INFS 208 / INFS 298A: BIBLIOMETRICS

Fall 2011

Syllabus

September 27, 2011

Course information

Number:	INFS 208 / INFS 298A
Title:	Scholarly Communication and Bibliometrics
ID:	628-049-200 / 628-588-200
Quarter:	fall 2011
Location:	Room 121, GSE&IS Building
Time:	Tuesday, 9:00am–12:30pm

Instructor information

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Office hours:	Tuesday, 1:30–4:30pm

Catalog description

> "*208. Scholarly Communication and Bibliometrics.* Lecture, four hours. Preparation: one inferential statistics course. Survey of current theory, method, and empirical studies at intersection of scholarly communication and bibliometrics, seeking to understand flow of ideas through published record, whether in print, electronic form, or other media. Letter grading."

> "*298A. Doctoral Seminar: Research Methods and Design.* (Formerly numbered 291B.) Seminar, four hours. Survey of quantitative, qualitative, and historical research designs. Ethical issues; conceptualization and measurement; indexes, scales, and sampling; experimental, survey, field, and evaluation research; data analysis. Letter grading."

Note on the catalog descriptions: In fall 2011, this class on bibliometrics is open to master's students taking INFS 208, and to doctoral students taking INFS 298A. However, a more-accurate course description for the class is the one provided in the catalog for INFS 298B: Special Topics in Methodology of Information Studies (see below). (In 2011–12, the doctoral class on research methods and design that is usually offered in the fall as INFS 298A [formerly INFS 291B] is to be offered in winter 2012 as INFS 298B.)

> "*298B. Special Topics in Methodology of Information Studies*. Seminar, four hours. Enforced requisite: course 298A. Topics include anthropological fieldwork methods, archival methodology, bibliographical studies, textual analysis, discourse analysis, historical methods, information visualization, network analysis – bibliometrics, informetrics, scientometrics, social network analysis. Letter grading."

Program requirements

Completing this course is one way of satisfying the M.L.I.S. program's research methodology requirement (see section 3.2.1, pp. 26–27, and section 3.6.1, p. 33, of the Department of Information Studies' *Student handbook: 2010–2011*). It also counts towards the IS Ph.D. program's core course requirement (see section 6.5.1.1.1, p. 43, of the *Student handbook: 2010–2011*).

Objectives

This course is an introduction to the **methodology and methods** of bibliometric research. **Bibliometrics** is the study of the ways in which we can use **quantitative** methods to analyze the decisions made by authors and readers of documents (books, journal articles, web pages, etc.). Such analysis is often useful if we wish (for example) to **reward** particular authors, or to **make recommendations** of particular documents, or to **understand the structure** of document networks. Universities use bibliometric techniques in evaluating promotion and tenure cases; libraries, of both traditional and digital varieties, use bibliometric techniques for collection management and information retrieval; and scholars use bibliometric techniques for mapping the intellectual structure of their fields.

The aim of this course is to prepare students for professional practice in the **design, application, and evaluation** of (a) evaluative studies of scholarly productivity and popularity, (b) link-based information retrieval systems and library services, and (c) descriptive and predictive studies of disciplinary structure.

The aim of the course will be met through achievement of the following objectives:

- to develop students' *practical expertise*
    - in the use of information services (e.g., Dialog, Web of Science, Scopus, Google Scholar) to **collect data** on the preferences or "votes" that underlie people's decisions to write, cite, retrieve, or view documents;
    - in the use of simple **statistical methods** of classifying, counting, describing, and comparing such preferences; and
    - in the derivation, from such counts, of **evaluations** of the popularity, impact, or "quality" of documents;
- to develop students' *theoretical knowledge*
    - of the bibliometric "laws"—the **probability distributions**, of a specific type, that have regularly been observed to characterize counts of document-related preferences;
    - of the "success-breeds-success" phenomenon typically invoked in **explanations** of the bibliometric "laws"; and
    - of **models** of decision-making behavior that identify other factors influencing the formation of individual preferences;
- to develop students' *current awareness*
    - of recent developments in the use of **citation analysis** for
        - visualizing the structure of disciplines, and
        - information retrieval;
    - of the contributions of **network science** to bibliometrics (and vice versa); and
    - of **webometrics**—the application of traditional bibliometric techniques in analyses of the structure of the World Wide Web; of **iconometrics**—the application of bibliometric techniques in analyses of the decisions made by creators and viewers of images; and of other innovative application areas.

There is no formal prerequisite for this course, but students will be required to understand and apply basic concepts of descriptive and inferential statistics. Students lacking an aptitude for elementary mathematics may find themselves disadvantaged.

Outcomes

Upon satisfactory completion of this course, you will be able to:

- conduct critical evaluations of the impact and influence of documents, authors, journals, and fields;
- make confident and successful use, in the generation, analysis, and presentation of bibliometric data, of a wide range of tools, standards, and techniques;
- conduct critical analyses of the efficiency and effectiveness of citation databases;
- contribute to institutional decision-making on the basis of informed assessment of the bibliometric tools and techniques that are most appropriate for application in individual contexts;
- appreciate, and communicate to others, the needs and preferences of information seekers, collections managers, information systems designers, and research policymakers; and
- participate actively in contemporary debates about bibliometric theory and practice.

A note on terminology

"Bibliometrics" is not the only term that is used to refer to the quantitative study of document-related processes. **Informetrics** and **librametry** may be defined in similar ways; **scientometrics**, **technometrics**, **sociometrics**, and **econometrics** are fields that overlap with bibliometrics to greater or lesser extents (in the sense either that similar methods are used, or that similar processes are studied); and **webometrics** and **cybermetrics** are newer areas that focus specifically on the communication of information in electronic form. Historically, bibliometrics was itself called "**statistical bibliography**"; and some of its elements, such as **citation analysis**, are important enough to be known by their own specific name. So, when exploring resources, be mindful that useful material will not always be labeled with the particular term "bibliometric(s)."

Methods

Each week the instructor will lead a discussion, supported by PowerPoint slides, handouts, and online demonstrations. The sets of slides and handouts will be available from the course website, accessible through UCLA's **Common Collaboration and Learning Environment** (CCLE).

To access the course website, go to http://www.ccle.ucla.edu/, click on "My Sites," enter your UCLA Logon ID and Password (i.e., your Bruin Online ID, *not* your GSE&IS ID) and click on "Sign In >," choose "2011 Fall" from the "Term" drop-down list, and click on either "11F-INFSTD208-1 - Scholarly Communication and Bibliometrics" (if you're a master's student) or "11F-INFSTD298A-1 - Doctoral Seminar: Research Methods and Design" (if you're a doctoral student).

Readings are set for each week. It's important that everyone comes to class well prepared, ready to discuss the week's readings. In the accompanying reading list (see "List of required and recommended readings" below), the readings marked with an asterisk (*) are required; the others are highly recommended. Most of the required and recommended readings are available from the course website, accessible through CCLE. Copies of any required readings that aren't available online will be put on reserve in the MIT Lab. Further suggestions for reading will be provided in a "Supplemental bibliography" distributed in class.

Syllabus

Week	*Date*	*Topic*	*Required readings*
1	Tue, Sep 27	Bibliometrics in context.	Rossiter (1993). Katz & Katz (1999). Galenson (2002). Salganik et al. (2006). De Bellis (2009a).

2	Tue, Oct 4	Bibliometric distributions and laws.	De Bellis (2009b). Rousseau & Rousseau (1993). Lotka (1926). Redner (1998). Anderson (2004).
3	Tue, Oct 11	**ASIS&T Conference—NO CLASS.**	-
4	Tue, Oct 18	Data sources for citation analysis. Analysis of productivity and citedness for research evaluation, I: Institutional evaluation.	De Bellis (2009c). Garfield (1955). Neuhaus & Daniel (2008). White (2010). Aguillo et al. (2010).
5	Tue, Oct 25 **Assignment #1 due at 9am.**	Analysis of productivity and citedness for research evaluation, II: Author evaluation.	De Bellis (2009d). White (2001). Hirsch (2005). Adler & Harzing (2009). Alonso et al. (2009).
6	Tue, Nov 1 **Assignment #2 due at 9am.**	Analysis of productivity and citedness for research evaluation, III: Journal evaluation.	Garfield & Sher (1963). Rousseau (2002). Bergstrom et al. (2008). Leydesdorff (2009). Bollen et al. (2009).
7	Tue, Nov 8 **Assignment #3 due at 9am.**	Methodological issues in citation analysis.	De Bellis (2009e, f). MacRoberts & MacRoberts (1989). White (2004). Bornmann & Daniel (2008). Davis & Walters (2011).
8	Tue, Nov 15 **Assignment #4 due at 9am.**	Bibliometric processes and explanations.	Merton (1968). Price (1976). Merton (1998). Barabási & Albert (1999). Easley & Kleinberg (2010a).
9	Tue, Nov 22	(a) Collaboration and coauthorship. (b) Mapping disciplines.	De Bellis (2009g) Price (1965). Small (1999). Klavans & Boyack (2011). Cobo et al. (2011).
10	Tue, Nov 29	Bibliometrics for information retrieval.	De Bellis (2009h). Pinski & Narin (1976). Brin & Page (1998). Easley & Kleinberg (2010b). Easley & Kleinberg (2010c).
11	Tue, Dec 6 **Assignment #5 due at 5pm, Fri, Dec 9.**	**Finals week: MAKE-UP CLASS.** Bibliometrics for the arts and humanities.	Cronin & Meho (2009). White et al. (2009). Kousha et al. (2010). Michel et al. (2011). Hammarfelt (2011).

Assignments

There are five assignments for this class:

- two analyses contributing to a bibliometric profile of an *author* in a field of your choice, with accompanying evaluations of the methods you used (the first counting towards **10%** of the final grade and due in Week **5—Tuesday, October 25, 9am**; the second **15%**, Week **6—Tuesday, November 1, 9am**);
- two analyses contributing to a bibliometric profile of a *journal* in a field of your choice, with accompanying evaluations of the methods you used (the first counting towards **10%** of the final grade and due in Week **7—Tuesday, November 8, 9am**; the second **15%**, Week **8—Tuesday, November 15, 9am**);
- a final essay on a novel application of bibliometric methods (**40%**; Week **11—Friday, December 9, 5pm**).

Full details of these assignments will be made available in class, and then from the course website. All assignments except the final essay are due for submission at 9am on the Tuesday of the week specified. The final **10%** of your final grade will be awarded on the basis of the quality (not the quantity) of your participation in class.

Information services

The two main sources of primary data that we will be using in this class are:

- Thomson Reuters' **Web of Science℠** (which includes Science Citation Index, Social Sciences Citation Index, and Arts & Humanities Citation Index—SCI, SSCI, and A&HCI): http://isiknowledge.com/; and
- **Google Scholar**: http://scholar.google.com/.

The Web of Science is accessible to UCLA students through UCLA's proxy server. Google Scholar is freely available to the public. Ideally, we would also have access to Elsevier's **SciVerse Scopus** (http://www.scopus.com/), but UCLA does not currently subscribe to Scopus, and Elsevier would charge us $3,000 for trial access by IS 208/298A students for the fall quarter.

SCI, SSCI, and A&HCI are also available via the **Dialog®** service, which offers some analytical tools unavailable through the Web of Science. Each student will be required to sign a "Student Use Agreement" before being assigned a Dialog User ID and Password that will allow access to DialogClassic Web™ at http://www.dialogclassic.com/.

Textbooks

There is one required textbook for this course, available from LuValle Commons (priced at $55 new), or from Amazon.com (priced at $52.24 new, or from $27.21 used, or $38.49 as a Kindle eBook):

- De Bellis, Nicola. 2009. *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*. Lanham, MD: Scarecrow Press.

In case you're interested, here's a review of this book:

- Vinkler, P. (2010). Indicators are the essence of scientometrics and bibliometrics. *Scientometrics*, *85*, 861-866.

A list of books that are highly recommended for background reading is provided in the accompanying bibliography of "Supplementary resources."

List of required and recommended readings

The required readings in this list are marked with an asterisk (*). The others are highly recommended. Most of the required and recommended readings are available from the course website, accessible through CCLE. Copies of any required readings that aren't available online will be put on reserve in the MIT Lab.

Week 1: Bibliometrics in context

* Rossiter, M. W. (1993). The ~~Matthew~~ Matilda effect in science. *Social Studies of Science*, *23* (2), 325-341.

* Katz, J. S., & Katz, L. (1999). Power laws and athletic performance. *Journal of Sports Sciences*, *17* (6), 467-476.

* Galenson, D. W. (2002). Quantifying artistic success: Ranking French painters, and paintings, from Impressionism to Cubism. *Historical Methods*, *35* (1), 5-19.

* Salganik, M. J., Dodds, P. S., & Watts, D. J. (2006). Experimental study of inequality and unpredictability in an artificial cultural market. *Science*, *311* (5762), 854-856.

* De Bellis, N. (2009a). Biblio/sciento/infor-metrics: Terminological issues and early historical developments. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 1–22 (Chapter 1). Lanham, MD: Scarecrow Press.

Borgman, C. L., & Furner, J. (2002). Scholarly communication and bibliometrics. *Annual Review of Information Science and Technology*, *36*, 3-72.

Bar-Ilan, J. (2008). Informetrics at the beginning of the 21st century: A review. *Journal of Informetrics*, *2* (1), 1-52.

Bar-Ilan, J. (2010). Informetrics. In Bates, M. J., & Maack, M. N. (Eds.), *Encyclopedia of Library and Information Sciences* (3rd ed.), pp. 2755-2764. Boca Raton, FL: CRC Press.

Week 2: Bibliometric distributions and laws

* De Bellis, N. (2009b). The mathematical foundations of bibliometrics. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 75–139 (Chapter 4). Lanham, MD: Scarecrow Press.

* Rousseau, R., & Rousseau, S. (1993). Informetric distributions: A tutorial review. *Canadian Journal of Information and Library Science*, *18* (2), 51-63.

* Lotka, A. J. (1926). The frequency distribution of scientific productivity. *Journal of the Washington Academy of Sciences*, *16* (12), 317-323.

Burrell, Q. (1991). The Bradford distribution and the Gini index. *Scientometrics*, *21* (2), 181-194.

* Redner, S. (1998). How popular is your paper? An empirical study of the citation distribution. *European Physical Journal B*, *4* (2), 131-134.

* Anderson, C. (2004). The long tail. *Wired*, *12* (10), 170-177.

Newman, M. E. J. (2005). Power laws, Pareto distributions and Zipf's law. *Contemporary Physics*, *46* (5), 323-

351.

Rousseau, R. (2010). Informetric laws. In Bates, M. J., & Maack, M. N. (Eds.), *Encyclopedia of Library and Information Sciences* (3rd ed.), pp. 2747-2754. Boca Raton, FL: CRC Press.

Week 3: ASIS&T Conference—NO CLASS.

Week 4: Data sources for citation analysis.
Analysis of productivity and citedness for research evaluation, I: Institutional evaluation.

* De Bellis, N. (2009c). The empirical foundations of bibliometrics: The Science Citation Index. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 23–48 (Chapter 2). Lanham, MD: Scarecrow Press.

* Garfield, E. (1955). Citation indexes for science. *Science*, *122* (3159), 108-111.

* Neuhaus, C., & Daniel, H. D. (2008). Data sources for performing citation analysis: An overview. *Journal of Documentation*, *64* (2), 193-210.

* White, H. D. (2010). Citation analysis. In Bates, M. J., & Maack, M. N. (Eds.), *Encyclopedia of Library and Information Sciences* (3rd ed.), pp. 1012-1026. Boca Raton, FL: CRC Press.

Snow, B. (1993). RANK: A new tool for analyzing search results on DIALOG. *Database*, *16* (3), 111-118.

Christensen, F. H., & Ingwersen, P. (1996). Online citation analysis: A methodological approach. *Scientometrics*, *39* (1), 39-62.

van Raan, A. F. J. (2005). Fatal attraction: Conceptual and methodological problems in the ranking of universities by bibliometric methods. *Scientometrics*, *62* (1), 133-143.

Moed, H. F. (2006, August). *Bibliometric rankings of world universities*. Leiden, The Netherlands: Centre for Science and Technology Studies (CWTS).

* Aguillo, I. F., Bar-Ilan, J., Levene, M., & Ortega, J. L. (2010). Comparing university rankings. *Scientometrics*, *85*, 243-256. doi:10.1007/s11192-010-0190-z

Thelwall, M. (2010). Webometrics. In Bates, M. J., & Maack, M. N. (Eds.), *Encyclopedia of Library and Information Sciences* (3rd ed.), pp. 5634-5643. Boca Raton, FL: CRC Press.

Guides to using citation databases

Dialog. (n.d.). *Successful searching with Dialog command language*. Morrisville, NC: Dialog. Retrieved September 20, 2011, from http://support.dialog.com/searchaids/success/.

Thomson Reuters. (2009). *Web of Science help*. Philadelphia, PA: Thomson Reuters. Retrieved September 20, 2011, from http://images.isiknowledge.com/help/WOS/h_toc.html.

McVeigh, M. E. (2010). Citation indexes and the Web of Science. In Bates, M. J., & Maack, M. N. (Eds.), *Encyclopedia of Library and Information Sciences* (3rd ed.), pp. 1027-1037. Boca Raton, FL: CRC Press.

Google. (2009). *About Google Scholar*. Mountain View, CA: Google. Retrieved September 20, 2011, from http://scholar.google.com/intl/en/scholar/about.html.

Week 5: Analysis of productivity and citedness for research evaluation, II:

Author evaluation

* De Bellis, N. (2009d). Impact factor and the evaluation of scientists: Bibliographic citations at the service of science policy and management. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 181–241 (Chapter 6). Lanham, MD: Scarecrow Press.

* White, H. D. (2001). Author-centered bibliometrics through CAMEOs: Characterizations automatically made and edited online. *Scientometrics*, *51* (3), 607-637.

Adkins, D., & Budd, J. M. (2006). Scholarly productivity of U.S. LIS faculty. *Library & Information Science Research*, *28* (3), 374-389.

* Hirsch, J. E. (2005). An index to quantify an individual's scientific research output. *Proceedings of the National Academy of Sciences of the United States of America*, *102* (46), 16569-16572.

Cronin, B., & Meho, L. I. (2006). Using the h-index to rank influential information scientists. *Journal of the American Society for Information Science and Technology*, *57* (9), 1275-1278.

* Adler, N. J., & Harzing, A.-W. (2009). When knowledge wins: Transcending the sense and nonsense of academic rankings. *Academy of Management Learning & Education*, *8*(1), 72-95. doi:10.5465/AMLE.2009.37012181

* Alonso, S., Cabrerizo, F. J., Herrera-Viedma, E., & Herrera, F. (2009). h-Index: A review focused in its variants, computation and standardization for different scientific fields. *Journal of Informetrics*, *3*(4), 273-289. doi:16/j.joi.2009.04.001

Egghe, L. (2010). The Hirsch-index and related impact measures. *Annual Review of Information Science and Technology*, *44*, 65-114.

Li, J., Sanderson, M., Willett, P., Norris, M., & Oppenheim, C. (2010). Ranking of library and information science researchers: Comparison of data sources for correlating citation data, and expert judgments. *Journal of Informetrics*, *4*(4), 554-563. doi:10.1016/j.joi.2010.06.005

Examples of analyses of individual authors

White, H. D. (2000). Toward ego-centered citation analysis [Eugene Garfield]. In B. Cronin & H. Atkins (Eds.), *The web of knowledge: A festschrift in honor of Eugene Garfield* (pp. 475-496). Medford, NJ: Information Today.

Jacsó, P. (2010). The impact of Eugene Garfield through the prism of Web of Science. *Annals of Library and Information Studies*, *57*, 222-247.

McCain, K. W. (2010). The view from Garfield's shoulders: Tri-citation mapping of Eugene Garfield's citation image over three successive decades. *Annals of Library and Information Studies*, *57*, 261-270.

Week 6: Analysis of productivity and citedness for research evaluation, III: Journal evaluation

* Garfield, E., & Sher, I. H. (1963). New factors in the evaluation of scientific literature through citation indexing. *American Documentation*, *14* (3), 195-201.

* Rousseau, R. (2002). Journal evaluation: Technical and practical issues. *Library Trends*, *50* (3), 418-439.

Bensman, S. J. (2007). Garfield and the impact factor. *Annual Review of Information Science and Technology*, *41*, 93-155.

Bollen, J., & van de Sompel, H. (2008). Usage Impact Factor: The effects of sample characteristics on

usage-based impact metrics. *Journal of the American Society for Information Science and Technology*, *59* (1), 136-149.

Schubert, A. (2008). Using the h-index for assessing single publications. *Scientometrics*, *78*, 559-565. doi:10.1007/s11192-008-2208-3

Falagas, M. E., & Alexiou, V. G. (2008). The top-ten in journal impact factor manipulation. *Archivum Immunologiae et Therapia Experimentalis*, *56*, 223-226.

* Bergstrom, C. T., West, J. D., & Wiseman, M. A. (2008). The Eigenfactor™ Metrics. *The Journal of Neuroscience*, *28*(45), 11433 -11434. doi:10.1523/JNEUROSCI.0003-08.2008

* Leydesdorff, L. (2009). How are new citation-based journal indicators adding to the bibliometric toolbox? *Journal of the American Society for Information Science and Technology*, *60*(7), 1327-1336. doi:10.1002/asi.21024

Archambault, É., & Larivière, V. (2009). History of the journal impact factor: Contingencies and consequences. *Scientometrics*, *79*(3), 635-649. doi:10.1007/s11192-007-2036-x

* Bollen, J., Van de Sompel, H., Hagberg, A., & Chute, R. (2009). A principal component analysis of 39 scientific impact measures. *PLoS One*, *4*(6), e6022.

Kurtz, M. J., & Bollen, J. (2010). Usage bibliometrics. *Annual Review of Information Science and Technology*, *44*, 3-64.

Examples of analyses of individual journals

Schubert, A. (2002). The web of *Scientometrics*: A statistical overview of the first 50 volumes of the journal. *Scientometrics*, *53* (1), 3-20.

Nebelong-Bonnevie, E., & Frandsen, T. F. (2006). Journal citation identity and journal citation image: A portrait of the *Journal of Documentation*. *Journal of Documentation*, *62* (1), 30-57.

Willett, P. (2009). A bibliometric study of *Quantitative Structure–Activity Relationships* and *QSAR & Combinatorial Science*. *QSAR & Combinatorial Science*, *28*, 1231-1236.

Furner, J. (2009). Forty years of the *Journal of Librarianship and Information Science*: A quantitative analysis, Part I. *Journal of Librarianship and Information Science*, *41* (3), 149-172.

Bar-Ilan, Judit. (2010). Rankings of information and library science journals by JIF and by h-type indices. *Journal of Informetrics*, *4*(2), 141-147. doi:10.1016/j.joi.2009.11.006

Week 7: Methodological issues in citation analysis

* De Bellis, N. (2009e). The philosophical foundations of bibliometrics: Bernal, Merton, Price, Garfield, and Small. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 49–73 (Chapter 3). Lanham, MD: Scarecrow Press.

* De Bellis, N. (2009f). On the shoulders of dwarfs: Citation as rhetorical device and the criticisms to the normative model. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 243–283 (Chapter 7). Lanham, MD: Scarecrow Press.

Edge, D. (1979). Quantitative measures of communication in science: A critical review. *History of Science*, *17* (2), 102-134.

* MacRoberts, M. H., & MacRoberts, B. R. (1989). Problems of citation analysis: A critical review. *Journal of the American Society for Information Science*, *40* (5), 342-349.

Baldi, S. (1998). Normative versus social constructivist processes in the allocation of citations: A network-

analytic model. *American Sociological Review*, *63* (6), 829-846.

White, H. D. (2004). Reward, persuasion, and the Sokal hoax: A study in citation identities. *Scientometrics*, *60* (1), 93-120.

* White, H. D. (2004). Citation analysis and discourse analysis revisited. *Applied Linguistics*, *25* (1), 89-116.

Nicolaisen, J. (2007). Citation analysis. *Annual Review of Information Science and Technology*, *41*, 609-641.

* Bornmann, L., & Daniel, H. D. (2008). What do citation counts measure? A review of studies on citing behavior. *Journal of Documentation*, *64* (1), 45-80.

Frandsen, T. F., & Nicolaisen, J. (2011). Praise the bridge that carries you over: Testing the flattery citation hypothesis. *Journal of the American Society for Information Science and Technology*, *62*(5), 807-818. doi:10.1002/asi.21503

* Davis, P. M., and Walters, W. M. (2011). The impact of free access to the scientific literature: A review of recent research. *Journal of the Medical Library Association*, *99* (3), 208-217.

Week 8: Bibliometric processes and explanations

* Merton, R. K. (1968). The Matthew Effect in science. *Science*, *159* (3810), 56-63.

* Price, D. J. de S. (1976). A general theory of bibliometric and other cumulative advantage processes. *Journal of the American Society for Information Science*, *27* (5/6), 292-306.

Allison, P. D., Long, J. S., & Krauze, T. D. (1982). Cumulative advantage and inequality in science. *American Sociological Review*, *47* (5), 615-625.

* Merton, R. K. (1988). The Matthew Effect in science, II: Cumulative advantage and the symbolism of intellectual property. *Isis*, *79* (4), 606-623.

Huber, J. C. (1998). The underlying process generating Lotka's Law and the statistics of exceedances. *Information Processing & Management*, *34* (4), 471-487.

* Barabási, A. L., & Albert, R. (1999). Emergence of scaling in random networks. *Science*, *286* (5439), 509-512.

Simonton, D. K. (2003). Scientific creativity as constrained stochastic behavior: The integration of product, person, and process perspectives. *Psychological Bulletin*, *129* (4), 475-494.

Watts, D. J. (2004). The "new" science of networks. *Annual Review of Sociology*, *30*, 243-270.

DiPrete, T. A., & Eirich, G. M. (2006). Cumulative advantage as a mechanism for inequality: A review of theoretical and empirical developments. *Annual Review of Sociology*, *32*, 271-297.

Börner, K., Sanyal, S., & Vespignani, Alessandro. (2007). Network science. *Annual Review of Information Science and Technology*, *41*, 537-607.

* Easley, D., & Kleinberg, J. (2010). Power laws and rich-get-richer phenomena. In *Networks, crowds, and markets: Reasoning about a highly connected world*, pp. 479-494 (Chapter 18). Cambridge: Cambridge University Press.

Week 9: Bibliometrics for mapping disciplines

* De Bellis, N. (2009g). Maps and paradigms: Bibliographic citations at the service of the history and sociology of science. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 141–179 (Chapter 5). Lanham, MD: Scarecrow Press.

Kessler, M. M. (1963). Bibliographic coupling between scientific papers. *American Documentation*, *14* (1), 10-25.

* Price, D. J. de S. (1965). Networks of scientific papers. *Science*, *149* (3683), 510-515.

Small, H. (1973). Co-citation in the scientific literature: A new measure of the relationship between two documents. *Journal of the American Society for Information Science*, *24* (4), 265-269.

White, H. D., & McCain, K. W. (1998). Visualizing a discipline: An author co-citation analysis of information science, 1972-1995. *Journal of the American Society for Information Science*, *49* (4), 327-355.

* Small, H. (1999). Visualizing science by citation mapping. *Journal of the American Society for Information Science*, *50* (9), 799-813.

Newman, M. E. J. (2004). Coauthorship networks and patterns of scientific collaboration. *Proceedings of the National Academy of Sciences of the United States of America*, *101* (suppl. 1), 5200-5205.

White, H. D. (2010). Bibliometric overview of information science. In Bates, M. J., & Maack, M. N. (Eds.), *Encyclopedia of Library and Information Sciences* (3rd ed.), pp. 534-545. Boca Raton, FL: CRC Press.

* Klavans, R., & Boyack, K. W. (2011). Using global mapping to create more accurate document-level maps of research fields. *Journal of the American Society for Information Science and Technology*, *62*(1), 1-18. doi:10.1002/asi.21444

* Cobo, M. J., López-Herrera, A. G., Herrera-Viedma, E., & Herrera, F. (2011). Science mapping software tools: Review, analysis, and cooperative study among tools. *Journal of the American Society for Information Science and Technology*, *62*(7), 1382-1402. doi:10.1002/asi.21525

Case study: Nanoscience and nanotechnology

Zucker, L. G., Darby, M. R., Furner, J., Liu, R. C., & Ma, H. (2007). Minerva unbound: Knowledge stocks, knowledge flows and new knowledge production. *Research Policy*, *36* (6), 850-863.

Maghrebi, M., Abbasi, A., Amiri, S., Monsefi, R., & Harati, A. (2010). A collective and abridged lexical query for delineation of nanotechnology publications. *Scientometrics*, *86*, 15-25. doi:10.1007/s11192-010-0304-7

Zucker, L. G., Darby, M. R., & Fong, J. (2011). *Communitywide database designs for tracking innovation impact: COMETS, STARS and Nanobank.* NBER working paper, no. 17404. Cambridge, MA: National Bureau of Economic Research.

Grieneisen, M. L., & Zhang, M. (n.d.). Nanoscience and nanotechnology: Evolving eefinitions and growing footprint on the scientific landscape. *Small*. doi:10.1002/smll.201100387

Week 10: Bibliometrics for information retrieval

* De Bellis, N. (2009h). Measuring scientific communication in the twentieth [sic] century. In *Bibliometrics and citation analysis: From the Science Citation Index to cybermetrics*, pp. 285-337 (Chapter 8). Lanham, MD: Scarecrow Press.

* Pinski, G., & Narin, F. (1976). Citation influence for journal aggregates of scientific publications: Theory with an application to the literature of physics. *Information Processing & Management*, *12* (5), 297-312.

* Brin, S., & Page, L. (1998). The anatomy of a large-scale hypertextual Web search engine. *Computer*

Networks and ISDN Systems, *30* (1-7), 107-117.

Furner, J. (2002). On recommending. *Journal of the American Society for Information Science and Technology*, *53* (9), 747-763.

Langville, A. N., & Meyer, C. D. (2005). A survey of eigenvector methods for Web information retrieval. *SIAM Review*, *47* (1), 135-161.

White, H. D. (2007a). Combining bibliometrics, information retrieval, and relevance theory, Part 1: First examples of a synthesis. *Journal of the American Society for Information Science and Technology*, *58* (4), 536-559.

White, H. D. (2007b). Combining bibliometrics, information retrieval, and relevance theory, Part 2: Some implications for information science. *Journal of the American Society for Information Science and Technology*, *58* (4), 583-605.

* Easley, D., & Kleinberg, J. (2010). The structure of the Web. In *Networks, crowds, and markets: Reasoning about a highly connected world*, pp. 333-349 (Chapter 13). Cambridge: Cambridge University Press.

* Easley, D., & Kleinberg, J. (2010). Link analysis and Web search. In *Networks, crowds, and markets: Reasoning about a highly connected world*, pp. 351-383 (Chapter 14). Cambridge: Cambridge University Press.

Castillo, C., & Baeza-Yates, R. (2010). Web retrieval and mining. In Bates, M. J., & Maack, M. N. (Eds.), *Encyclopedia of Library and Information Sciences* (3rd ed.), pp. 5615-5622. Boca Raton, FL: CRC Press.

Week 11: Finals week—MAKE-UP CLASS.
Bibliometrics for the arts and humanities

* Cronin, B., & Meho, L. I. (2009). Receiving the French: A bibliometric snapshot of the impact of "French theory" on information studies. *Journal of Information Science*, *35*(4), 398 -413. doi:10.1177/0165551508100831

* White, H. D., Boell, S. K., Yu, H., Davis, M., Wilson, C. S., & Cole, F. T. H. (2009). Libcitations: A measure for comparative assessment of book publications in the humanities and social sciences. *Journal of the American Society for Information Science and Technology*, *60*(6), 1083-1096. doi:10.1002/asi.21045

Leydesdorff, L., & Salah, A. A. A. (2010). Maps on the basis of the Arts & Humanities Citation Index: The journals Leonardo and Art Journal versus "digital humanities" as a topic. *Journal of the American Society for Information Science and Technology*, *61*(4), 787-801. doi:10.1002/asi.21303

* Kousha, K., Thelwall, M., & Rezaie, S. (2010). Can the impact of scholarly images be assessed online? An exploratory study using image identification technology. *Journal of the American Society for Information Science and Technology*, *61*(9), 1734-1744. doi:10.1002/asi.21370

* Michel, J.-B., Shen, Y. K., Aiden, A. P., et al. (2011). Quantitative analysis of culture using millions of digitized books. *Science*, *331*(6014), 176-182.

Hicks, D., & Wang, J. (2011). Coverage and overlap of the new social sciences and humanities journal lists. *Journal of the American Society for Information Science and Technology*, *62*(2), 284-294. doi:10.1002/asi.21458

* Hammarfelt, B. (2011). Citation analysis on the micro level: The example of Walter Benjamin's *Illuminations*. *Journal of the American Society for Information Science and Technology*, *62*(5), 819-830. doi:10.1002/asi.21504

Kousha, K., Thelwall, M., & Rezaie, S. (n.d.). Assessing the citation impact of books: The role of Google Books, Google Scholar, and Scopus. *Journal of the American Society for Information Science and Technology*.

Zuccala, A., & van Leeuwen, T. (n.d.). Book reviews in humanities research evaluations. *Journal of the American Society for Information Science and Technology*. doi:10.1002/asi.21588