Converting Data Into Actionable Insights: Open Data, Open Code, and Open Education

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Commerce Data Advisory Council (CDAC) Meeting
National Oceanic and Atmospheric Administration (NOAA)
David Skaggs Research Center, Boulder, CO

October 29-30, 2015

Olivier H. Beauchesne, 2011. Map of Scientific Collaborations from 2005-2009.

Computed Using Data from Elsevier's Scopus

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Open Data

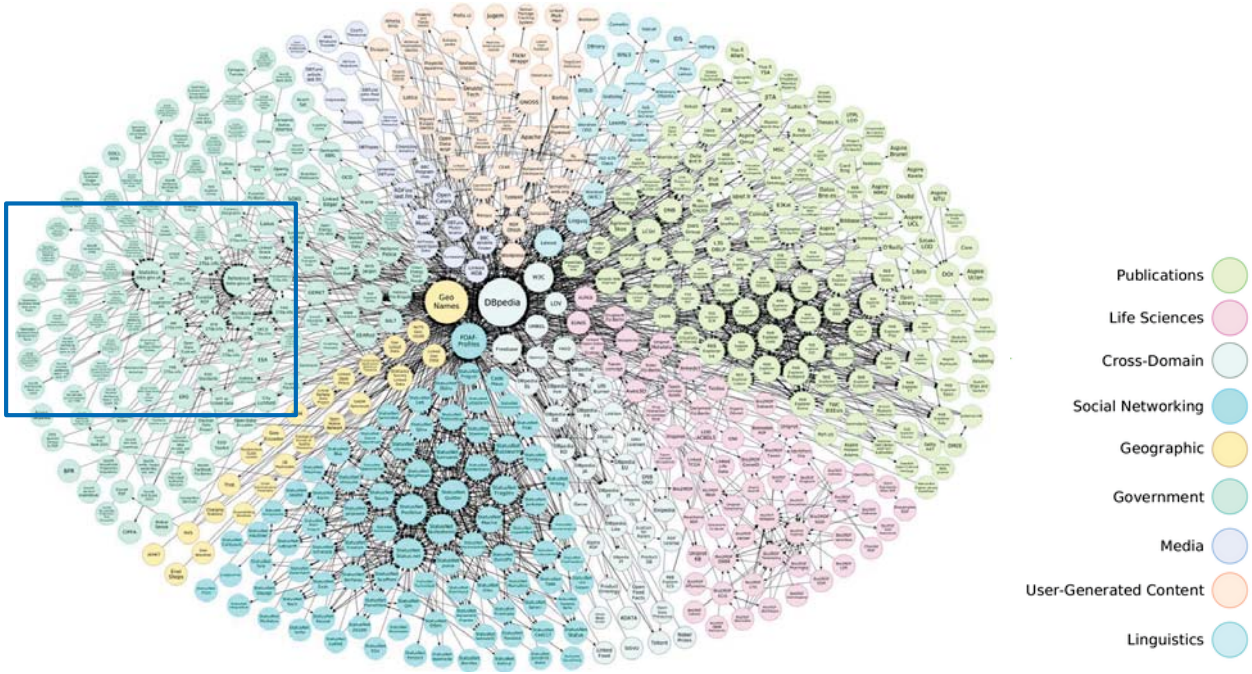
Data - economic, scientific, environmental, patent, geospatial

Core CDAC Mission:

- data management practices
- common, open data standards
- policy issues related to privacy, latency, and consistency
- effective models for public-private partnership
- external uses of Commerce data
- methods to build new feedback loops between the Department and data users.

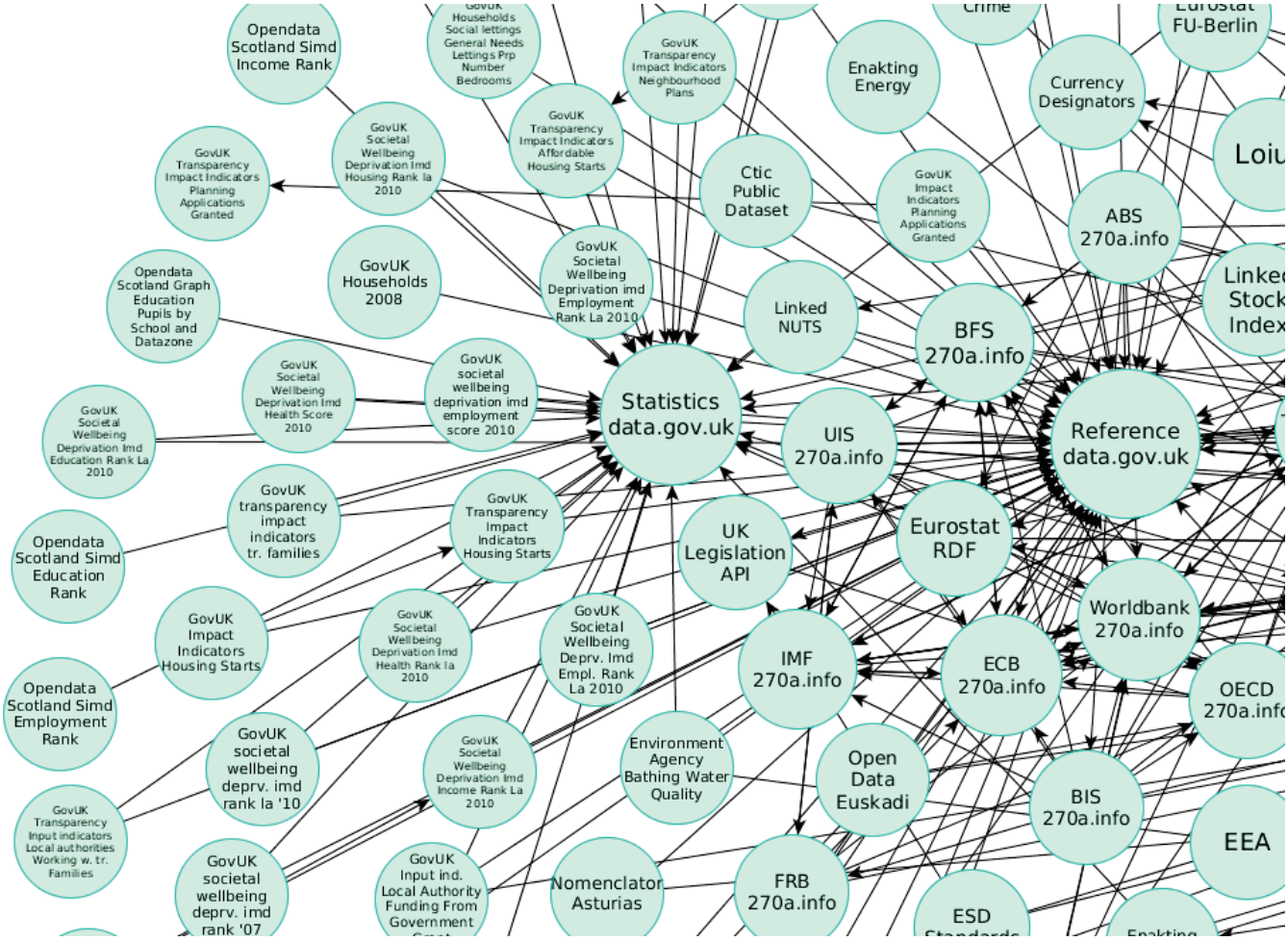
http://www.esa.doc.gov/content/cdac-mission-goals

Data - economic, scientific, environmental, patent, geospatial

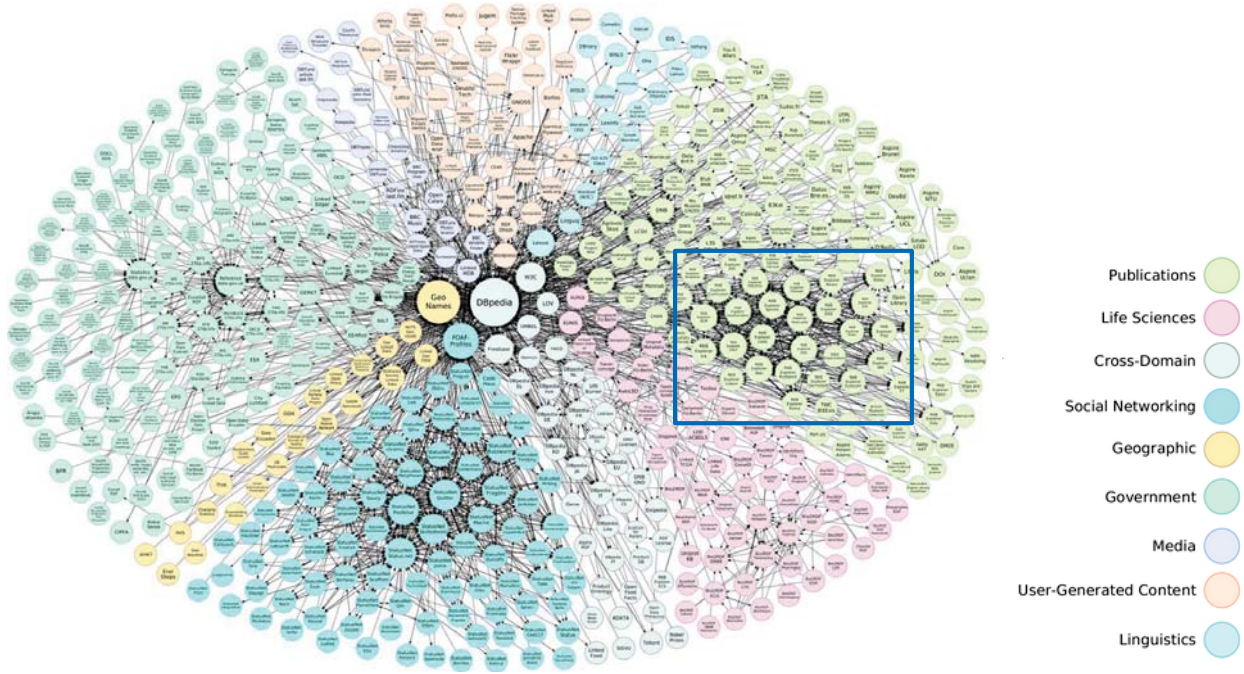


Linked Open Data Cloud Diagram 2014

http://data.dws.informatik.uni-mannheim.de/lodcloud/2014/



Data – Expertise



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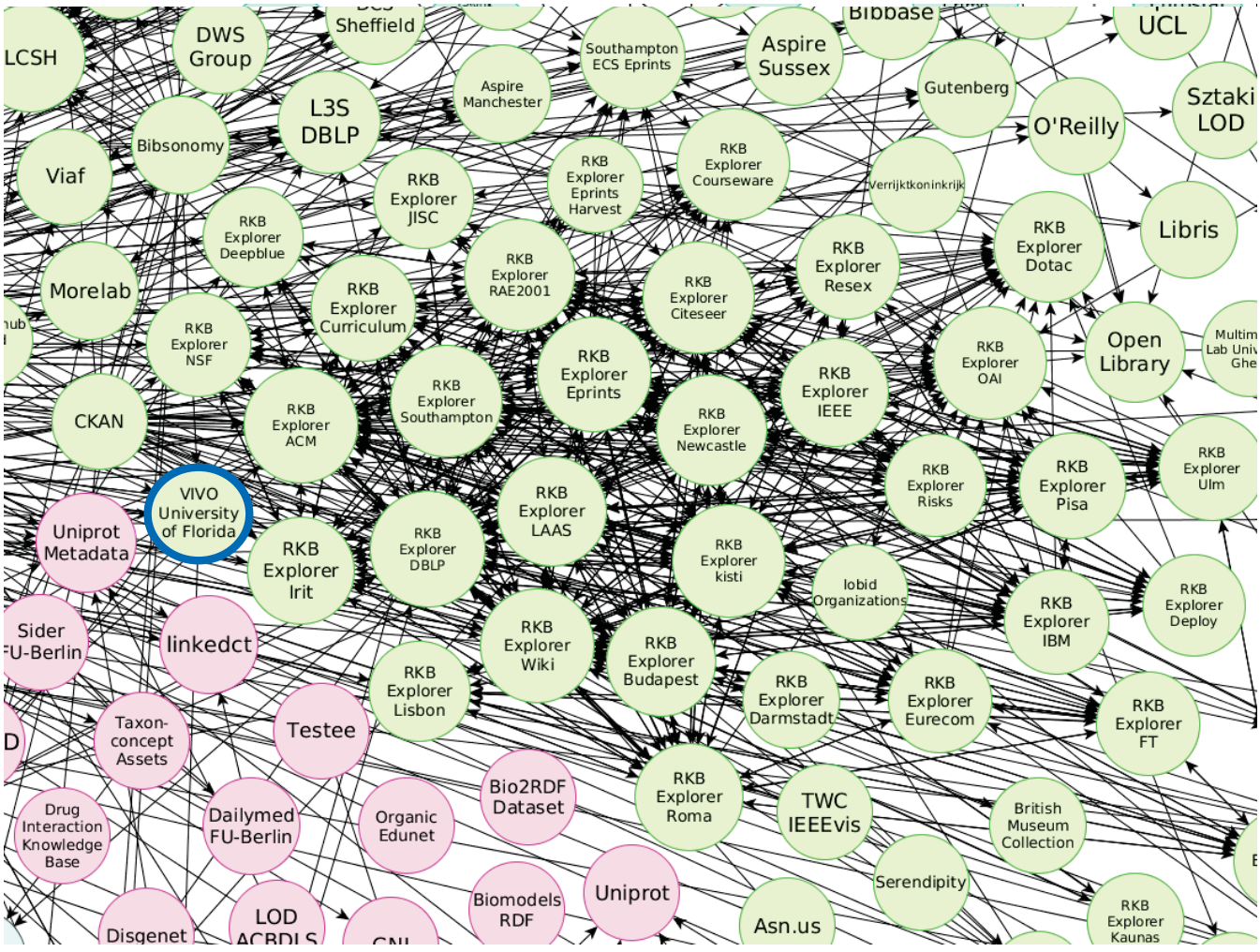
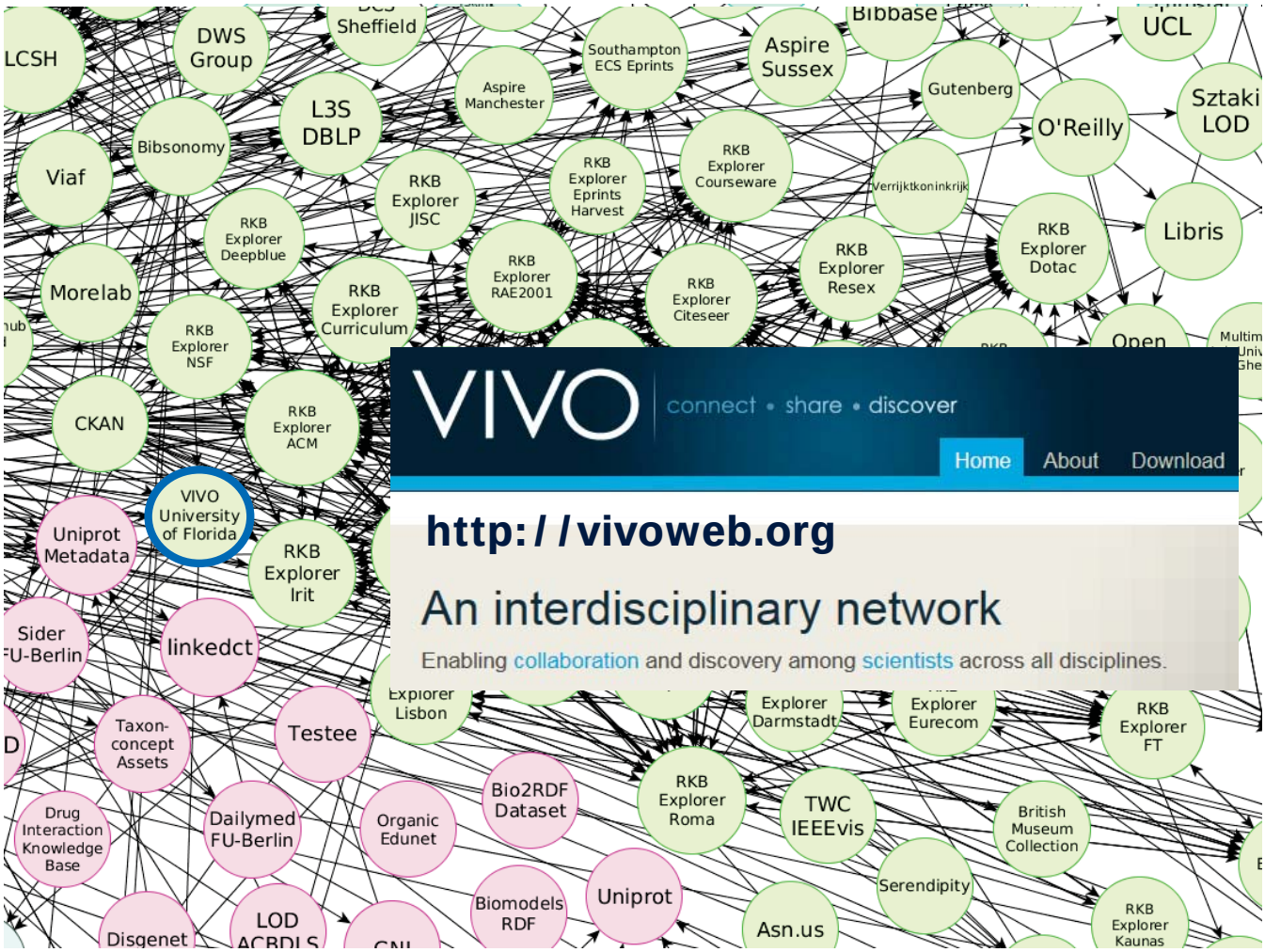
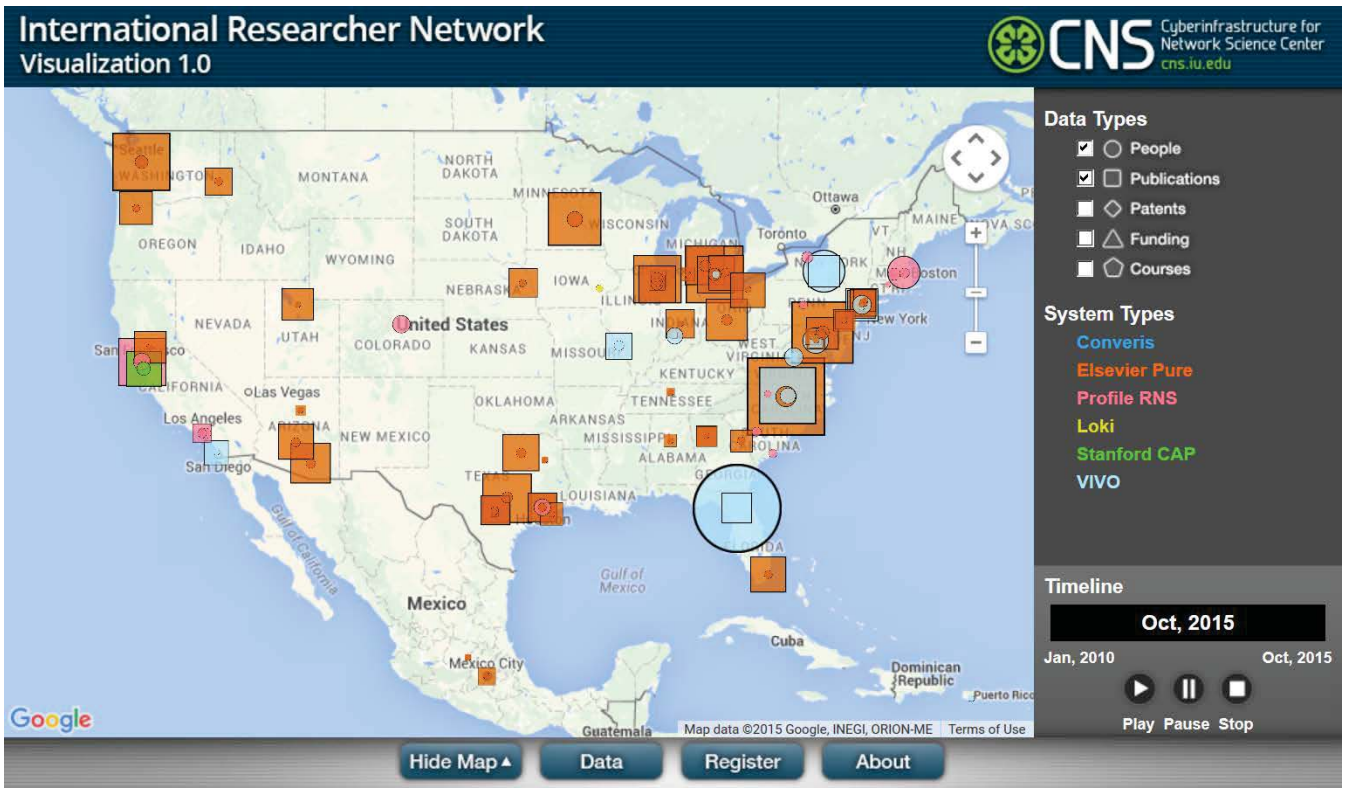






http://nrn.cns.iu.edu

Open Data Portals in Europe

Open Data Portals as part of the Europe 2020 Initiative
http://ec.europa.eu/digital-agenda/en/open-data-portals

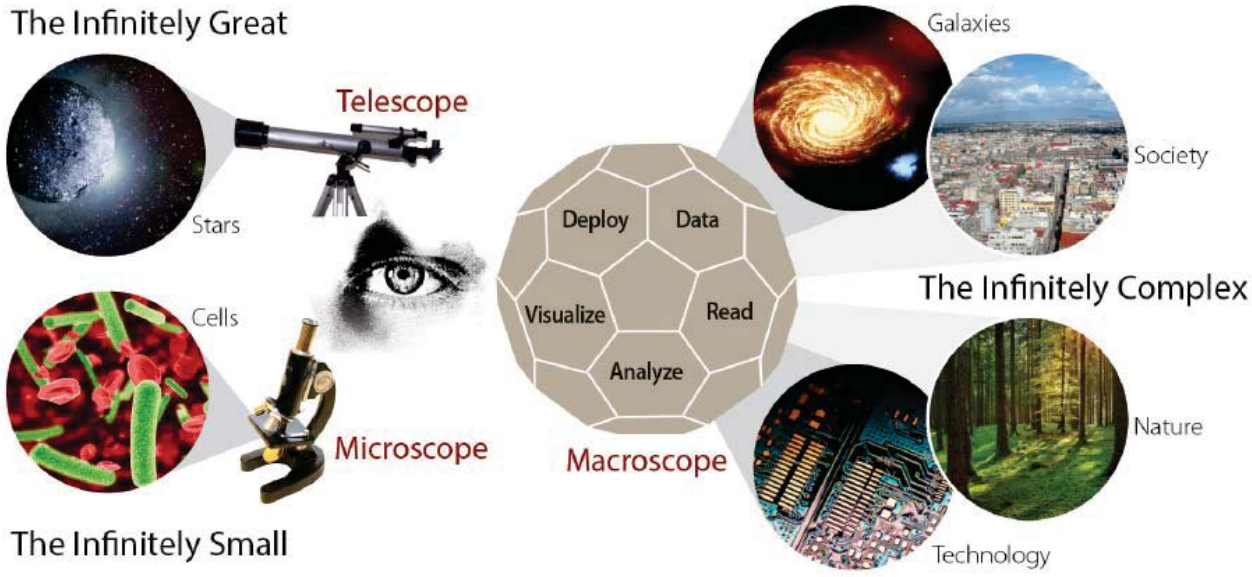
European Union Open Data Portal
http://open-data.europa.eu/en/data/

European cloud of public administration data and services
http://open-dai.eu

Open Code

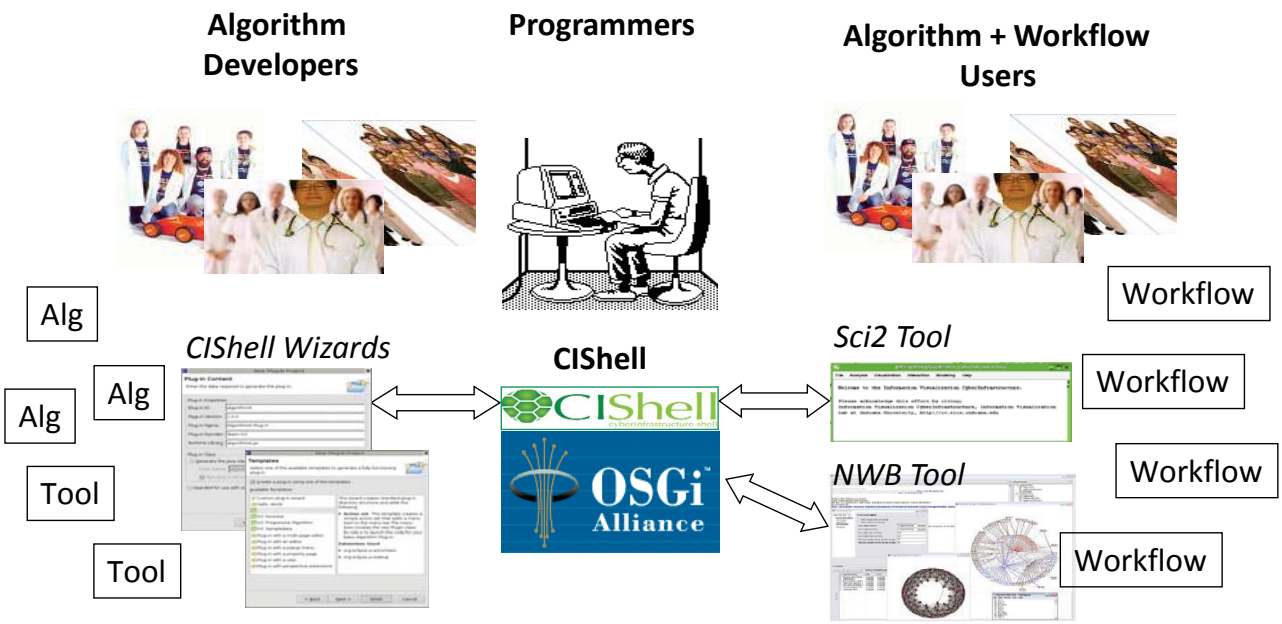
Code – analysis, simulation, visualization

Microscopes, Telescopes, Macroscopes Plug-and-Play Macroscopes



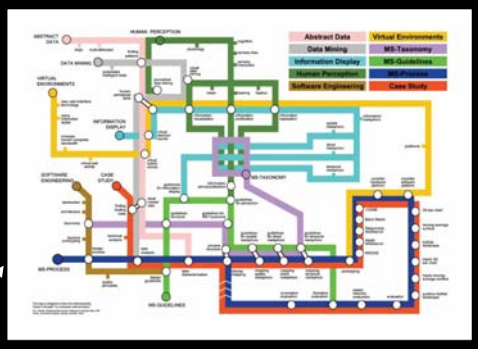
Code – analysis, simulation, visualization

Plug-and-Play Macroscopes



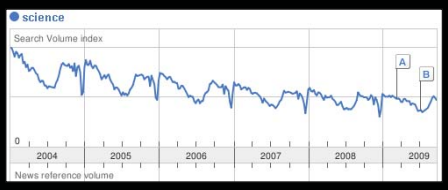
Terra bytes of data

Macroscopes

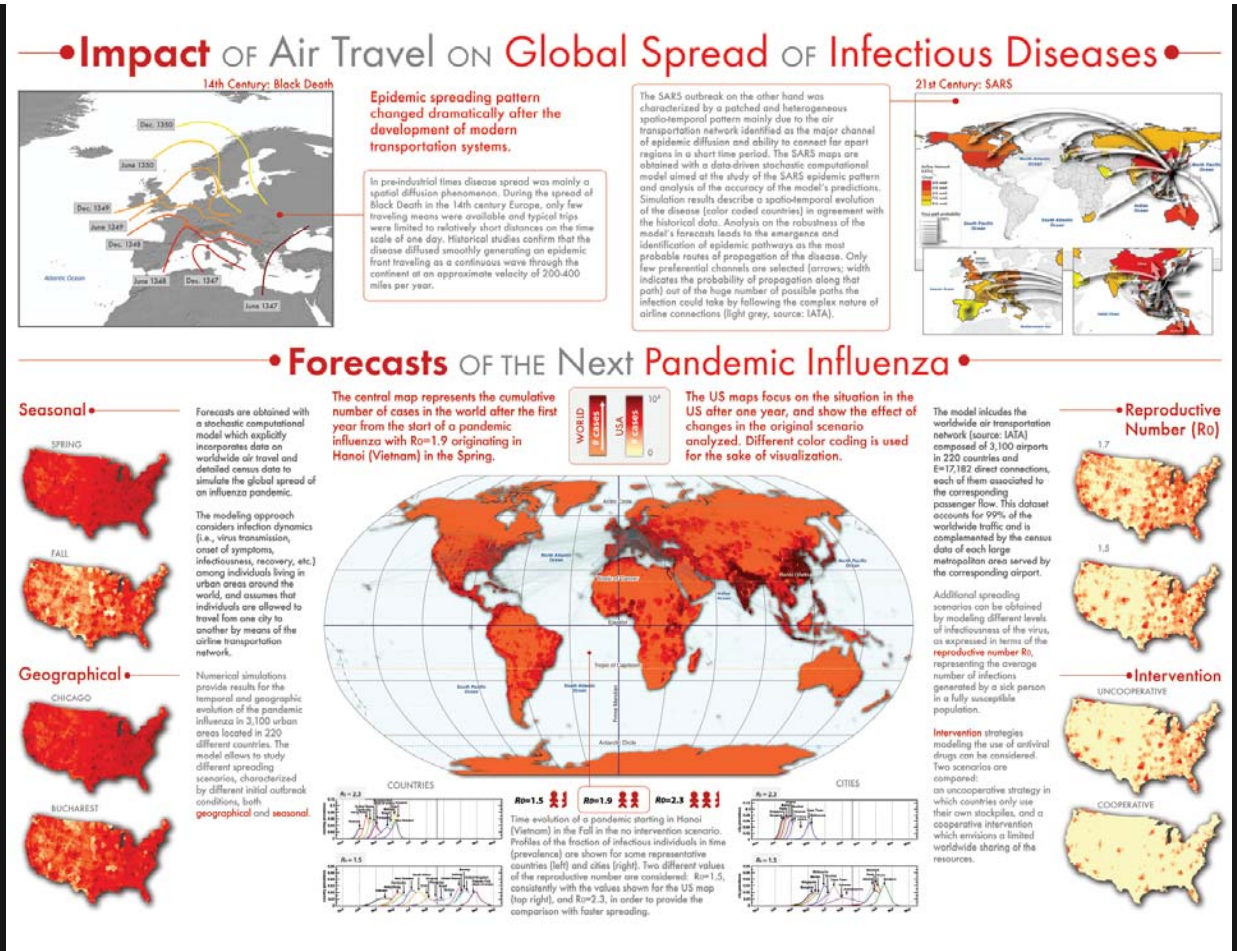


Find your way

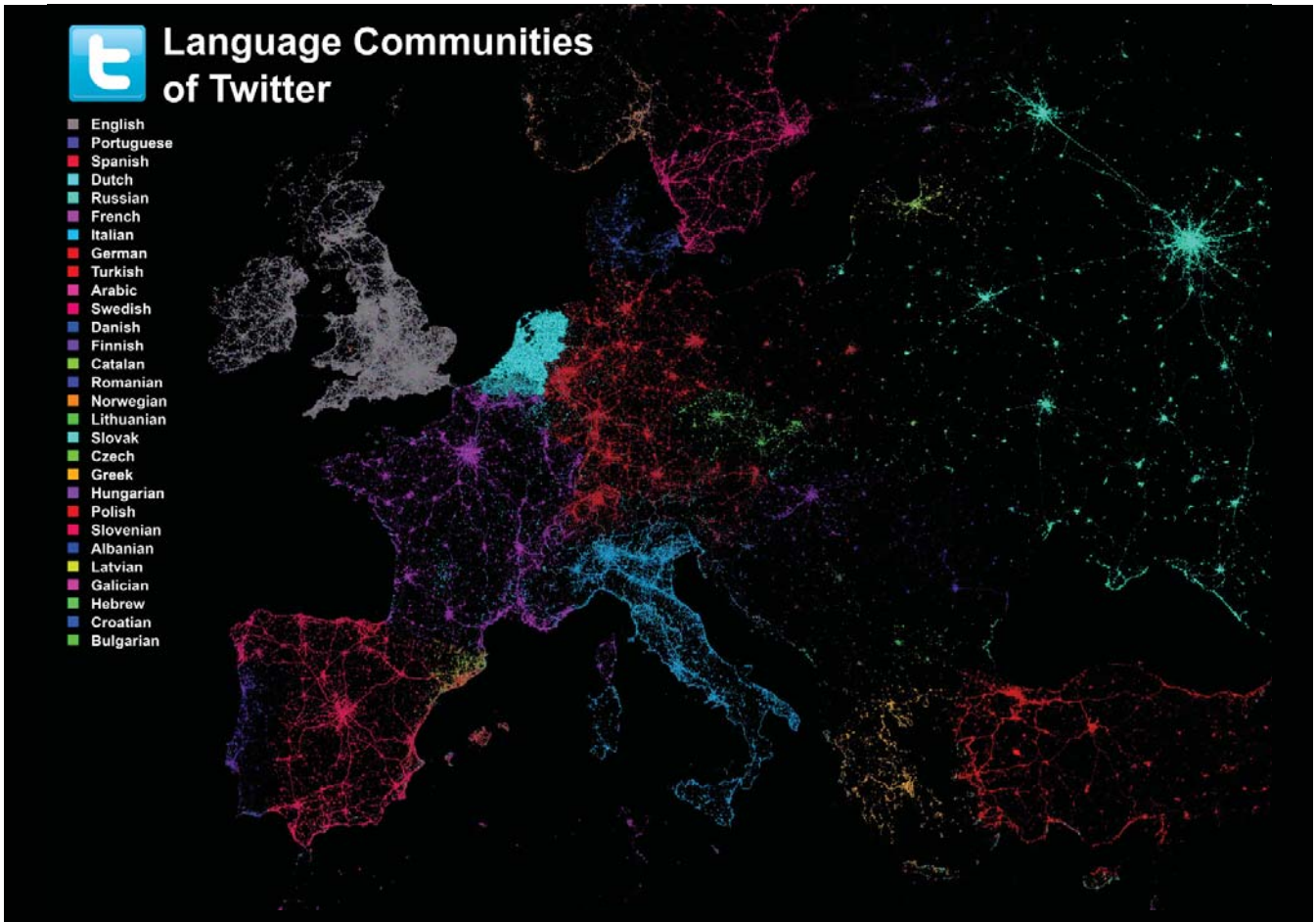
Find collaborators, friends



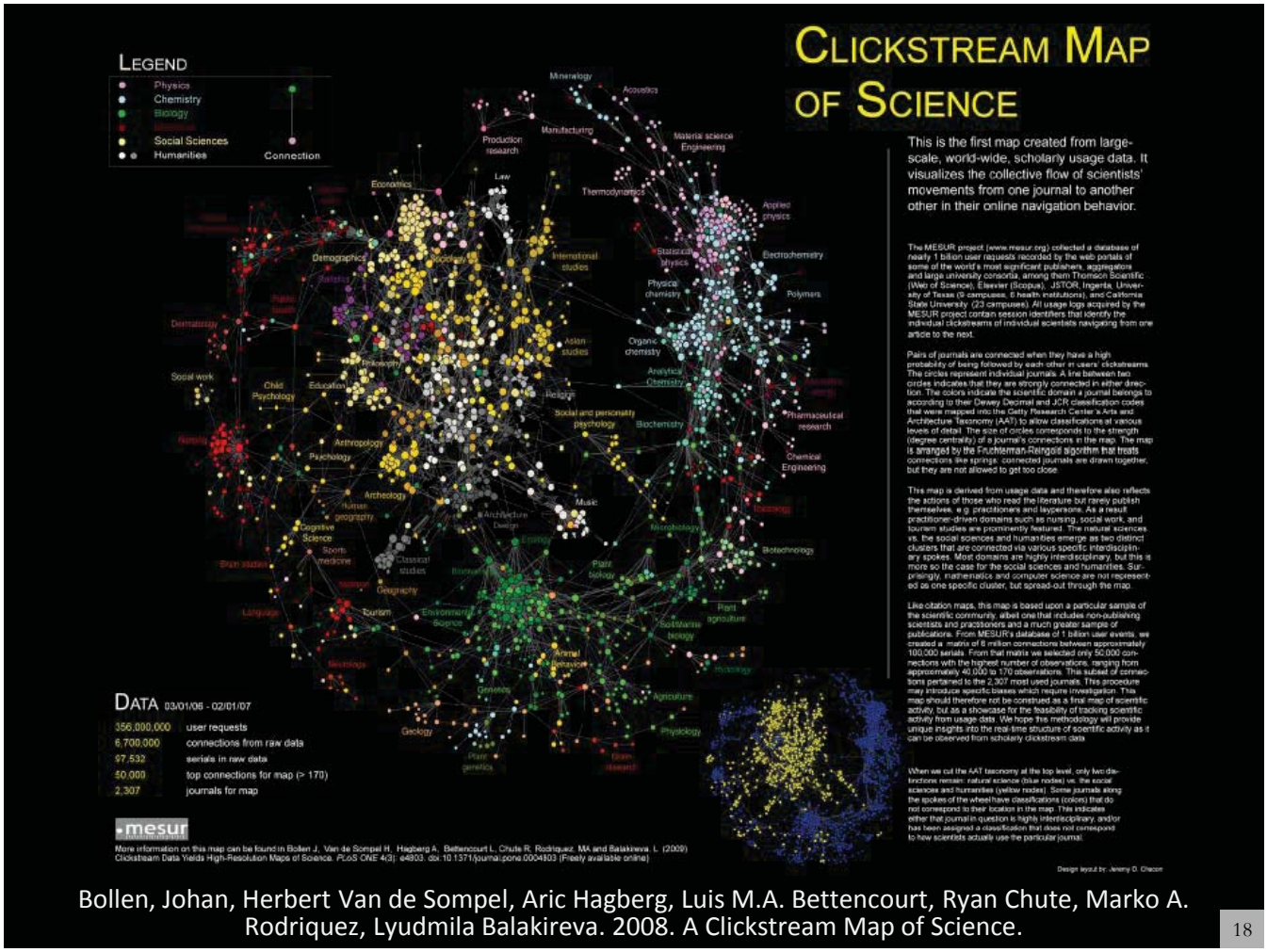
Identify trends



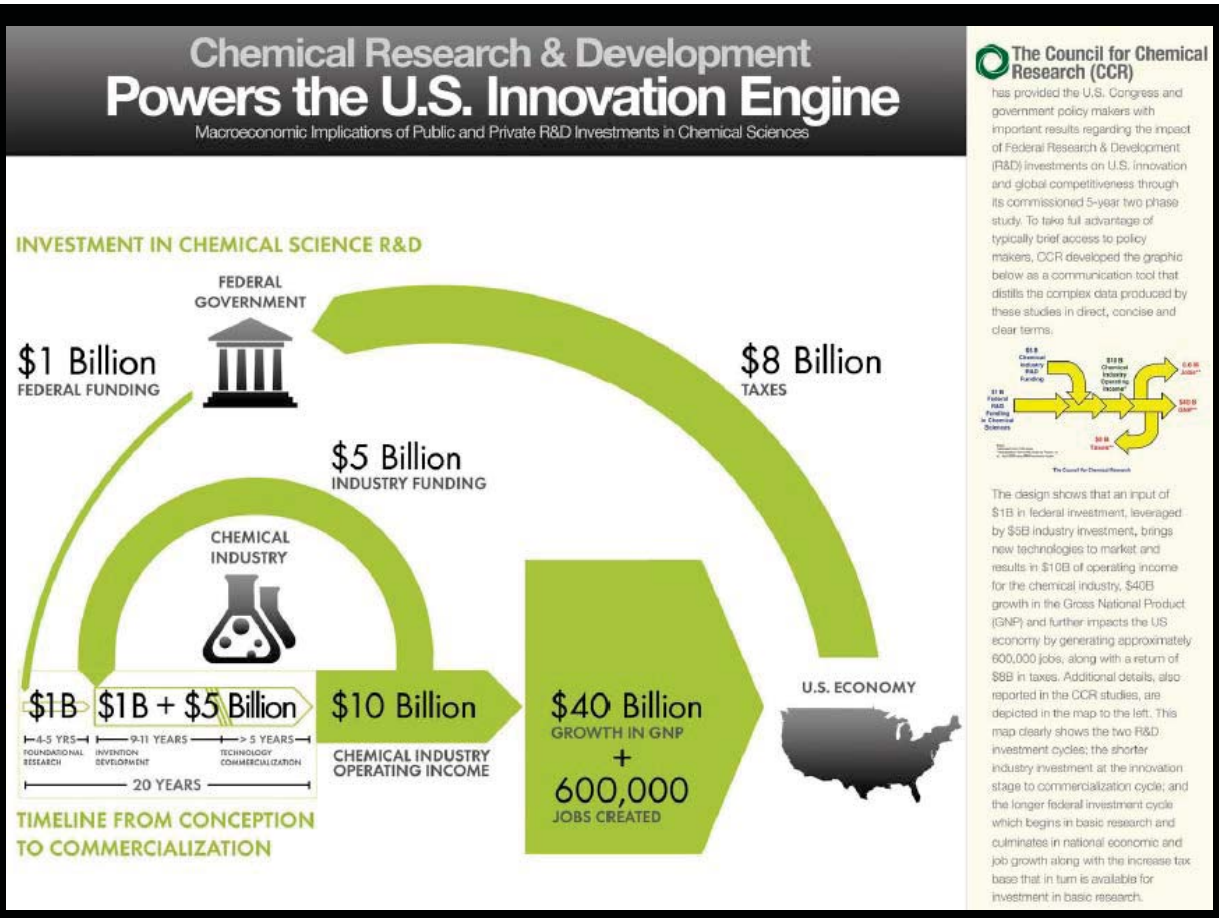
Impact of Air Travel on Global Spread of Infectious Diseases - Vittoria Colizza, Alessandro Vespignani - 2007



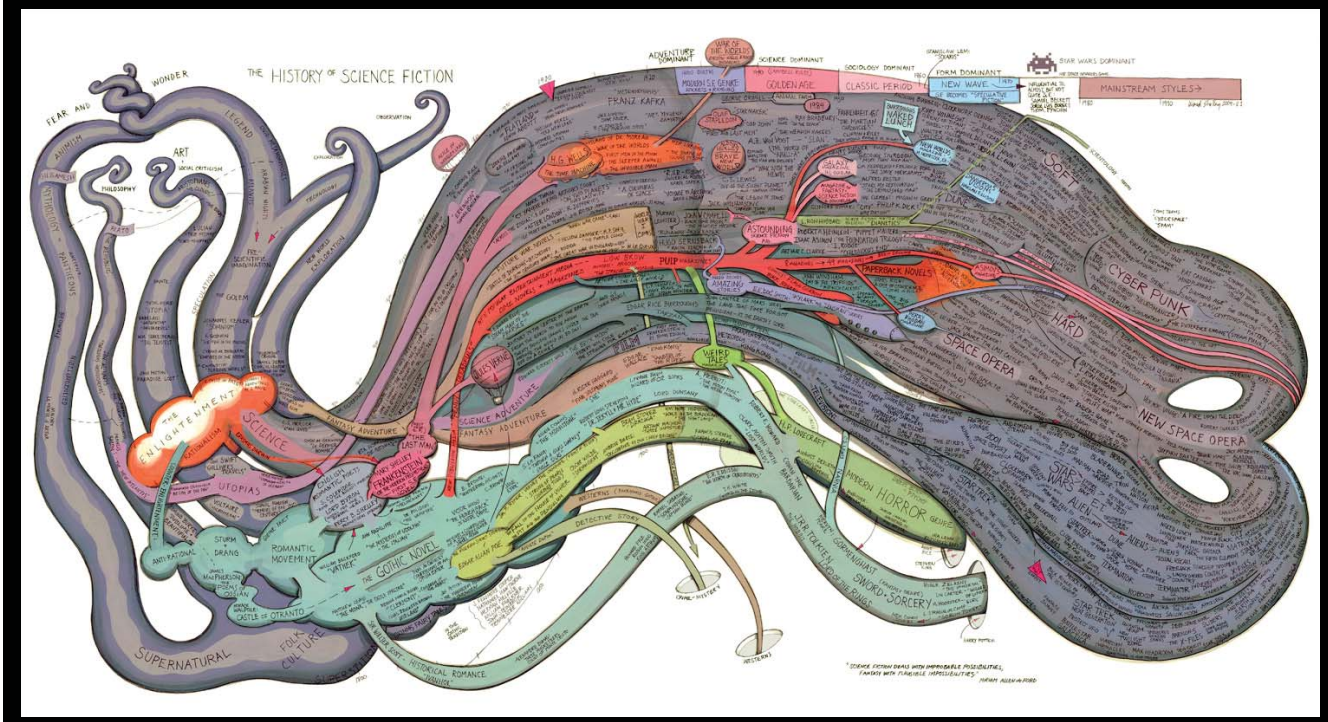
Language Communities of Twitter - Eric Fischer - 2012



Bollen, Johan, Herbert Van de Sompel, Aric Hagberg, Luis M.A. Bettencourt, Ryan Chute, Marko A. Rodriquez, Lyudmila Balakireva. 2008. A Clickstream Map of Science.

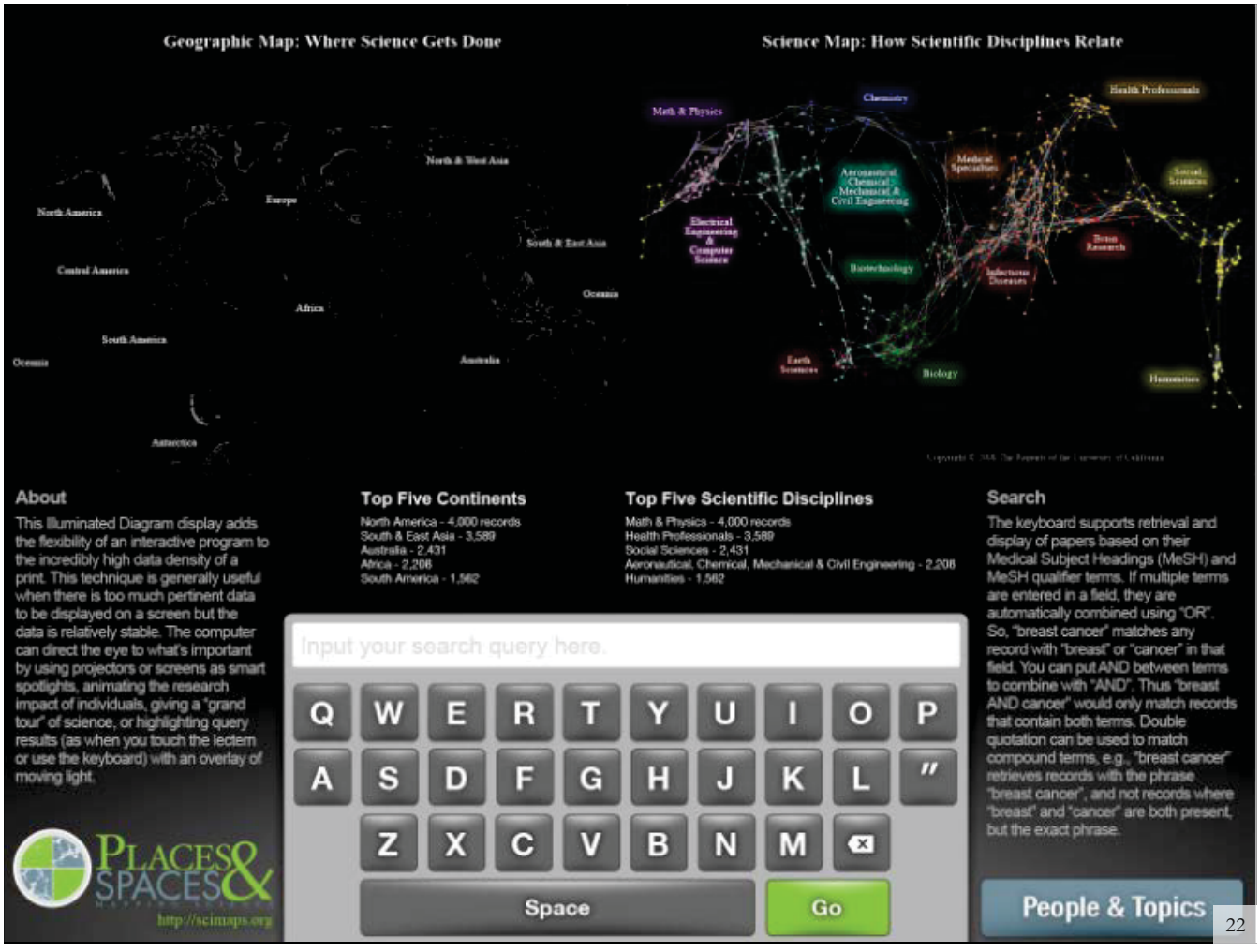


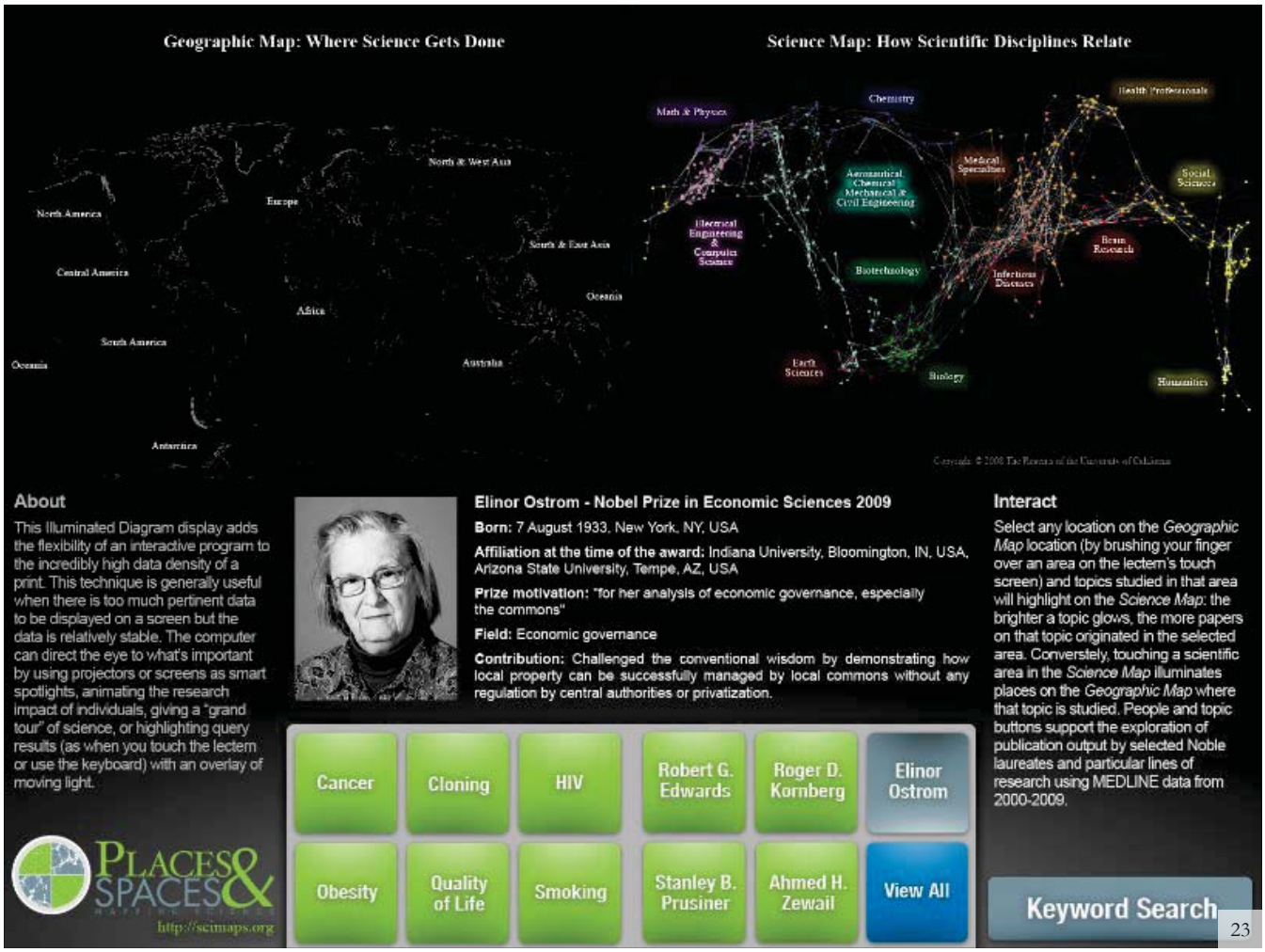
Council for Chemical Research. 2009. Chemical R&D Powers the U.S. Innovation Engine. Washington, DC. Courtesy of the Council for Chemical Research.



Ward Shelley . 2011. History of Science Fiction.

Illuminated Diagram Display
on display at the Smithsonian in DC.
http://scimaps.org/exhibit_info/#ID





Open Education

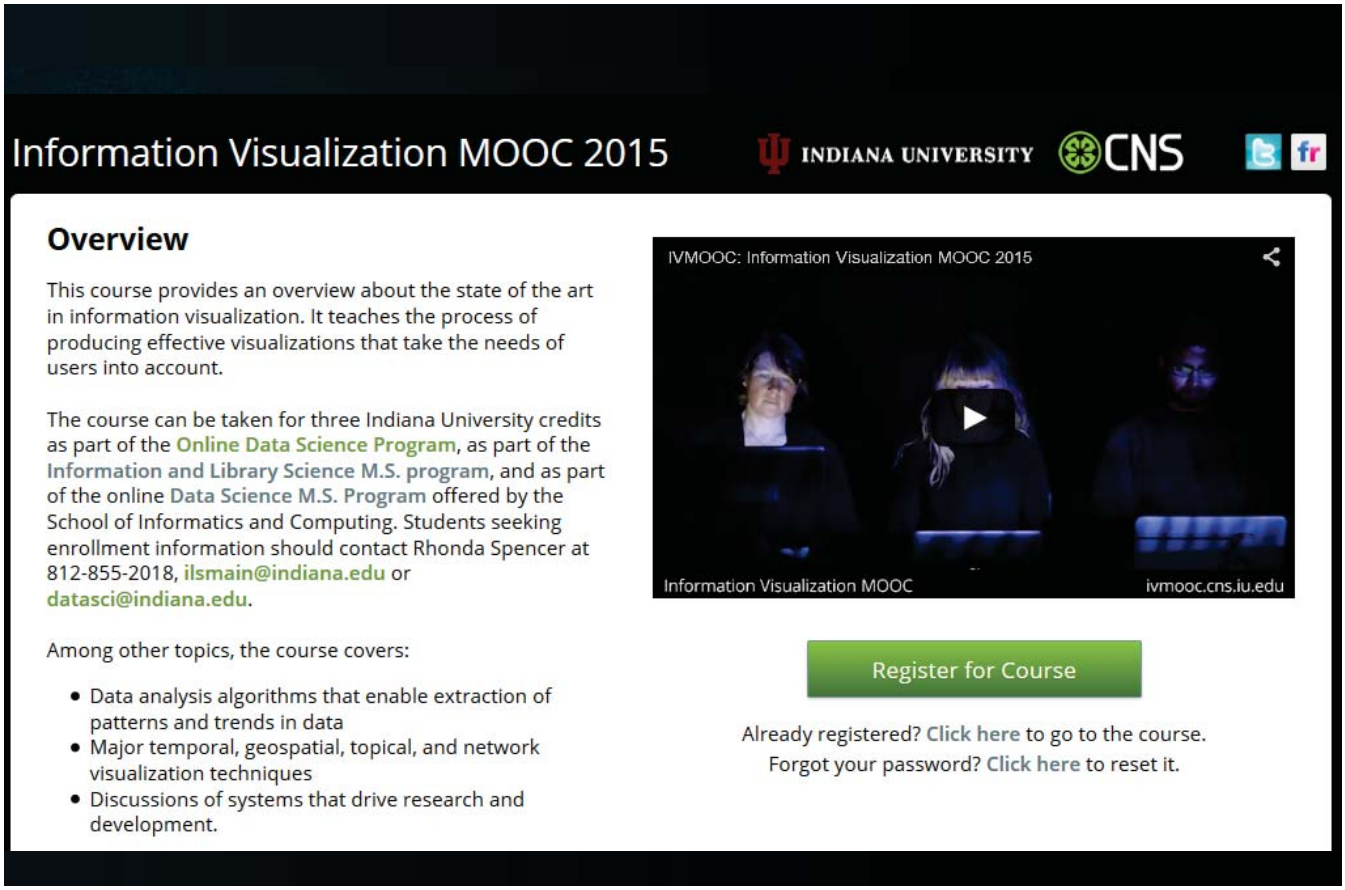
Education – K-12, college, grad., informal, professional training

"Expedition Zukunft" German science train visiting 62 cities in 7 months. 12 coaches, 300 m long.

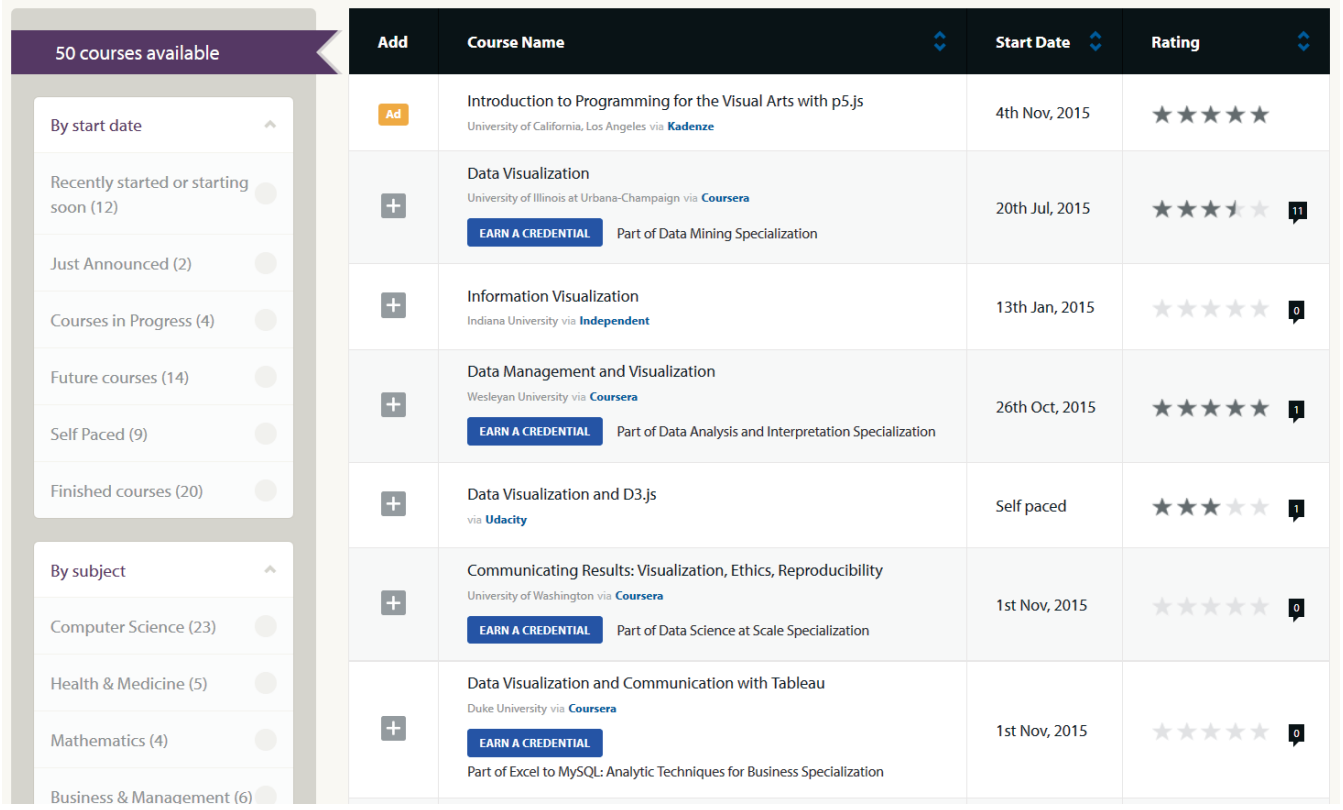
North Carolina State's Immersion Theater

Hidalgo, et al., 2007.
See also The Product Space map in http://scimaps.org

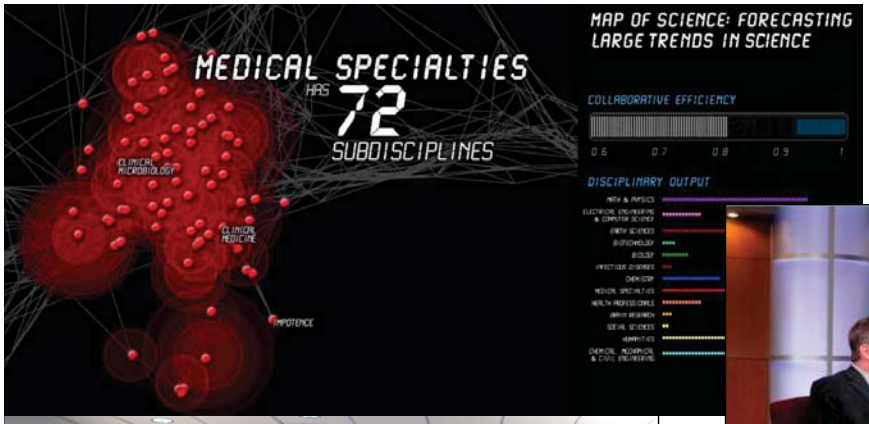
Places & Spaces Exhibit at the David J. Sencer CDC Museum, Atlanta, GA
January 25-June 17, 2016



Register for free at http://ivmooc.cns.iu.edu. Class restarts January 12, 2016.



https://www.class-central.com/search?q=visualization



Science Forecast
S1:E1, 2015

References

Börner, Katy, Chen, Chaomei, and Boyack, Kevin. (2003). **Visualizing Knowledge Domains.** In Blaise Cronin (Ed.), *ARIST*, Medford, NJ: Information Today, Volume 37, Chapter 5, pp. 179-255. http://ivl.slis.indiana.edu/km/pub/2003-borner-arist.pdf

Shiffrin, Richard M. and Börner, Katy (Eds.) (2004). **Mapping Knowledge Domains**. *Proceedings of the National Academy of Sciences of the United States of America*, 101(Suppl_1). http://www.pnas.org/content/vol101/suppl_1

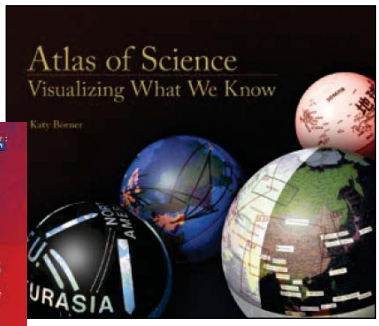
Börner, Katy (2010) **Atlas of Science: Visualizing What We Know**. The MIT Press. http://scimaps.org/atlas

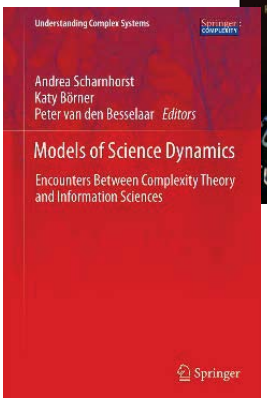
Scharnhorst, Andrea, Börner, Katy, van den Besselaar, Peter (2012) **Models of Science Dynamics**. Springer Verlag.

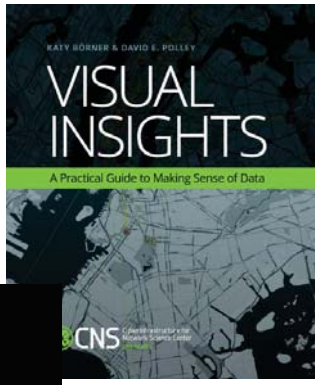
Katy Börner, Michael Conlon, Jon Corson-Rikert, Cornell, Ying Ding (2012) **VIVO: A Semantic Approach to Scholarly Networking and Discovery**. Morgan & Claypool.

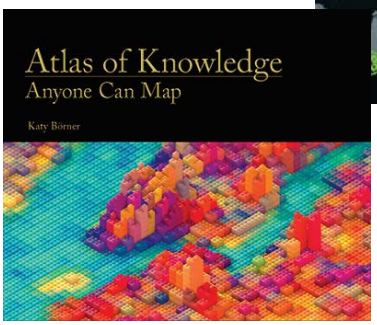
Katy Börner and David E Polley (2014) **Visual Insights: A Practical Guide to Making Sense of Data**. The MIT Press.

Börner, Katy (2015) **Atlas of Knowledge: Anyone Can Map**. The MIT Press. http://scimaps.org/atlas2









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

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