Information Visualization MOOC

Unit 1: Visualization Framework & Workflow Design

Course Overview

Instructors

Katy Börner – Theory Parts
Instructor, Professor at SLIS

David E. Polley – Hands-on Parts
CNS Staff, Research Assistant with MIS/MLS
Teaches & Tests Sci2 Tool

Scott B. Weingart – Client Work
Assistant Instructor, SLIS PhD student

Schedule

- **Unit 1** – Visualization Framework & Workflow Design
- **Unit 2** – "When": Temporal Data
- **Unit 3** – "Where": Geospatial Data
- **Unit 4** – "What": Topical Data

Mid-Term

- **Unit 5** – "With Whom": Trees
- **Unit 6** – "With Whom": Networks
- **Unit 7** – Dynamic Visualizations & Deployment

Final Exam

Students work in teams with clients.

Unit Structure

The course and each unit has three components:

Theory: Videos and Slides
Self-Assessment (not graded)

Hands-on: Videos and Slides & Wiki pages with workflows
Homework (not graded)

Client Work: Using Drupal Marketplace (peer review)

Theory Unit Structure

Each theory unit comprises:

- Examples of best visualizations
- Visualization goals
- Key terminology
- General visualization types and their names

- Workflow design
  - Read data
  - Analyze
  - Visualize

- Discussion of specific algorithms

IVMOOC Social Media Stream

Before, during, and after the course, please use tag “ivmooc” on

- **Twitter** to share links to insightful visualizations, conferences and events, or relevant job openings.
- **Flickr** to upload your own visualizations or tag visualizations by others.

We hope to use this course to create a unique, real-time data stream of the best visualizations, experts, and companies that apply data mining and visualization techniques to answer real-world questions.

Grading

All students are asked to create a personal profile to support working in teams.

Final grade is based on Midterm (**30%**), Final (**40%**), Client Project/Homework (**30%**).

- Weekly self-assessments are not graded.
- Homework is graded automatically.
- Midterm and Final test materials from theory and hands-on sessions are graded automatically.
- Client work is peer-reviewed via online forum.

All students that receive more than **80%** of all available points get an official certificate/badge.

Meet Instructors in Person

Katy's schedule in 2013:

- July 31-Aug 4, Cognitive Science Society Conference, Berlin, Germany.
- July 15-19, 14th International Society of Scientometrics and Informetrics Conference, Vienna, Austria.
- May 12-17, Dagstuhl Seminar on Information Visualization – Towards Multivariate Network Visualization, Germany.
- May 2-4, Ann McCranie teaches Sci2/NWB Workshop at Sunbelt, Hamburg, Germany.
- April 26, Sci2 Tutorial at NAS
- April 25, 6p, DASER talk, NAS. Washington, D.C.
- April 17-20, Board Meeting of Elsevier's Bibliometrics Research Program, Amsterdam, Netherlands.
- Jan 23-27, World Economic Forum Annual Meeting, Davos-Klosters, Switzerland.
- Jan 16-22, VIVO Workshop at KNAW, Amsterdam, The Netherlands.

Books (classics)

- Semiology of Graphics: Diagrams, Networks, Maps by Jacques Bertin (Nov 1, 2010), Originally published in French in 1967.
- Envisioning Information by Edward R. Tufte (May 1990).
- How to Lie with Maps (2nd Edition) by Mark Monmonier and H. J. de Blij (May 1, 1996).
- Readings in Information Visualization: Using Vision to Think (Interactive Technologies) by Stuart K. Card, Jock Mackinlay and Ben Shneiderman (Feb 8, 1999).
- Information Graphics: A Comprehensive Illustrated Reference by Robert L. Harris (Jan 6, 2000).
- How Maps Work: Representation, Visualization, and Design by Alan M. MacEachren (Jun 21, 2004).
- The Grammar of Graphics (Statistics and Computing) by Leland Wilkinson, D. Wills, D. Rope and A. Norton (Jul 15, 2005).

Books (recent)

- Visualize This: The FlowingData Guide to Design, Visualization, and Statistics by Nathan Yau (Jul 20, 2011).
- Infographics: The Power of Visual Storytelling by Jason Lankow, Josh Ritchie and Ross Crooks (Sep 4, 2012).
- Show Me the Numbers: Designing Tables and Graphs to Enlighten by Stephen Few (Jun 1, 2012) and other books by him.
- Information Visualization, Third Edition: Perception for Design (Interactive Technologies) by Colin Ware (Jun 1, 2012).
- The Functional Art: An introduction to information graphics and visualization by Alberto Cairo (Sep 1, 2012).

Please post your favorite to Twitter, Flickr using tag “ivmooc”

Web sites

- David Rumsey's Map Collection http://www.davidrumsey.com/GIS/ (soon at Stanford U).
- Science and Engineering Visualization Challenge by National Science Foundation and the journal *Science* http://www.nsf.gov/news/special_reports/scivis/winners.jsp
- Edward Tufte's Ask ET forum.
- Golan Levin's FLONG.
- Stamen design's beautiful and technologically sophisticated projects.
- Andrew Vande Moere's Information Aesthetics

See also Nathan Yau’s excellent suggestions at http://flowingdata.com/2012/04/27/data-and-visualization-blogs-worth-following/

References

Börner, Katy, Chaomei Chen, and Kevin Boyack. 2003. "Visualizing Knowledge Domains." Chap 5. in *ARIST*, edited by Blaise Cronin, 37: 179-255. Medford, NJ: Information Today, Inc.
http://ivl.slis.indiana.edu/km/pub/2003-borner-arist.pdf

Shiffrin, Richard M., and Katy Börner, eds. 2004. "Mapping Knowledge Domains," special issue, *PNAS* 101 (Suppl. 1).
http://www.pnas.org/content/vol101/suppl_1/

Börner, Katy, Soma Sanyal, and Alessandro Vespignani. 2007. "Network Science." Chap. 12 in *ARIST*, edited by Blaise Cronin, 41: 537-607. Medford, NJ: Information Today, Inc.
http://ivl.slis.indiana.edu/km/pub/2007-borner-arist.pdf

Börner, Katy. 2010. *Atlas of Science*. Cambridge, MA: MIT Press.
http://scimaps.org/atlas

Scharnhorst, Andrea, Katy Börner, and Peter van den Besselaar. 2012. *Models of Science Dynamics*. New York: Springer Verlag.