Visualizing What We Know

Noodles and Co.
February 2017
A New Map of the Whole World, by Herman Moll 1736
Places & Spaces On Display
Meet the international advisory board that helps select the maps that make up the exhibit

The process of selecting the exhibit’s pieces begins each year with a call for maps corresponding to a particular theme or addressing the needs of a particular audience. Once the submissions have been gathered, a team of international reviewers and exhibit advisors select the ten most articulate and innovative maps for entry into Places & Spaces.
These men and women from around the globe work selflessly to make the exhibit a success. Their intellectual guidance and commitment to promoting science mapping are what has made *Places & Spaces* the vital exhibit it is today.
Ph.D. Thesis Map, by Keith V. Nesbitt
Being a Map of Physics, by Bernard Porter
“When you’re lost in information, an information map is kind of useful.”

-David McCandless, data journalist and information designer
Tree of Life, by Peer Bork, Francesca Ciccarelli, Berend Snel, Chris Creevey, Christian Von Mering
Maps of Science, by Kevin W. Boyack and Richard Klavans
Map of Scientific Collaborations from 2005-2009

Scientific Collaborations between World Cities, by Olivier H. Beauchesne
Mapping a Stream of Data
MOBILE LANDSCAPES
Using Location Data from Cell Phones for Urban Analysis

This research shows how geo-referencing cell phone activity data can allow for hourly estimates of population flows within urban environments. Analyzing the movement of people on this scale had never been investigated in depth before this project and the results allow researchers to investigate how people navigate and use urban systems. Understanding these flows will allow us to plan better cities.

The maps below show cell phone activity around Milan, Italy’s train station during rush hour. As one might imagine at rush hour’s peak there is high activity around the train station, as time passes this activity moves further away from this transit node. Milan’s urban population is beginning to inhabit completely different parts of the city. While this analysis highlights what one might expect, a closer inspection of the data not only shows high volumes of people at the train station during rush hour, but also the smaller urban plazas that are activated at dusk. This contrast between day and night helps to illustrate how Milan’s population uses its urban environment and what parts of the city are important to their daily flow. It also illustrates the potential of cell phone data to tell us about the pulse of the city.

Mobile Landscapes, by Carlo Ratti, Riccardo Maria Pulselli, Sarah Williams
Could you convey the collective “mood” of Twitter users with just text? Maybe—but it would take pages and pages to convey the same insights this map does in seconds.

**Pulse of the Nation: U.S. Mood Variations Inferred From Twitter**

- **Mood Variations**
  A number of interesting trends can be observed in the data. For example, daily variations can be seen for mood graphs, with the early morning and late evening having the highest levels of happiness. Seasonal depressive variations can be observed, especially with a significant mood drop occurring before the winter solstice.

- **Weekly Variations**
  Weekly trends can be observed as well, with weekends much happier than weekdays.

**About the Data and Visualization**

The data was collected using over 300 million tweets from June 2009 to August 2011 by researchers at the University of Pennsylvania and the University of Michigan. The sentiment of each tweet was inferred using the Linguistic Inquiry and Word Count (LIWC) dictionary and the LIWCnet software. The data was then mapped onto the U.S. mainland using the U.S. Census Bureau’s TIGER/Line shapefiles, and the resulting choropleth maps were created using R and the ggplot2 package.

**About Cartograms**

A cartogram is a map in which the mapping variable (in this case, the number of tweets) is scaled for the cartogram area, thus, the geometry of the actual map is altered so that the size of each region is proportionate to the number of tweets that originate in that region. This results in a cartogram that looks more like a mosaic rather than a traditional map.

**References**

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

http://www.cs.miami.edu/research/twitter/mood

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Language Communities of Twitter, by Eric Fischer
Maps as Tools for Decision-making

https://spreecommerce.com/blog/data-driven-decisions
Impact of Air Travel on Global Spread of Infectious Diseases

by Vittoria Colizza, Alessandro Vespignani, and Elisha F. H. Allgood
Tectonic Movements and Earthquake Hazard Predictions
by Chuck Meertens, Elisha F. H. Allgood, Michael W. Hamburger, and Lou Estey
Chemical R & D Powers the U.S. Innovation Engine, by the Council for Chemical Research
Interactive Maps as Tools for Discovery

Interactive visualization on display at the CDC Museum in Atlanta.

Photo courtesy of Mike Jensen.
Mapping Global News
Kalev Leetaru

gdeltproject.org
Charting Culture
Maximilian Schich and Mauro Martino

cultsci.net
Science Maps . . .

- help us navigate
- help us see patterns in data
- help us decide
- help us discover
Enjoy the first two books in Katy Börner’s 3-Part *Atlas* series

**Atlas of Science**
*Visualizing What We Know*

Katy Börner

**Atlas of Knowledge**
*Anyone Can Map*

Katy Börner

[scimaps.org/atlas1](http://scimaps.org/atlas1)

*Atlas of Science*, featuring more than thirty full-page science maps, fifty data charts, a timeline of science-mapping milestones, and 500 color images, serves as a sumptuous visual index to the evolution of modern science and as an introduction to "the science of science"—charting the trajectory from scientific concept to published results.

[scimaps.org/atlas2](http://scimaps.org/atlas2)

The *Atlas of Knowledge* introduces a theoretical visualization framework meant to empower anyone to systematically render data into insights. It aims to teach "timeless" knowledge that holds true over a lifetime while referring to an extensive set of references for "timely" advice on what tool and workflow is currently the best for answering a specific question.

[facebook.com/cnscenter](http://facebook.com/cnscenter)

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IVMOOC
Information Visualization MOOC

The Information Visualization MOOC provides an overview about the state of the art in information visualization, teaching the process of producing effective visualizations that take the needs of users into account.

The inaugural IVMOOC, which launched in January 2013, attracted participants from more than 100 countries. It is one of the first MOOCs offered by IU and the first to offer an opportunity for students to work in teams with real clients. All registrants gain free access to the Scholarly Database and the Sci2 Tool.

The course can be taken for three Indiana University credits as part of the Online Data Science Program offered by the School of Informatics and Computing.

The course will return in January 2016. Learn more at ivmooc.cns.iu.edu.