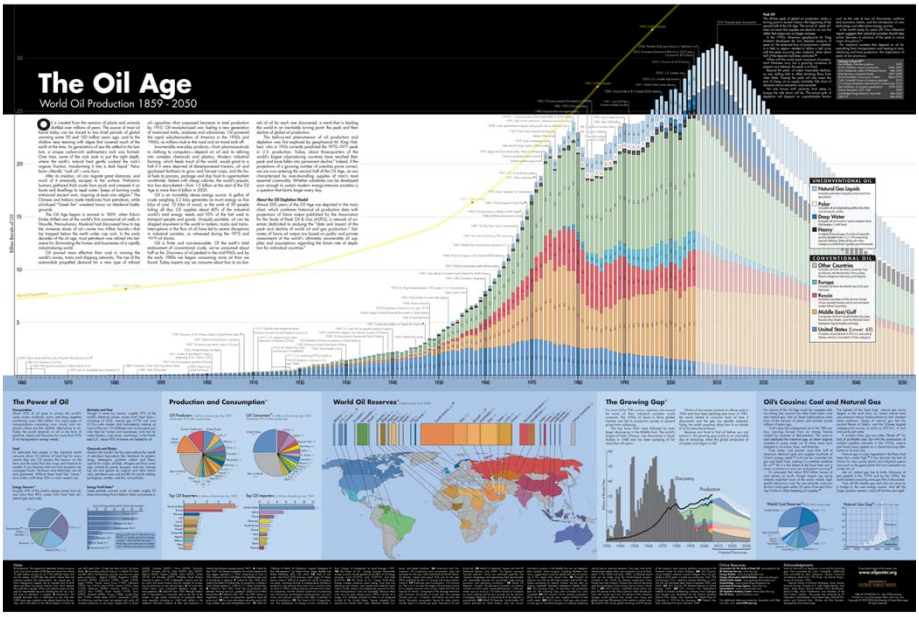


TexArc Visualization of "The History of Science" - W. Bradford Paley - 2006

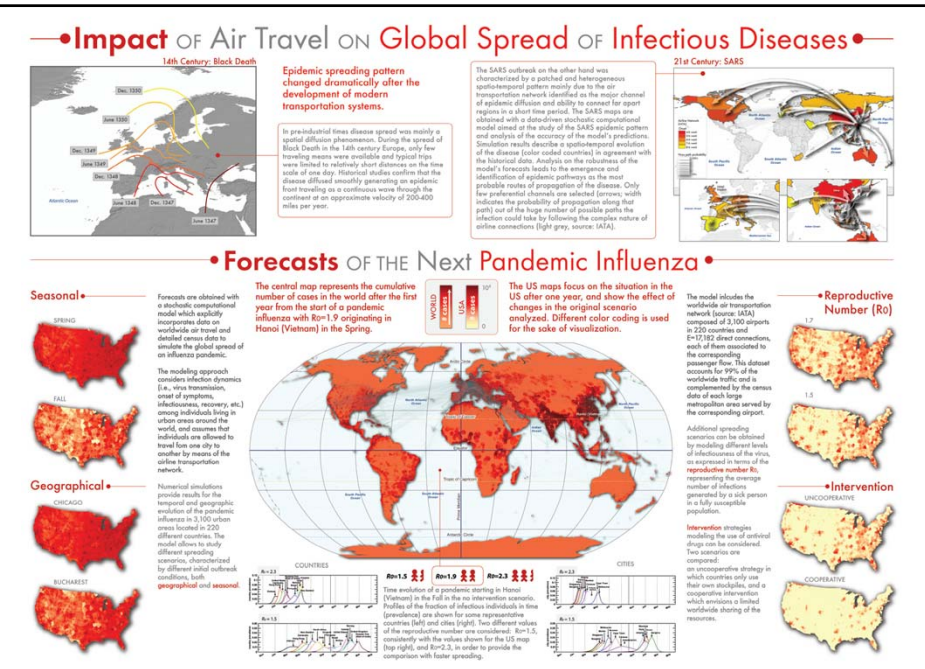
The Power of Forecasts 2007



Tectonic Movements and Earthquake Hazard Predictions - Martin W. Hamburger, Lou Estey, Chuck Meertens, Elisha Hardy - 2005



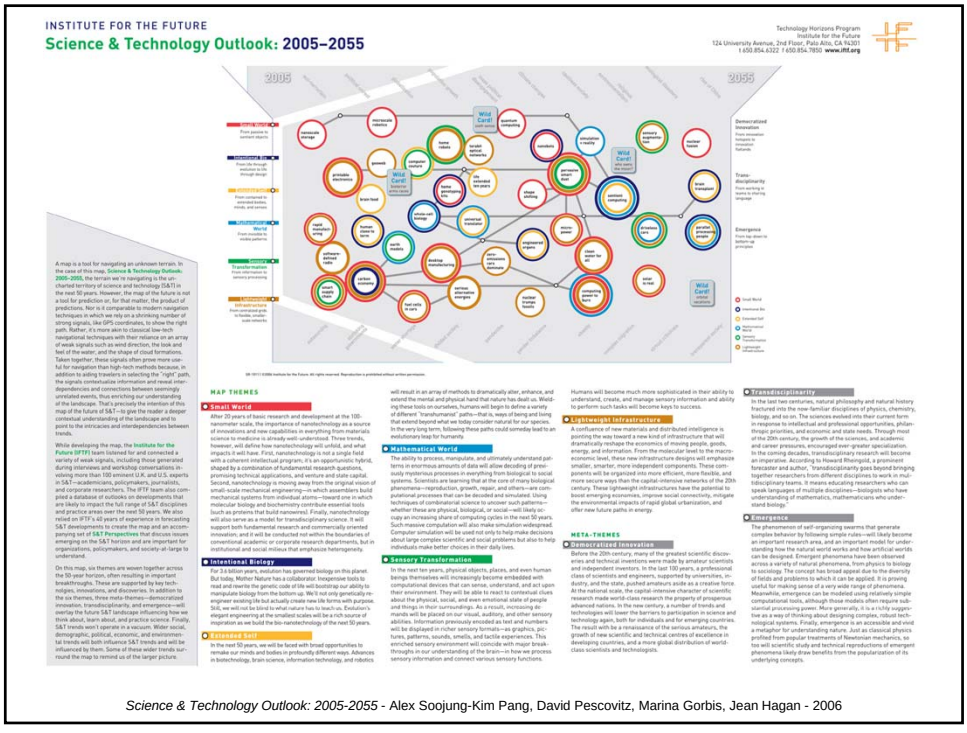
The Oil Age: World Oil Production 1859-2050 - Rob Bracken, Dave Menninger, Michael Poremba, Richard Katz - 2005



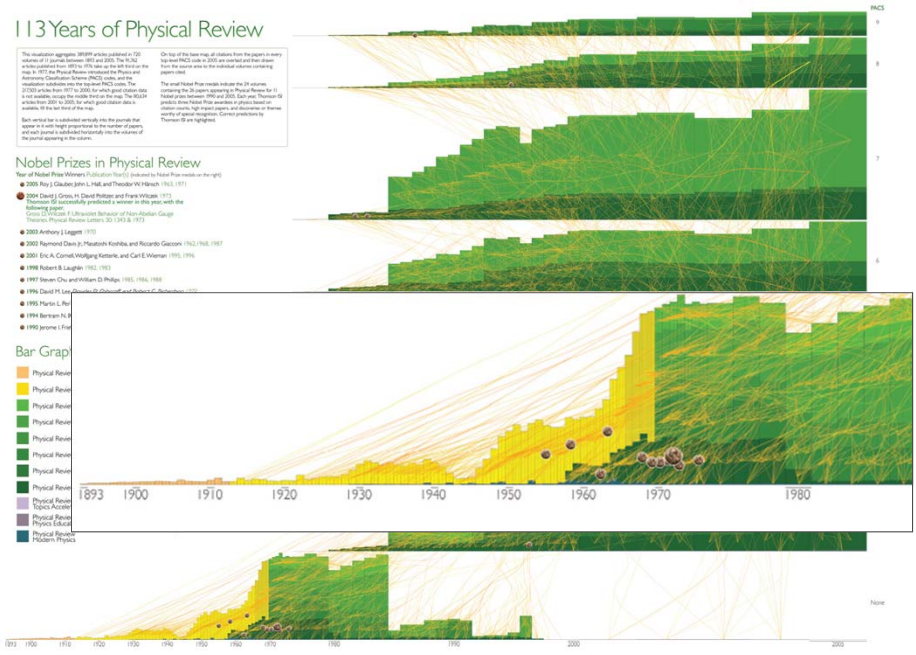
Impact of Air Travel on Global Spread of Infectious Diseases - Vittoria Colizza, Alessandro Vespignani - 2007

Can one forecast science?

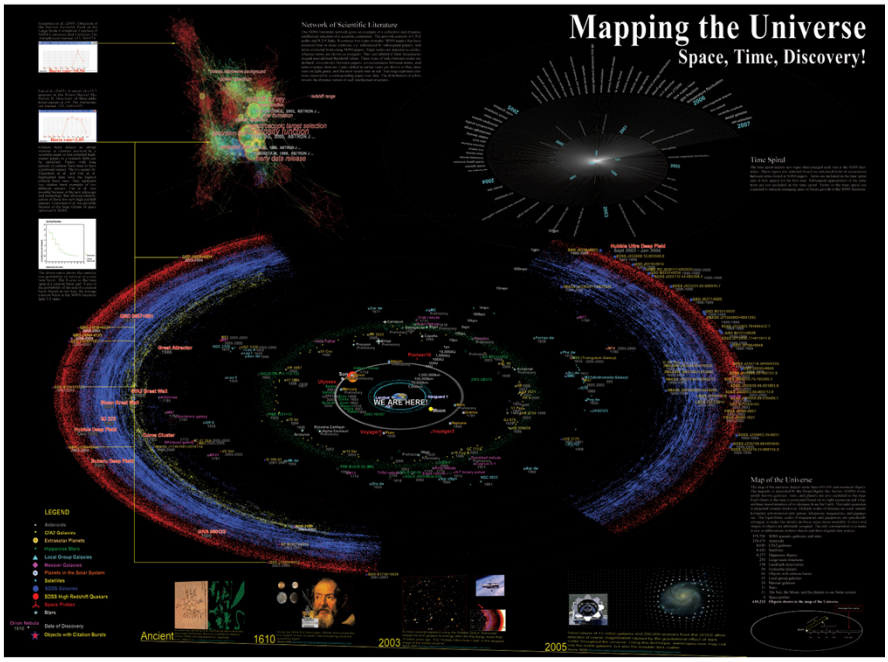
What ‘science forecast language’ will work to communicate results?



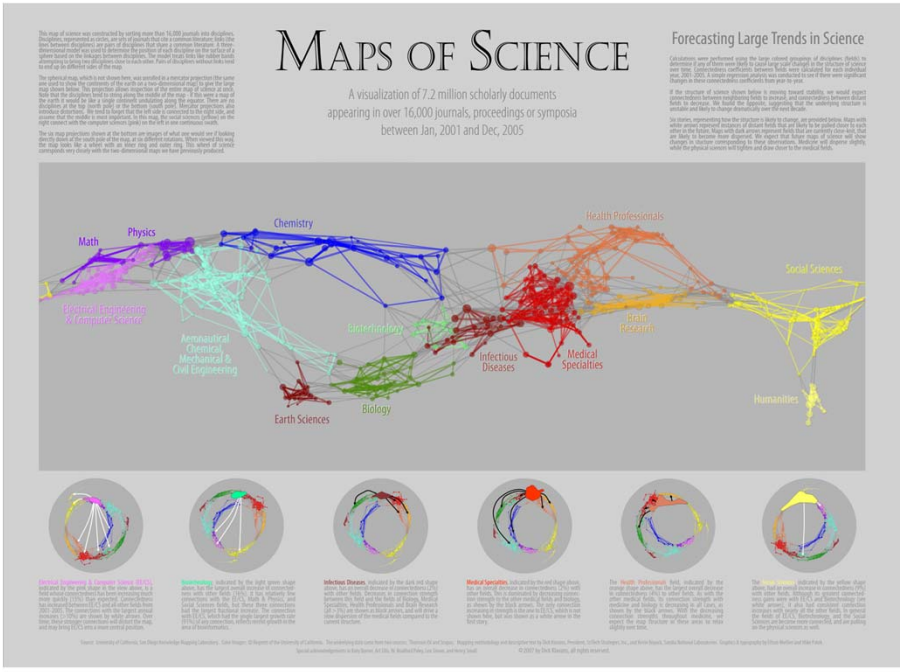
Science & Technology Outlook: 2005-2055 - Alex Soojung-Kim Pang, David Pescovitz, Marina Gorbis, Jean Hagan - 2006



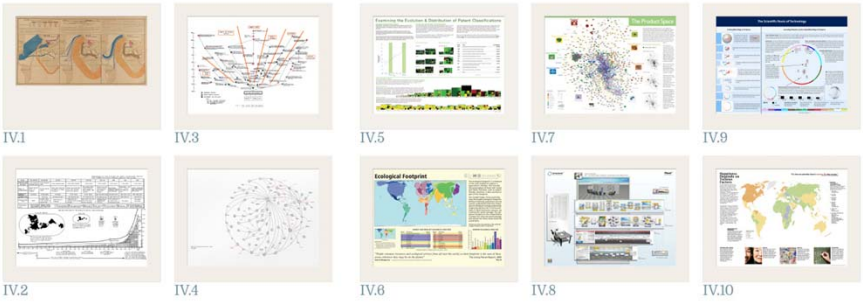
114 Years of Physical Review - Bruce W. Herr II, Russell Duhon, Katy Borner, Elisha Hardy, Shashikant Penumarthy - 2007



Mapping the Universe: Space, Time, Discovery!
Choumei Chen, Jian Zhang, Michael S. Vogeley, J. Richard Gott III, Mario Juric, Lisa Kershner - 2007

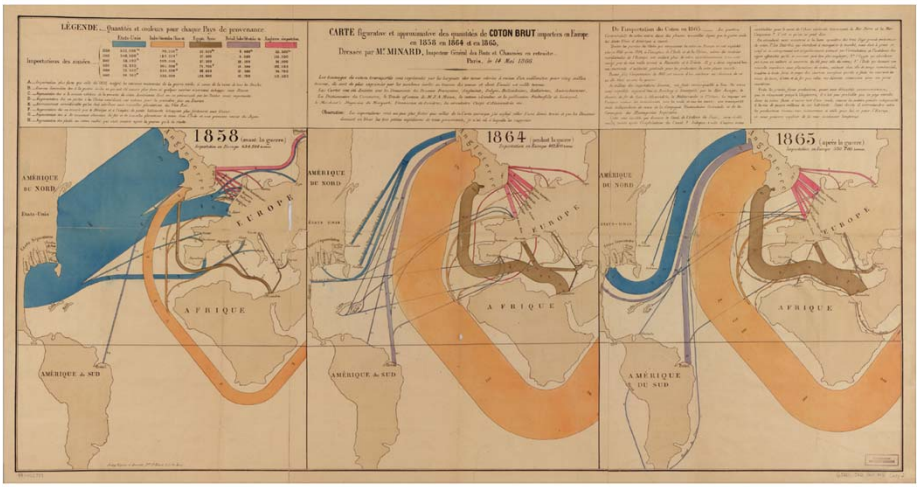


Maps of Science: Forecasting Large Trends in Science - Richard Klavans, Kevin Boyack - 2007



What insight needs to economic decision makers have?

What data views are most useful?



Europe Raw Cotton Imports in 1858, 1864 and 1865 - Charles Joseph Minard - 1866

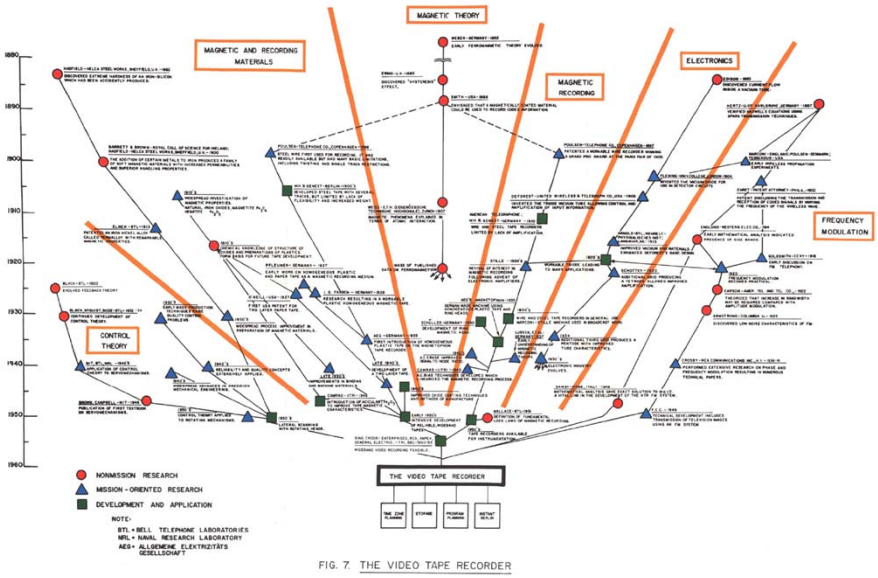
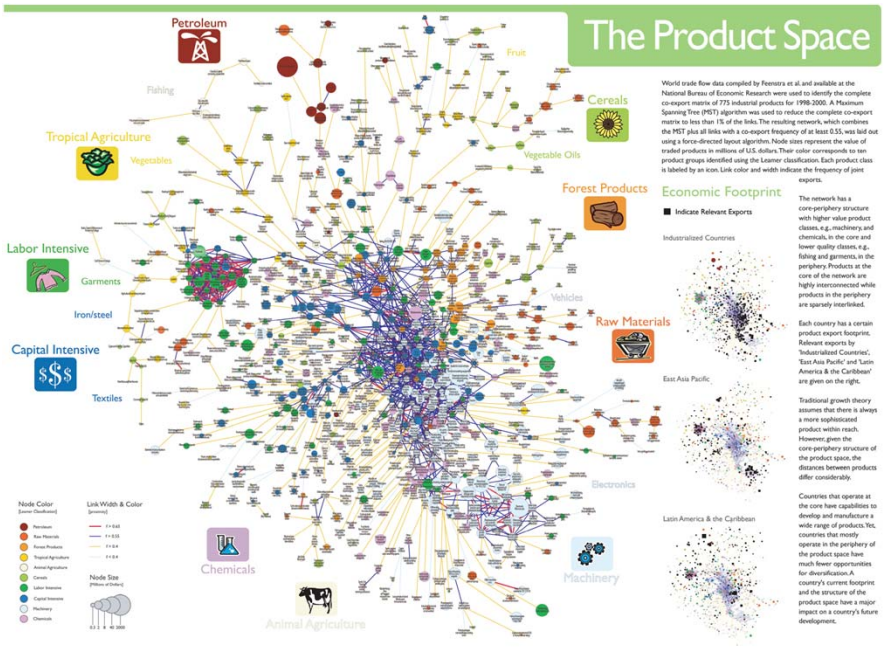
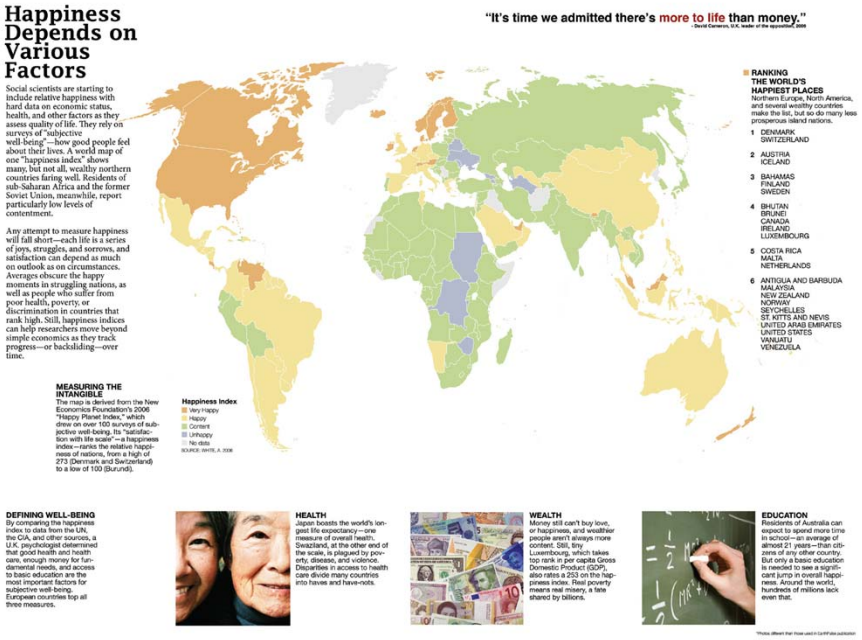


FIG. 7. THE VIDEO TAPE RECORDER

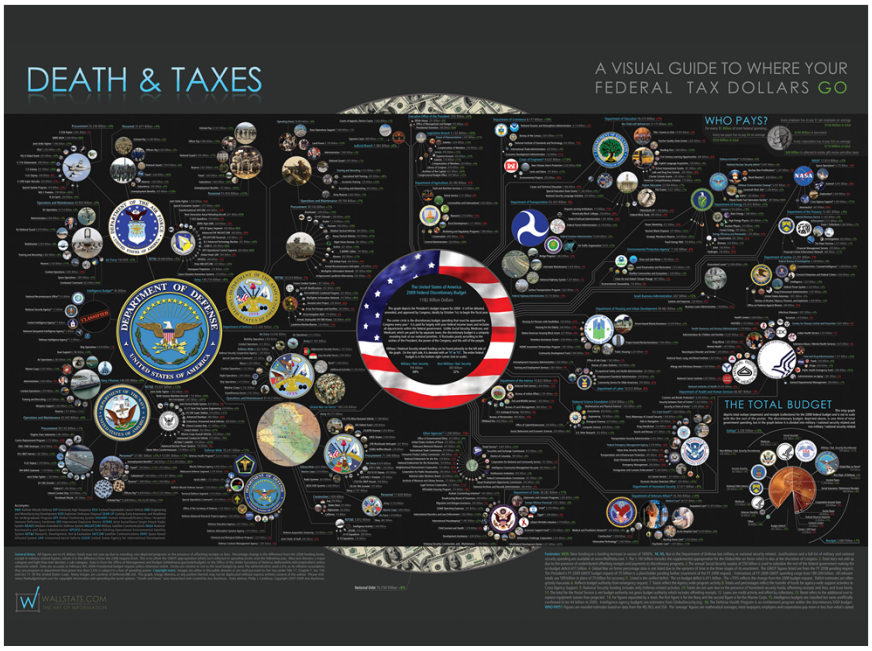
Tracing of Key Events in the Development of the Video Tape Recorder - Mr. G. Benn, Francis Narin - 1968



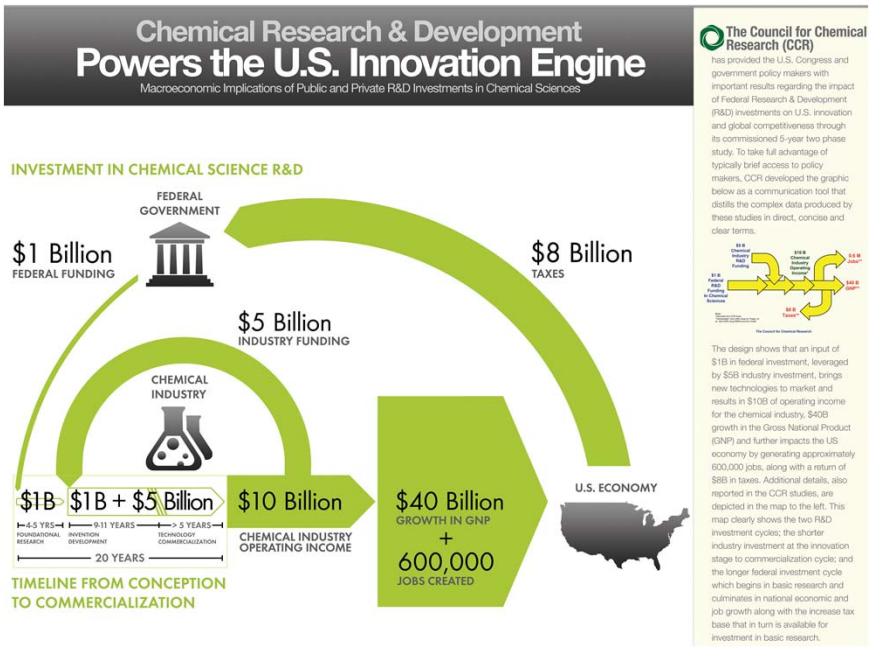
The Product Space - Cesar A. Hidalgo, Bailey Klinger, Albert-Laszlo Barabasi, Ricardo Hausmann - 2007



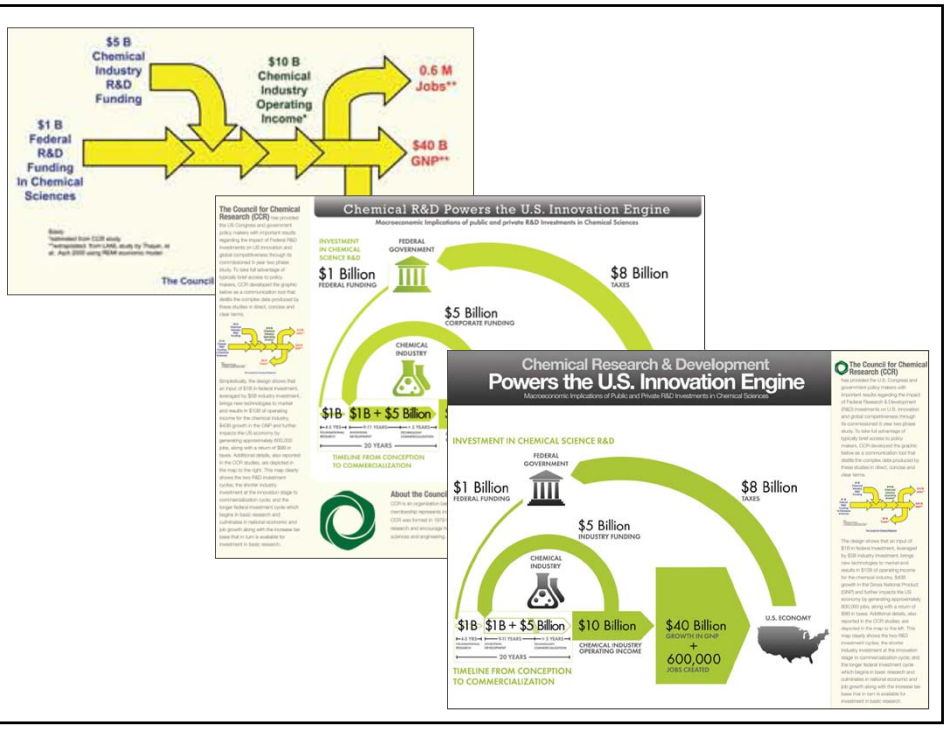
The Global Projection of Subjective Well-being - Adrian White, National Geographic EarthPulse Team - 2008

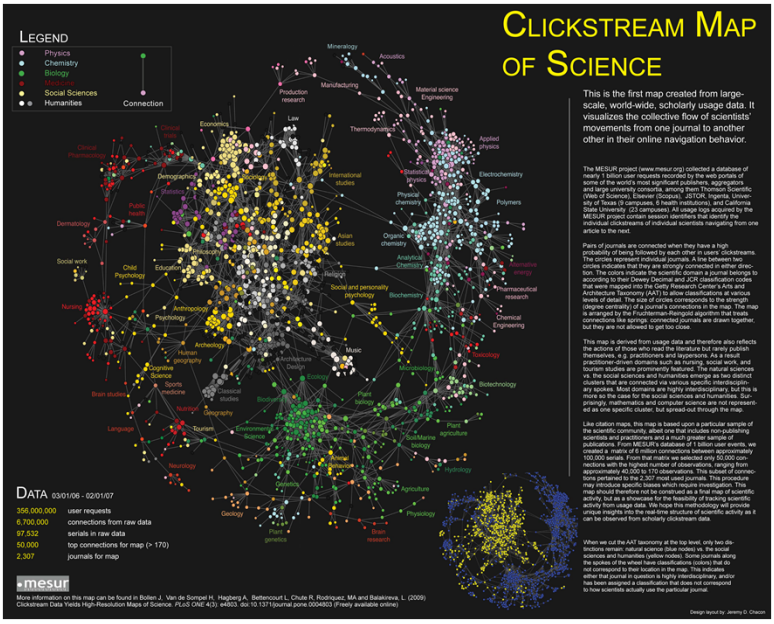


Death and Taxes 2009 - Jess Bachman - 2009



Chemical R&D Powers the U.S. Innovation Engine - The Council for Chemical Research - 2009



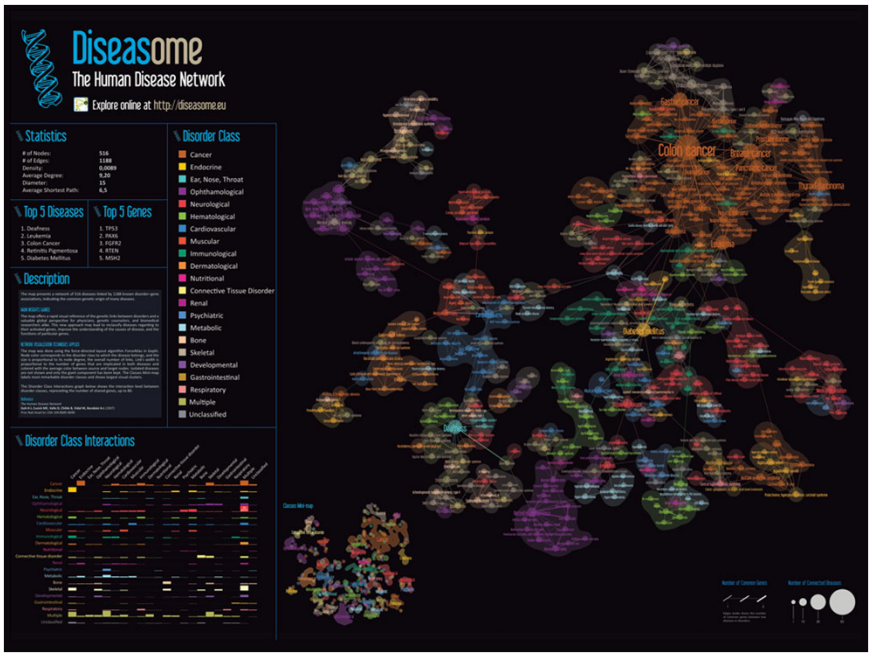


A Clickstream Map of Science
Johan Bollen, Herbert Van de Sompel, Aric Hagberg, Luís M. A. Bettencourt, Ryan Chute, Marko A. Rodriguez, and Lyudmila Balakireva - 2008

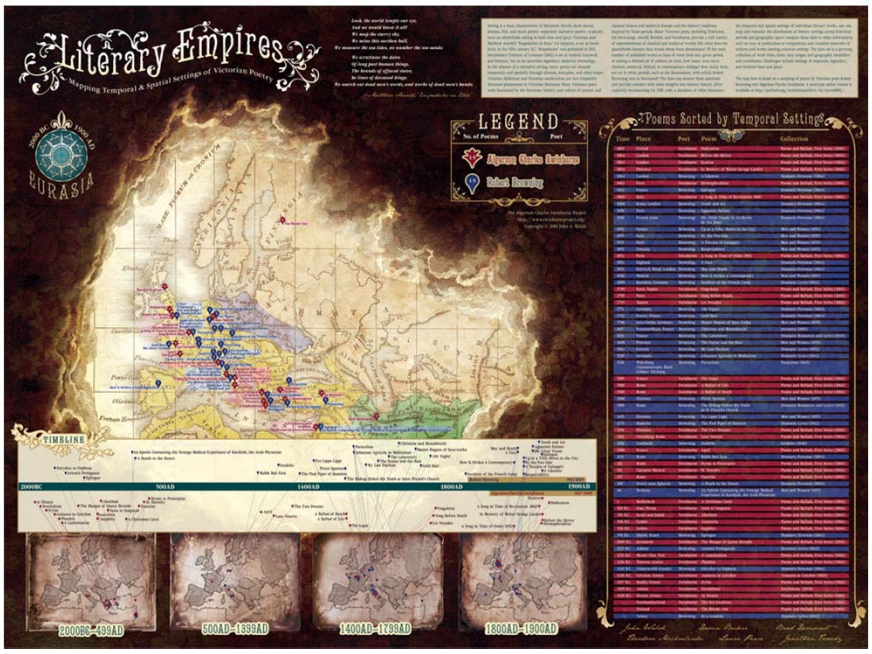
Science Maps for Scholars 2010

VI.1 VI.3 VI.5 VI.7 VI.9

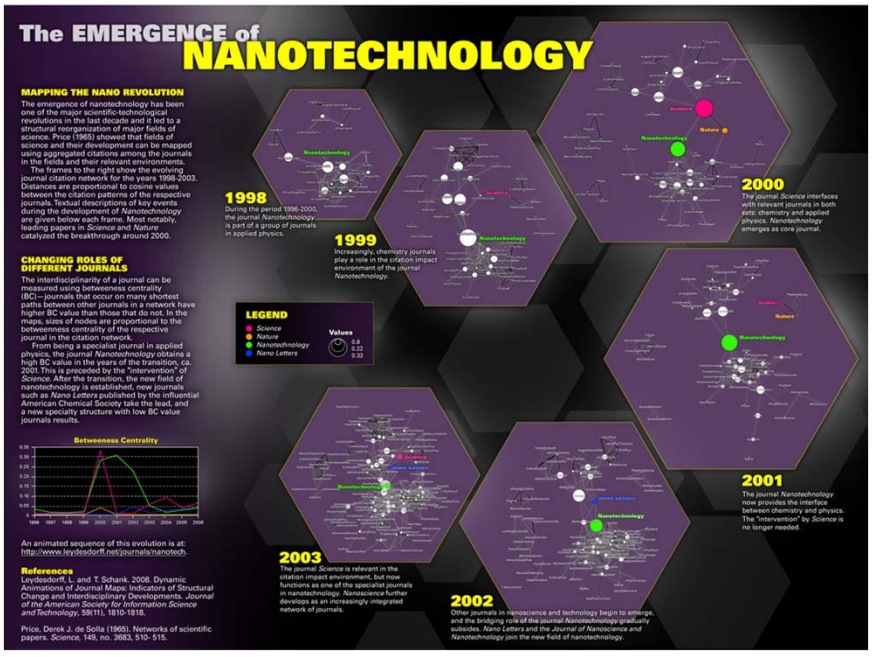
VI.2 VI.4 VI.6 VI.8 VI.10



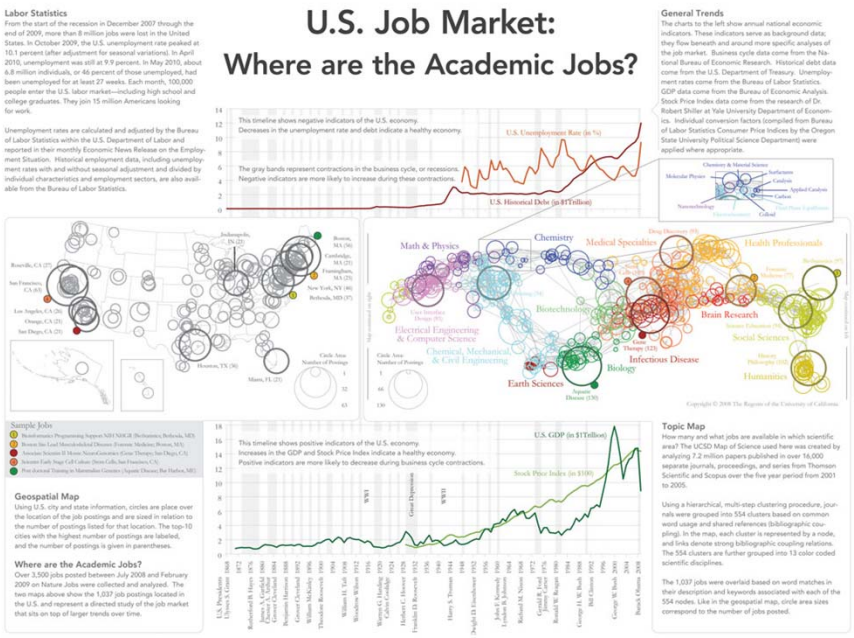
Diseasome - Mathieu Bastian & Sebastien Heymann - 2009



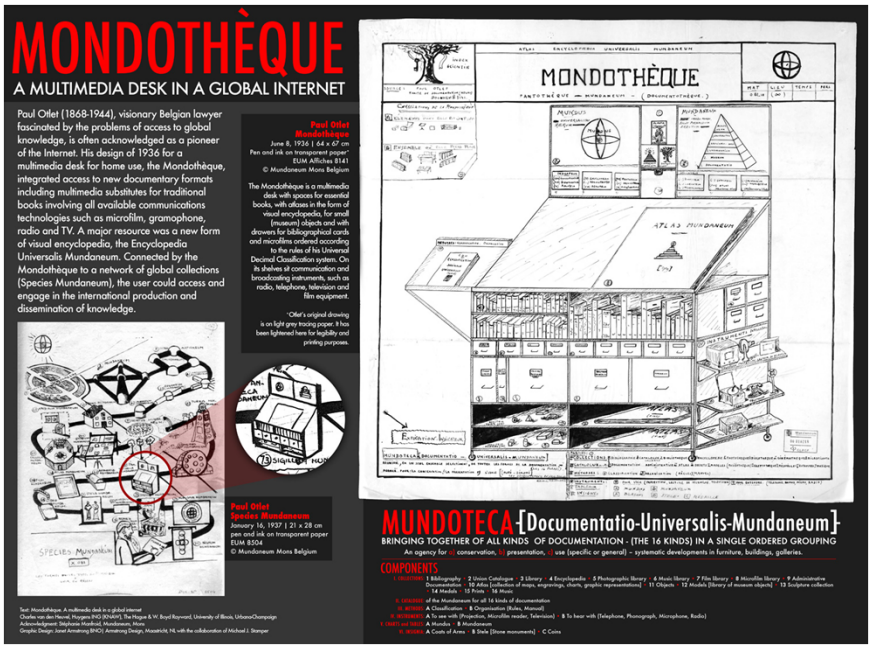
Literary Empires: Mapping Temporal and Spatial Settings of Victorian Poetry
John A. Walsh, Devin Becker, Bradford Demarest, Jonathan Tweedy, Theodora Michaelidou & Laura Pence - 2010



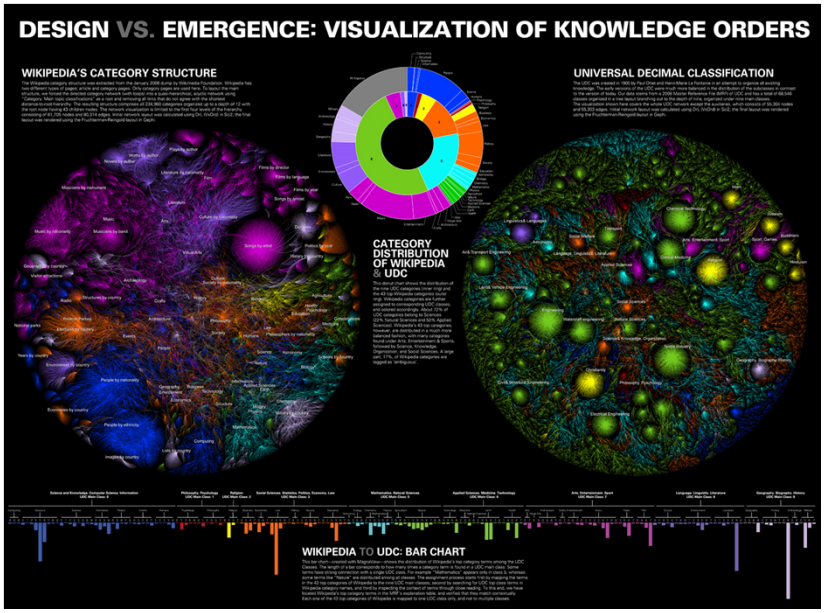
The Emergence of Nanoscience & Technology - Loet Leydesdorff - 2010



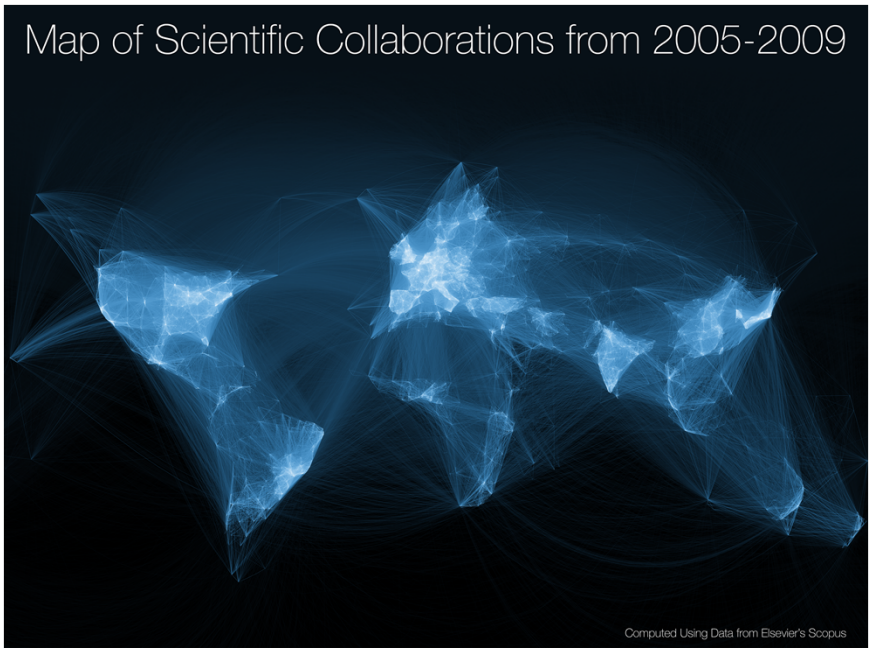
U.S. Job Market: Where are the Academic Jobs? - Angela M. Zoss & Katy Börner - 2010



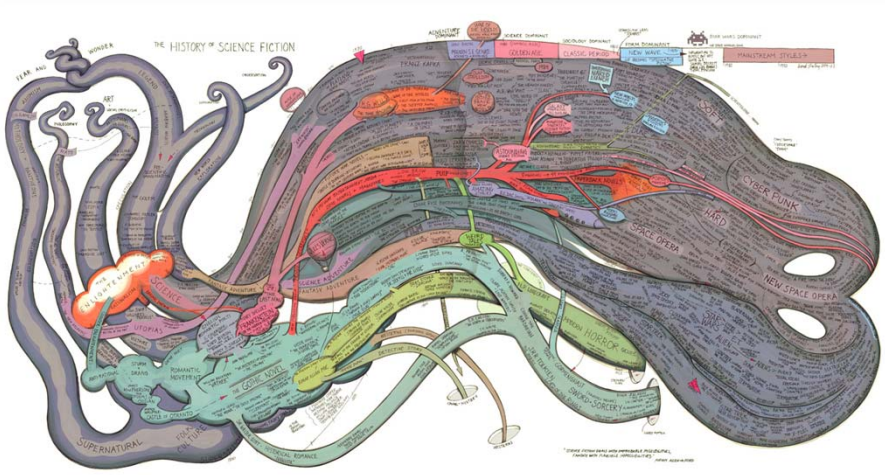
Mondothèque. Multimedia Desk in a Global Internet - Paul Otlet - 1936/37



Design vs. Emergence: Visualization of Knowledge Orders
Alkim Almila Akdag Salah, Cheng Gao, Krzysztof Suchecki, and Andrea Scharnhorst - 2011



Stream of Scientific Collaborations between World Cities - Olivier H. Beauchesne - 2012



History of Science Fiction - Ward Shelley - 2011

Check out our Zoom Maps online!

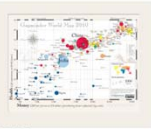
VII.10
History of Science Fiction, by Ward S

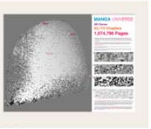
Visit scimaps.org and check out all our maps in stunning detail!

Science Maps for Kids 2012


VIII.1


VIII.3


VIII.5


VIII.7


VIII.9

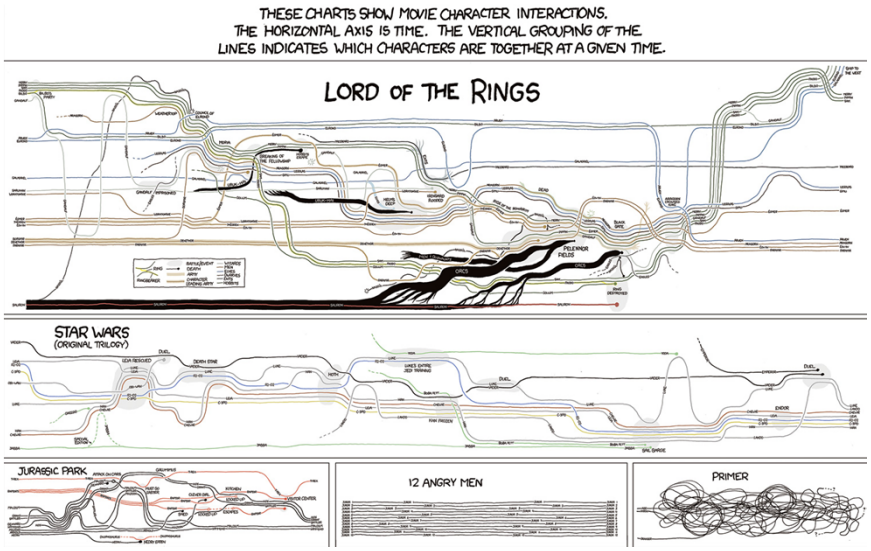

VIII.2


VIII.4

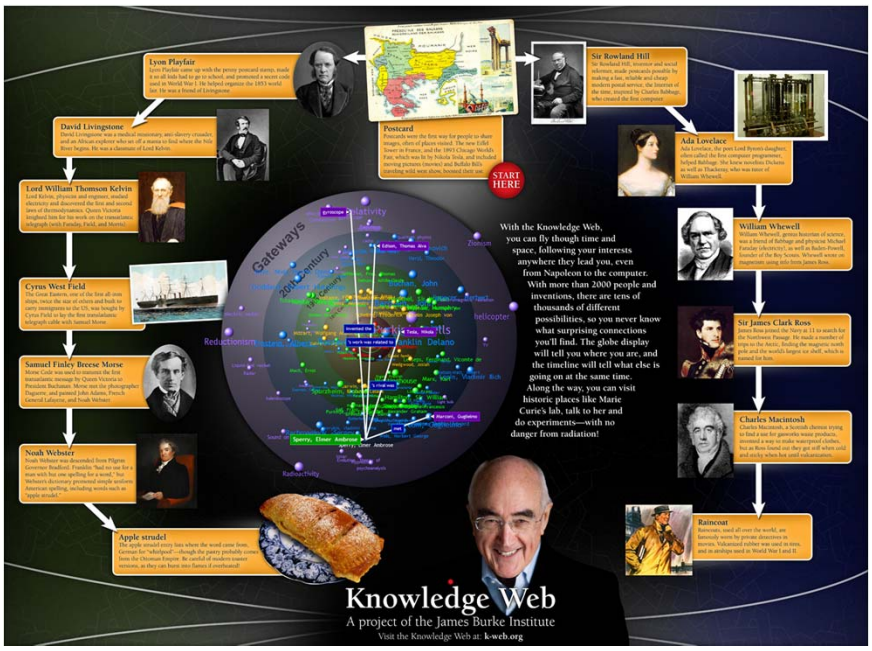

VIII.6


VIII.8

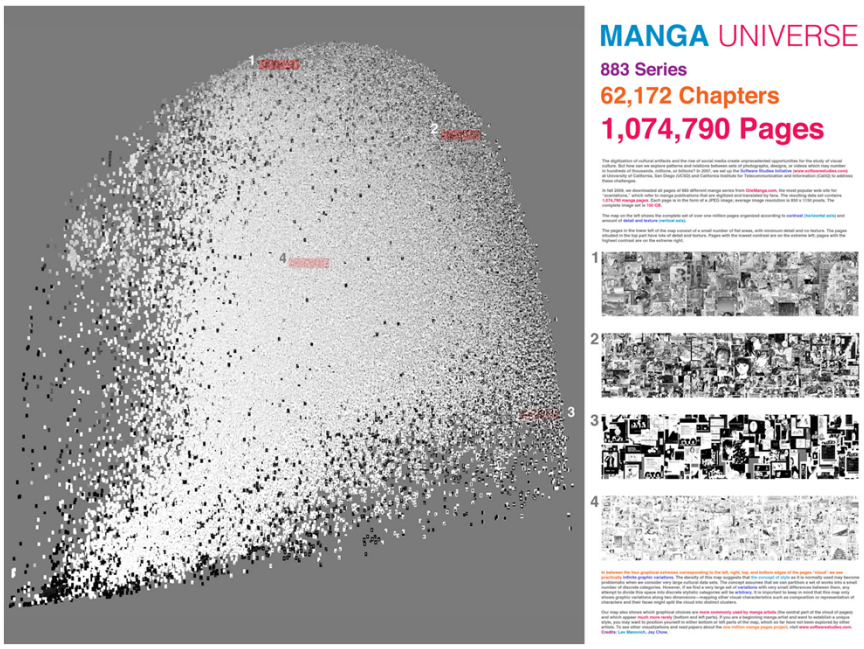
VIII.10



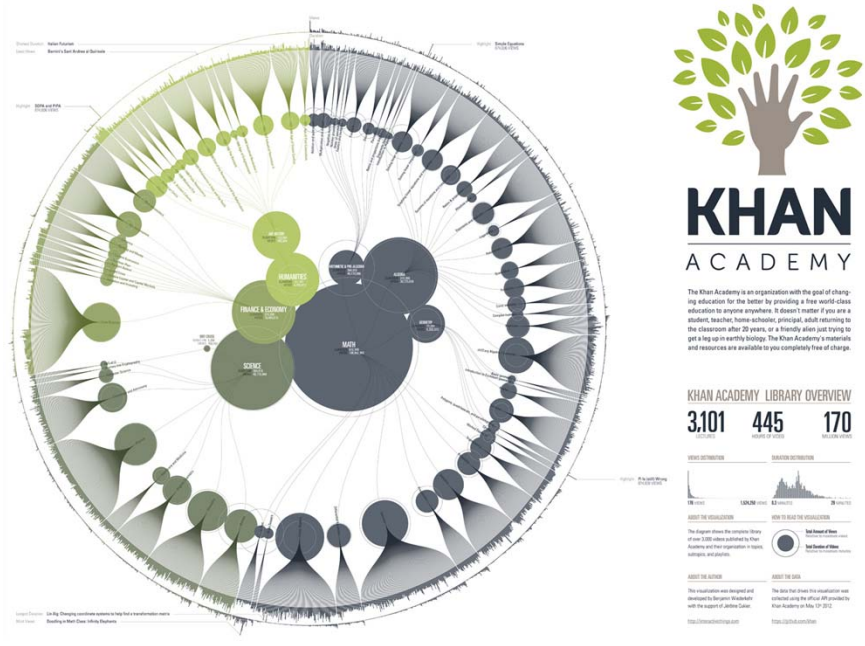
Movie Narrative Charts (Comic #657) - Randall Munroe - 2009



Knowledge Web - James Burke, Patrick McKercher, and Michael J. Stamper - 2012



Manga Universe - Lev Manovich and Jay Chow - 2012



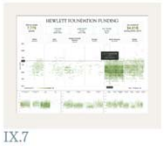
Khan Academy Library Overview - Benjamin Wiederkehr and Jérôme Cukier - 2012

Science Maps Showing Trends and Dynamics 2013


IX.1


IX.3


IX.5


IX.7


IX.9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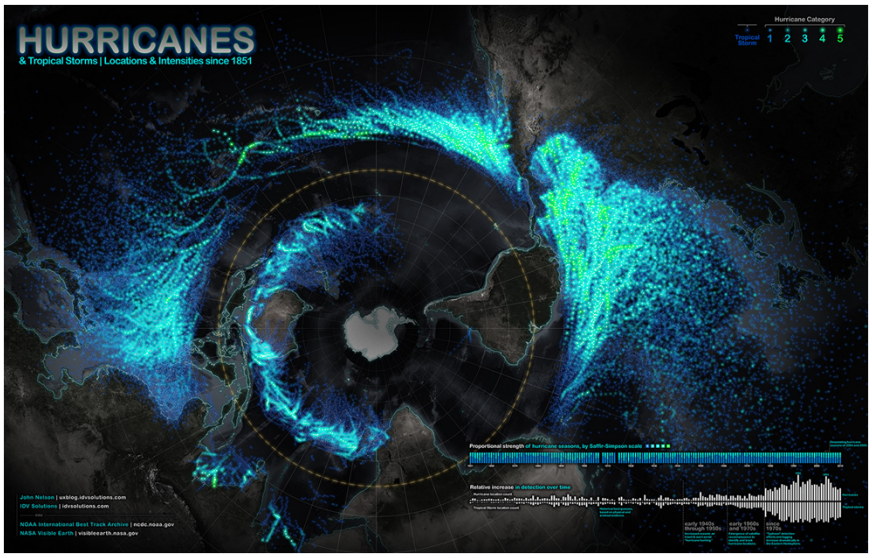
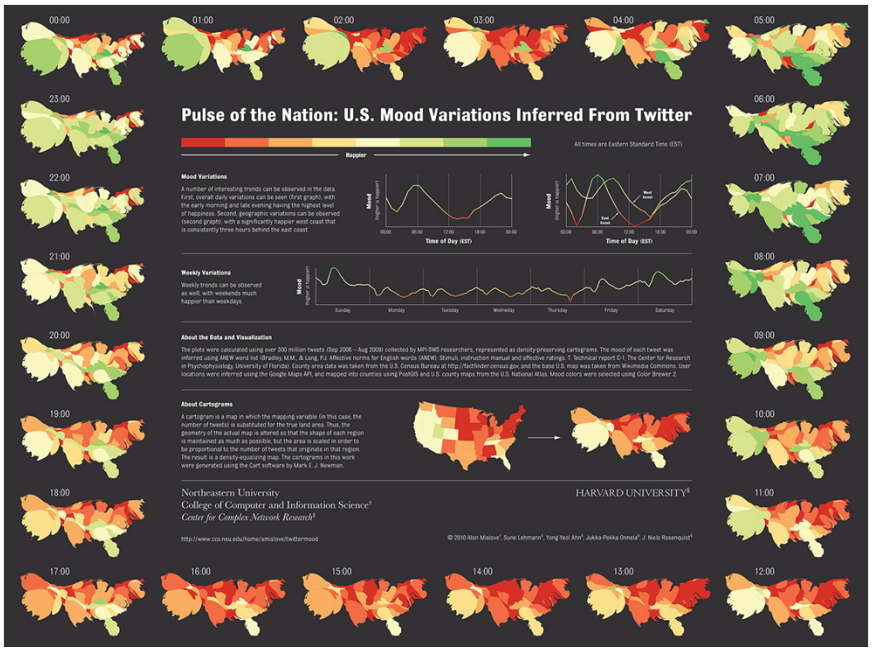
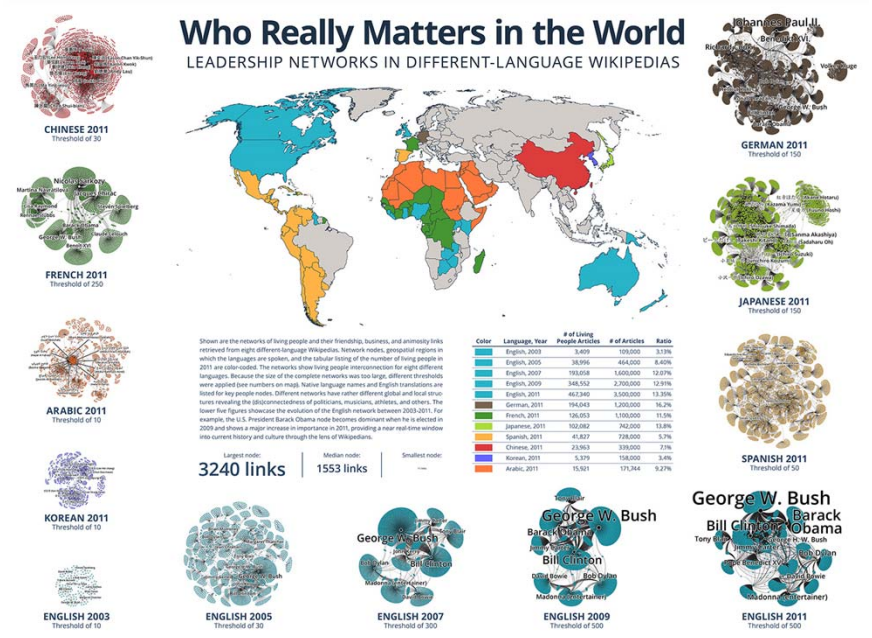


Hurricanes & Tropical Storms—Locations and Intensities Since 1851 - John Nelson - 2012



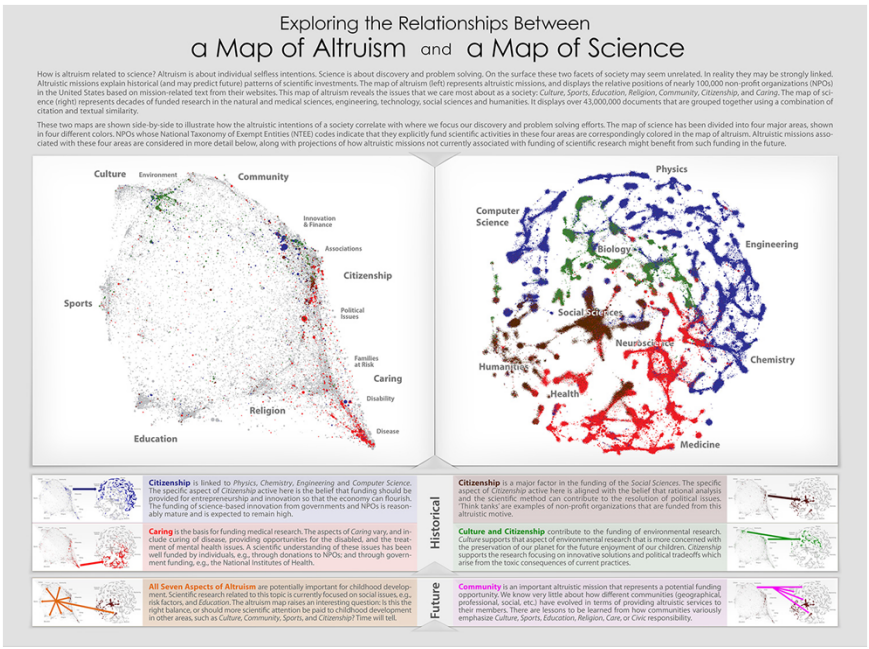
Pulse of the Nation - Alan Mislove, Sune Lehmann, Yong-Yeol Ahn, Jukka-Pekka Onnela, and James Niels Rosenquist - 2010



Who Really Matters in the World—Leadership Networks in Different-Language Wikipedias
Peter A. Gloor, Keiichi Nemoto, Samuel T. Mills, and David E. Polley - 2013

The Future of Science Mapping 2014

Map of the Internet - Martin Vargic - 2014



Exploring the Relationships between a Map of Altruism and a Map of Science - Richard Klavans and Kevin W. Boyack - 2014

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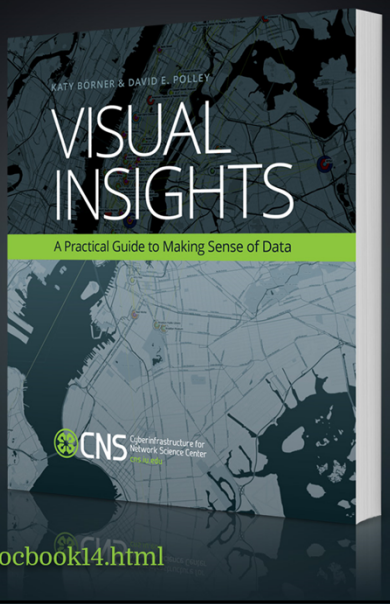

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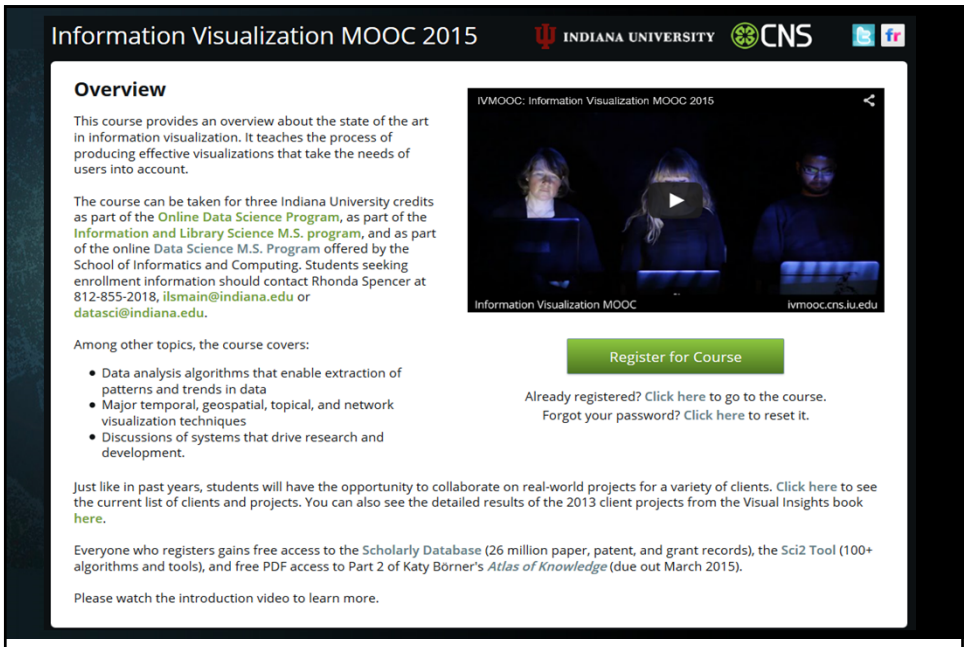

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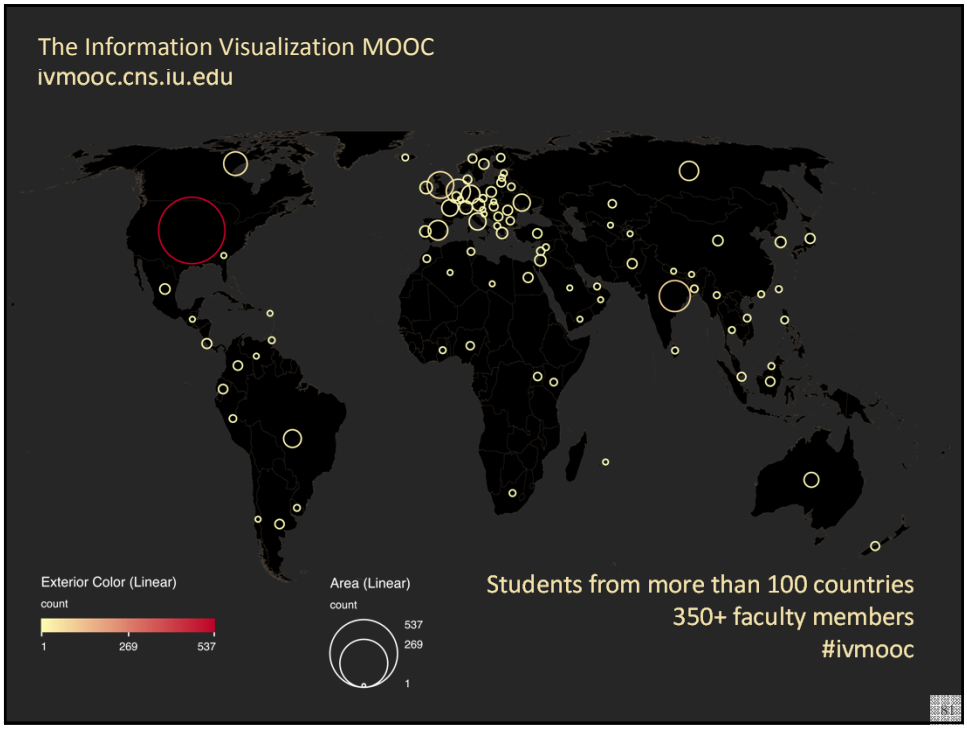

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18	2010	MALDEN	USA	CTS-CLINICAL AND TRANSLATIONAL SCIENCE	Advancing the Science of Team Science	Research & Experimental Medicine	Falk-Krzesinski, HJ|Borner, K|Contractor, N|Fiore, SM|Hall, KL|Keyton, J|Spring, B|Stokols, D|Trochim, W|Uzzi, B
13	2010	WASHINGTON	USA	SCIENCE TRANSLATIONAL MEDICINE	A Multi-Level Systems Perspective for the Science of Team	Cell Biology |Research & Experimental Medicine	Borner, K|Contractor, N|Falk-Krzesinski, HJ|Fiore, SM|Hall, KL|Keyton, J|Spring, [illegible]Trochim,

Statistical Analysis–p. 44 | Temporal Burst Analysis–p. 48 | Geospatial Analysis–p. 52 | Geospatial Analysis–p. 52

Location	Count	# Citations
Netherlands	13	292
United States	9	318
Germany	11	36
United Kingdom	1	2

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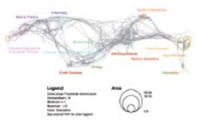
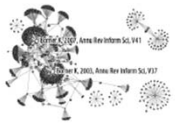
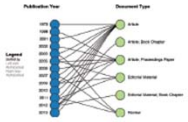
Topical Analysis–p. 56 | Paper Citation Network–p. 60 | Bi-Modal Network–p. 60







Co-author and many other bi-modal networks.

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Scharnhorst, Andrea, Börner, Katy, van den Besselaar, Peter (2012) **Models of Science Dynamics**. Springer Verlag.

Katy Börner, Michael Conlon, Jon Corson-Rikert, Cornell, Ying Ding (2012) **VIVO: A Semantic Approach to Scholarly Networking and Discovery**. Morgan & Claypool.

Katy Börner and David E Polley (2014) **Visual Insights: A Practical Guide to Making Sense of Data**. The MIT Press.

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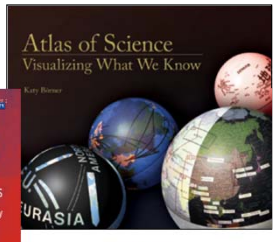

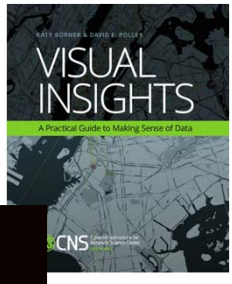

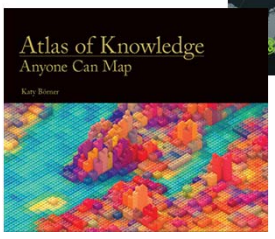

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PLACES & SPACES MAPPING SCIENCE

Curated by the Cyberinfrastructure for Network Science Center

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Hidalgo, César A., Bailey Klinger, Albert-László Barabási, and Ricardo Hausmann. 2007. See also The Product Space map from Phase I of *Places & Spaces*.

Call for Macroscope Tools for the *Places & Spaces: Mapping Science* Exhibit (2015)

http://scimaps.org/call

Themes for the upcoming iterations/years are:

- 11th Iteration (2015): Macroscopes for Interacting With Science
- 12th Iteration (2016): Macroscopes for Making Sense of Science
- 13th Iteration (2017): Macroscopes for Forecasting Science
- 14th Iteration (2018): Macroscopes for Economic Decision Makers
- 15th Iteration (2019): Macroscopes for Science Policy Makers
- 16th Iteration (2020): Macroscopes for Scholars

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COMPUTATIONAL SOCIAL SCIENCE SUMMIT

K / *inspiring growth*

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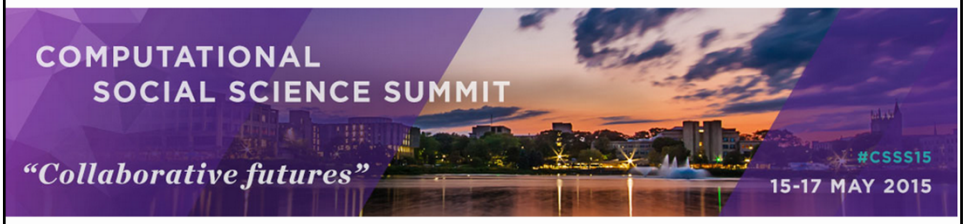
2015 Computational Social Science Summit



This new annual computational social science summit is designed to create a broad community of social science researchers - academics, tech industry workers, open data activists, government agency workers, and think tank analysts – dedicated to **advancing sociological knowledge through computational methods**. Our goal is to foreground social science research and identify areas that can benefit from a deep engagement with computer science and related areas. The Summit will take place over three days, from May 15-17 at Northwestern University's Kellogg School of Management in Evanston, IL.

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Pre-Session:

On Friday, May 15th, we'll start with training **workshops for social science researchers and data analytics enthusiasts** who are newcomers to computational methods or who simply want to broaden their computational tool-kits by learning new methods and related software techniques, for example using R to do social network analysis. At the same time, we will host a day-long **datathon: an intensive team-based workshop format modeled after hackathons**. During the datathon, researchers who already have computational skills will utilize prepared datasets and computational methods to respond to sociological questions developed by our panel of judges. Judges will include **Matt Gee** of the University of Chicago's Urban Center for Computation and Data and the Center for Data Science and Public Policy, **Gueorgi Kossinets** of Google, and **Susan Parker** of the University of Chicago's Crime Lab.

ISSI 2015

15th INTERNATIONAL CONFERENCE ON SCIENTOMETRICS & INFORMETRICS

29 June - 3 July 2015

BOGAZICI UNIVERSITY • ISTANBUL-TURKEY

3. **Forecasting science: Models of science and technology dynamics for innovation policy**

Organized by

- Katy Börner (Indiana University, USA)
- Andrea Scharnhorst (KNAW, The Netherlands)
- Stasa Milojevic (Indiana University, USA)
- Petra Ahrweiler (Director and CEO, EA European Academy of Technology and Innovation Assessment GmbH, Bad Neuenahr-Ahrweiler, Germany)
- David Chavalarias (Centre d'Analyses de Mathématiques Sociales (CAMS), Ecole des Hautes Etudes en Sciences Sociales (EHESS), Director of the Complex Systems Institute of Paris Ile-de-France, Paris, France)

Here is an extended abstract of the workshop

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All papers, maps, tools, talks, press are linked from http://cns.iu.edu
These slides will soon be at http://cns.iu.edu/docs/presentations

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