

INFORMATION VISUALIZATION

Course: LIS-658
Semester: Spring 2013
Meeting Information: Thursdays
Location: PMC, Room 606
Credits: 3
Prerequisites: None

Chris Alen Sula, Ph.D.
Office: PMC, Room 604B
Office Hours: Wed, 3:30-6:30 pm or by appt.
p 212.647.7377
e csula@pratt.edu
w <http://chrisalensula.org>

COURSE DESCRIPTION

This course examines the art, science, and practice of information visualization. Particular emphasis is placed on the ways in which position, shape, size, brightness, color, orientation, texture, and motion influence perception of information and facilitate comprehension and analysis of large and complex bodies of information. Topics include cognition and visual perception; the aesthetics of visual media; techniques for processing and manipulating information for the purpose of visualization; studies of spatial, relational, multivariate, time-series, interactive, and other visual approaches; and methods for evaluating information visualizations.

COURSE GOALS + LEARNING OBJECTIVES

The goals of this course are to:

- explore various theoretical, practical, and aesthetic perspectives on information visualization
- examine cognitive and psychological studies relevant to visual perception and information processing
- develop familiarity with a wide variety of visual representations, with particular emphasis on selecting appropriate representations based on data frameworks and audience
- build skills in planning, developing, and evaluating information visualizations

By the end of this course, students will be able to:

- critically discuss information visualizations in light of current theories and empirical research
- plan and implement effective information visualizations
- design appropriate evaluative instruments for information visualizations

REQUIRED TEXTS

- Stephen Few, *Now You See It: Simple Visualization Techniques for Quantitative Analysis* (Analytics Press 2009) [ISBN 0970601980]
- Additional readings [available on Learning Management System via my.pratt.edu]

COURSE WEBSITE

All students enrolled in the course have access to course materials on Pratt's Learning Management System (a Moodle installation) available at my.pratt.edu. Please make sure you know how to access LMS and use Moodle. Also, please note that LMS facilitates communication using Pratt e-mail only. If you do not use your Pratt account, please use webmail to forward your Pratt e-mail to an account that you do use.

COURSE FORMAT

This course will be structured as a lecture/discussion and lab. While the professor will clarify the main points of each session and address more advanced research material, the main portion of class will be devoted to discussion of the required readings for that week. Students will bring their own ideas, experience, and interpretations to class and will learn from sharing and hearing others. This course will also include routine labs exploring visualization processes and methods. Active preparation is therefore an important part of the class and contributes significantly to your overall learning in the course.

COURSE REQUIREMENTS + ASSIGNMENTS

Readings

Each student is required to read the articles assigned on a weekly basis in advance of the session for which they are assigned. Additional readings will also be provided; though not required, many of these will be covered in lecture, and a judicious sampling of them will significantly enhance your understanding of the course material.

Methods of student assessment

Your grade in the course will be based on the following:

Weekly visualization post	30%
Lab reports	30%
Final project	40%

Weekly visualization post (30%)

Throughout the course, students are expected to contribute to an ongoing Tumblr featuring examples of visualization. At minimum, you must follow the Tumblr throughout the course and make at least one new post per week. Your post should include an image/screenshot (appropriately credited) and link to the original visualization, as well as brief commentary on the visualization (250–500 words). Your post can make positive and/or negative remarks about the visualization, but above all, it should demonstrate a careful reading of the texts and creativity in finding those ideas in practice throughout the field. By making thoughtful contributions to the archive, you will help to create a public resource that looks at visualization in a critical light.

Lab reports (5 reports, 6% each)

Throughout the course, we will explore various tools for managing data and creating visualizations. You will be responsible for bringing in appropriate datasets for these exercises and for experimenting with these tools in a structured way during class time. Within one week of each lab, you should submit a short report (500–750 words) that presents the results of your visualization and discusses its significance for the data visualized. Your report should demonstrate that you have followed best practices as discussed in class and in the readings.

Final project (40%)

Students may complete a range of activities for their final projects including:

- analytic—creating a set of visualizations pertaining to one set/type of information (the visualizations may be print or digital, static or interactive, as appropriate to the information and intended audience, and must be accompanied by critical reflections on that work)
- methodological—creating a tool for visualizing one set/type of information (accompanied by critical reflections on that work), or proposing such a method in the form of a research paper
- evaluative—completing a written evaluation of several different methods or tools on one set/type of information

Any of these activities may be carried out individually or collectively. All students will make a short presentation of their projects in class on May 2, 2013, and the final version must have some individually written component of at least 1,000 words that incorporates theory and research in information visualization. Students should email a short proposal (no more than 250 words) before April 14, 2013. Proposals require approval by the professor before the project is eligible for grading.

GRADING

All graded assignments are due on the date indicated. All assignments will be graded on a rubric basis, with the criteria circulated in advance. Final grades will be awarded as follows:

- A sustained level of superior performance demonstrated in all areas of course requirements
- B consistent level of performance that is above average in a majority of the course requirements
- C performance that is generally average and course requirements are achieved
- D below average performance and achievement of the course requirements
- F accomplishment of the course requirements is not sufficient to receive a passing grade

Late work will not be accepted without prior approval by the professor.

E-PORTFOLIO

Students entering the MSLIS degree program in fall 2012 are required to complete an eportfolio that is approved by their advisor before graduation. The eportfolio provides students with an opportunity to showcase their best work from SILS courses and an opportunity to demonstrate they have met the learning objectives of a MSLIS degree. Work completed for this course may be included in the eportfolio, esp. work satisfying bolded areas below. Students must demonstrate that their work jointly fulfills the following learning outcomes:

1. Students carry-out and apply research
- 2. Students demonstrate excellent communication skills and create and convey content**
- 3. Students use information technology and digital tools effectively**
4. Students apply concepts related to use and users of information and user needs and perspectives
5. Students perform within the framework of professional practice

Detailed information on the learning outcomes, requirements and how to create your eportfolio is available from: http://www.pratt.edu/academics/information_and_library_sciences/degree_programs/sils_eportfolio

POLICIES

Academic Integrity & Institute-Wide Policies

Students are expected to adhere to the Academic Integrity Code and Judicial Process of the Pratt Institute (<http://www.prattsenate.org/learning/02-academic.htm>). All infractions will be reported, and I am disposed to fail all violators for the entire course. Students must adhere to the Pratt Community Standards listed in the current Student Handbook (http://www.pratt.edu/uploads/Online_Student_HandbookFINAL.pdf).

Disabilities

Students who require special accommodations for disabilities must obtain clearance from the Office of Disability Services at the beginning of the semester. For further information, contact the Coordinator of Disability Services in the Office of the Vice President for Student Affairs at 718.636.3711.

Incompletes

The professor is generally allergic to incompletes. However, students with health conditions or no-fault hardships are encouraged to discuss options for course completion with the professor.

Participation in Faculty Research

Students taking this class may be asked to participate in faculty-sponsored research; all contributions will be appropriately credited.

Revisions to the Syllabus

While this syllabus provides a reliable framework for the course, including readings and assignments, it is subject to change pending notice in class and on the course website.

COURSE SCHEDULE

This is a tentative outline of topics, readings, and assignments. On occasion, I may add, delete, or substitute topics or readings. Changes will be announced in class and posted to LMS; no printed updates will be given.

WEEK	DATE	TOPICS, READINGS, AND ASSIGNMENTS
1	1/17	Course Introduction <ul style="list-style-type: none">• Heer, Jeffrey, Michael Bostock & Vadim Ogievetsky (2010). "A Tour through the Visualization Zoo: A survey of powerful visualization techniques, from the obvious to the obscure" <i>ACM Queue</i> 8(5)• Keim, Daniel A., et al. (2008). "Visual Analytics: Scope and Challenges" in <i>Visual Data Mining, LNCS 4404</i>, eds. S. J. Simoff, et al., 76–90
2	1/24	History and Theory of Information Visualization <ul style="list-style-type: none">• Few, <i>Now You See It</i>, Ch. 1• Friendly, Michael (2008). "A Brief History of Data Visualization" in <i>Handbook of Data Visualization</i>, eds. Chunhouh Chen, Wolfgang Härdle and Antony Unwin. Berlin: Springer, 15–56.• Fekete, Jean-Daniel, et al. (2008). "The Value of Information Visualization" in <i>Information Visualization: Human-Centered Issues and Perspectives</i>, eds. Andreas Kerren, et al. Berlin: Springer, 1–18• Bateman, Scott, et al. (2010). "Useful junk? The effects of visual embellishment on comprehension and memorability of charts" <i>CHI '10 Proceedings of the 28th international conference on Human factors in computing systems</i>: 2573–2582
3	1/31	Perception and Visual Processing <ul style="list-style-type: none">• Few, <i>Now You See It</i>, Chs. 3, 6• Healey, Christopher G. (2009) "Perception in Visualization" http://www.csc.ncsu.edu/faculty/healey/PP/index.html• MacDonald, Lindsay W. (1999). "Using Color Effectively in Computer Graphics" <i>Computer Graphics and Applications, IEEE</i> 19(4): 20–35
4	2/7	Data for Visualization <i>Google Refine Lab</i> <ul style="list-style-type: none">• Kasik, et al. (2009). "Data Transformations and Representations for Computation and Visualization" <i>Information Visualization</i> 8(4): 275–85• Ward, Matthew (2010). "Data Foundations" from <i>Interactive Data Visualization</i>, eds. Matthew Ward, Georges Grinstein, Daniel Keim. Natick, MA: A. K. Peters, Ltd., 45–71
5	2/14	Design and Narrative Structure for Visualization <ul style="list-style-type: none">• Huff, Darrell (1954). <i>How to Lie with Statistics</i>. New York: W. W. Norton [Intro, Chs. 5–6, 9]• Lima, Manuel (2009). "Information Visualization Manifesto" VCBlog http://www.visualcomplexity.com/vc/blog/?p=644• Illinsky, Noah and Julie Steele (2011). "Source Trinity: Ingredients of Successful Visualizations" in <i>Designing Data Visualizations</i>. Sebastapol, Calif.: O’Rielly Media, 13–17• Segel, E. and J. Heer (2010). "Narrative Visualization: Telling Stories with Data" <i>IEEE Trans. on Visualization and Computer Graphics</i> 16(6): (Nov/Dec)2010
6	2/21	Temporal Visualization <i>Google Fusion Tables Lab</i> <ul style="list-style-type: none">• Few, <i>Now You See It</i>, Ch. 7• Aigner, Wolfgang, et al. (2008), "Visual Methods for Analyzing Time-Oriented Data" <i>IEEE Transactions on Visualization and Computer Graphics</i> 14(1): 47–60

7	2/28	Statistical Visualization I: Part-Whole, Deviation, Distribution	<i>Tableau Lab</i>
		<ul style="list-style-type: none"> • Few, <i>Now You See It</i>, Chs. 8–10 • Few, Stephen (2005). “Effectively Communicating Numbers: Selecting the Best Means and Manner of Display” <i>ProClarity</i> 	
8	3/7	Statistical Visualization II: Correlation, Hierarchy, Multivariate	
		<ul style="list-style-type: none"> • Few, <i>Now You See It</i>, Chs. 11–12 • Graham, Martin and Jessie Kennedy (2010), “A Survey of Multiple Tree Visualization” <i>Information Visualization</i> 9(4): 235–252 • Inselberg, A. (1997). “Multidimensional Detective” <i>Proceedings of the 1997 IEEE Symposium on Information Visualization (InfoVis '97)</i>: 100–107 	
9	3/14	NO CLASS —Spring Break	
10	3/21	Mapping and Countermapping	
		<ul style="list-style-type: none"> • MacEachren, Alan M. and Menno-Jan Kraak (2001). “Research Challenges in Geovisualization” <i>Cartography and Geographic Information Science</i> 28(1), 3–12 • Crampton, Jeremy W and John Krygier (2006). “An Introduction to Critical Cartography” <i>ACME: An International E-Journal for Critical Geographies</i> 4(1), 11–33 	
11	3/28	GIS & Geospatial Visualization	<i>CartoDB Lab</i>
		<ul style="list-style-type: none"> • Goodchild, Michael F. (2007) “Citizens as Sensors: The World of Volunteered Geography” <i>GeoJournal</i> 69(4): 211–221 	
12	4/4	Relational Data & Network Analysis	
		<ul style="list-style-type: none"> • Marsden, Peter V. (2011). “Survey Methods for Network Data” in <i>Sage Handbook of Social Network Analysis</i>, eds. John Scott and Peter J. Carrington. London: Sage Publications, 370–88 • Hollstein, Benita (2011). “Qualitative Approaches” in <i>ibid.</i>, 404–16 	
13	4/11	Network Visualization	<i>Gephi Lab</i>
		<ul style="list-style-type: none"> • Krempel, Lothar (2011). “Network Visualization” in <i>ibid.</i>, 558–77 	
14	4/18	Interactive Visualization	
		<ul style="list-style-type: none"> • Few, <i>Now You See It</i>, Ch. 4 • Cockburn, Andy, Amy Karlson, and Benjamin B. Bederson (2008). “A Review of Overview-Detail, Zooming, and Focus+Context Interfaces” <i>ACM Computing Surveys</i> 41(1) • Yi, Ji Soo, et al. (2007). “Toward a Deeper Understanding of the Role of Interaction in Information Visualization” <i>IEEE Transactions on Visualization and Computer Graphics</i> 13(6): 1224–1231 	
15	4/25	Evaluation & Usability	
		<ul style="list-style-type: none"> • Carpendale, Sheelagh (2008). “Evaluating Information Visualizations” in <i>Information Visualization: Human-Centered Issues and Perspectives</i>, eds. Andreas Kerren, et al. Berlin: Springer, 19–45 • Pretorius, A. Johannes and Jarke J. Van Wijk (2009). “What Does the User Want to See? What do the Data Want to Be?” <i>Information Visualization</i> 8(3), 153–66 	
16	5/2	Final Project Presentations	
	5/5	<i>Final project due</i>	