

History G8479  
Information—Computing—Infrastructure  
Version 2.0

Graduate Colloquium

T 10:10-12

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#### Description

The course introduces the major works in the history of computing and information technologies, with particular attention to transformative methodologically important texts. Students will be likewise introduced to major current works in the history of technology and media studies. The course along the way provides an outline of the development of computing from the late nineteenth century.

#### Prerequisites

None. The course assumes only an interest in the history of computing or technology, and a willingness to go beyond textbook history. Additional readings will be available for students with substantial technical expertise or substantial expertise in science and technologies studies. Historians and more humanities-trained students should expect some challenge from the technical material, and computer scientists from the historical methodological considerations.

**A BIT LESS PROVISIONAL** The syllabus *is likely to change*, once I get to know your interests.

**Readings that are easily available online through CLIO (e.g. JSTOR or IEEE journals) are your responsibility. A few books have been ordered. The rest will be available on Courseworks in time.**

For overall orientation, a basic source is Campbell-Kelly, Martin, William Aspray, Nathan Ensmenger, and Jeffrey Yost. *Computer: A History of the Information Machine*. Boulder, CO: Westview Press, a member of the Perseus Books Group, 2014.

A large number of the best books in the history of computing and information are published by MIT Press. You can access most of them at <http://ieeexplore.ieee.org.ezproxy.cul.columbia.edu/browse/books/title/>

### **Session 1. Introduction (1/19)**

### **Session 2. Organization, Social and Computational (1/26)**

Thomas Parke Hughes, “The Evolution of Large Technological Systems,” in W. Bijker, T. P. Hughes, and T. Pinch, eds., *The Social Construction of Technological Systems* (MIT Press, 1987), pp. 51-82

Chris Kelty, *Two Bits* (Duke, 2009), chs. 1, 3, 4, 5, 7, conclusion, available at <http://twobits.net/read/>

\* Erik van der Vleuten, “Infrastructures and Societal Change: A View from the Large Technical Systems Field”, *Technology Analysis & Strategic Management* 16:3 (2004), 395–414

### **Session 3. Ideation (2/2) [AARON]**

Martin-Kelly et al., *Computer*, Ch. End of 2, 3-4. [read for overview]

Davis, *Engines of Logic*, ch 7. [Read this with some care, after you read Aspray and Martin-Campbell quickly for the overview.]

Priestley, *Science of Operations*, ch.6

Turing, "On Computable Numbers," 58-63 [end before the math gets involved if you want]

John von Neumann, "First Draft of a Report on the EDVAC," 1945; in *Annals of the History of Computing* 15(1993). [online](#)

Optional: M.D. Godfrey and D.F. Henry, "The Computer as von Neumann Planned It," *Annals of the History of Computing*, 15(1993); ENIAC technical report: <http://ftp.arl.mil/~mike/comphist/46eniac-report/>; Paul Ceruzzi, "Crossing the Divide: Architectural Issues and the Emergence of the Stored Program Computer," *Annals of the History of Computing* 19(1997):1-12.

#### **Session 4. Information: Business, Theory, Retrieval (2/9) [Joonwoo]**

JoAnne Yates, "Business Use of Information and Technology from 1880-1950," in *A Nation Transformed by Information: How Information Has Shaped the United States from Colonial Times to the Present*, ed. Alfred D. Chandler, Jr., and James Cortada (Oxford Press, 2000), pp. 107-135.

James Gleick, *The Information*, ch. 7. [basic intro]

Aspray, William F. 1985. The Scientific Conceptualization of Information: A Survey. *Annals of the History of Computing* 7 (2):117-140.

Colin Burke, readings TBA.

Bush, "As We May Think" (1945)

#### **Session 5. Cold War (2/16) [Benedict]**

Campbell-Kelley and Aspray, *Computer*, ch. 7.

"Semi-Automatic Ground Environment (SAGE)"

<https://web.archive.org/web/20050204131737/http://www.mitre.org/about/sage.htm>

Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (The MIT Press, 1996), ch. 1-4.

Optional: Robert Everett, Charles Zraket, and Herbert Bennington, "SAGE -- A Data Processing System for Air Defense." (1957), reprinted in *IEEE Annals for the History of Computing*, 5(1983)

Workshop: First thoughts on topic, questions, historical sources. In picking a topic, be sure to have a *historical* question in mind. You will not be bound to this topic and your comments can be quite informal.

### **Session 6. Cybernetics and political economy (2/23) [DANIELLE]**

Norbert Wiener, *Cybernetics; The Human Use of Human Beings*, pp. 30-44, 116-132, 155-165.

Eden Medina, *Cybernetic Revolutionaries: Technology and Politics in Allende's Chile* (Cambridge: The MIT Press, 2011), chapters tba

Slava Gerovitch, "Mathematical Machines' of the Cold War: Soviet Computing, American, Cybernetics and Ideological Disputes in the Early 1950s," *Social Studies of Science*, 2001.

### WORKSHOP

Thesis paragraph, with hypothesis at the top, supporting sub-hypotheses below, all in analytic form. No statement is allowed without "because" or some such explanatory material. No description or narrative permitted.

### **Session 7. Organizing coding (3/1) [EFRAT]**

Light, Jennifer, "When Computers Were Women," *Technology and Culture* 1999.

Brooks, Jr., Frederick P. 1982. *The Mythical Man-Month: Essays on Software Engineering*. Reading, Mass.: Addison-Wesley, pp. 13-25

Nathan Ensmenger, *The Computer Boys Take Over* (MIT, 2010), chs 1-3, 6-9.

Mahoney, "Finding a History for Software Engineering", *Annals of the History of Computing* 26,1(2004), 8-19.

### **Session 8. Silicon Valley (3/8) [ELENA]**

Margaret Pugh O'Mara, "From the Farm to the Valley: Stanford University and the San Francisco Peninsula," in *Cities of Knowledge: Cold War Science and the Search for the Next Silicon Valley* (Princeton: Princeton University Press, 2005): 97-141.

Christophe Lécuyer, *Making Silicon Valley: Innovation and the Growth of High Tech, 1930-1970* (Cambridge, Mass.: MIT Press, 2006): 129-167; 253-303.

Steve Blank, "Secret History of Silicon Valley," <http://steveblank.com/secret-history/>

Optional: Campbell-Kelley and Aspray, *Computer*, ch. 8; Campbell-Kelly, M. (2003). *From airline reservations to sonic the hedgehog: a history of the software industry* (history of computing). (MIT Press, 2003), chs 1-5; Downey, "Place of Labor in the History of Information-Technology Revolutions," *IRSH* 48 (2003), Suppl, 225-261; [online](#); Lazonick, [Globalization of the IT Labor Force](#)

### **Session 9. SPRING BREAK (3/15)**

### **Session 10. Toward the PC: Heroes and Hippies (3/22) [DANIELLE T]**

Brand, Stewart, "[Spacewar: Fanatic Life and Symbolic Death Among the Computer Bums](#)," *Rolling Stone*, Dec. 1972.

Campbell-Kelly et al. *Computer*, ch. 10

Ceruzzi, Paul, "From Scientific Instrument to Everyday Appliance: the Emergence of Personal Computers, 1970-77," *History and Technology* 13(1996):1-31.

Larry Tesler, "The Smalltalk Environment," *Byte*, August 1981, 90-147 [not as long as seems—mostly ads!]

Levy, Stephen. "Hacker Ethic," "The Homebrew Computer Club," and "Woz," in *Hackers; Heroes of the Computer Revolution* 2<sup>nd</sup> edition. (O'Reilly, 2010), pp. 27-34, 201-225, 249-274.

Optional: Ceruzzi, Paul. *History of Modern Computing* (2nd Edition), MIT 2003, chs. 7. (wiki) [another version of above]; <http://www.digibarn.com/collections/newsletters/homebrew/newsletters.html>; Bill Gates, "[Open Letter To Hobbyists](#)" *Homebrew Computer Club Newsletter* Vol. 2, issue 1 (1976); Turkle, Sherry. 1982. [The Subjective Computer: A Study in the Psychology of Personal Computation](#). *Social Studies of Science* 12 (2):173-205

### **Session 11. Arpanet to Internet (3/29) [to be rescheduled]**

(Review Kelty on ISO vs. TCP/IP)

<http://www.isoc.org/internet/history/brief.shtml>

Janet Abbate, *Inventing the Internet* (MIT Press 1999), 1-145.

Andrew L. Russell, *Open Standards and the Digital Age* (Cambridge, 2014), 197-261

Gillespie, Tarleton. "Engineering a Principle: 'End-to-End' in the Design of the Internet." *Social Studies of Science* 36(3), June 2006, pps. 427-457

Optional: Martin-Campbell and Aspray, *Computer*, ch. 11; Hauben, *Netizens*, at <http://www.columbia.edu/~rh120/>; Martin-Cambell and Daniel Garcia-Swartz, "The History of the Internet: The Missing Narratives," 2005; [online](#)

Cluetrain Manifesto (<http://www.cluetrain.com/>) and new Cluetrain Manifesto. (<http://newclues.cluetrain.com/>)

## **Session 12. Visualization and Human Computer Interaction [Eduardo] (4/5)**

JCR Licklider, "Man-Computer Symbiosis," *IRE Transactions on Human Factors in Electronics*, volume HFE-1, pages 4-11, March 1960 [DEC Archives](#)

ADDITIONAL READINGS TO BE ANNOUNCED

### WORKSHOP

Sentence outline (at minimum): thesis plus major stages in argument all sentences are hypotheses, not descriptions. Goal is the architecture of the argument. No statement is allowed without "because" or some such explanatory material. No description or narrative permitted.

## **Session 13. Changing Epistemologies: Proof and Models (4/12) [EAMONN]**

Galison, *Image and Logic*, ch. 8 "Monte Carlo Simulations"

John Agar, "What Difference Did Computers Make?" *Social Studies of Science*, 36/6, 2006: 869-907.

Stevens, Hallam. 2013. *Life Out of Sequence: A Data-Driven History of Bioinformatics*. Chicago: University of Chicago Press), chs. To follow

Paul Edwards, *A Vast Machine* (MIT Press, 2010), chs. 7 (skim technical parts), 11-13, 15, conclusion;

Optional: Donald Mackenzie, *Mechanizing proof: computing, risk, and trust*. (MIT Press, 2004), ch. 4.

#### Session 14. “Big Data” (4/19)

Acker, Amelia. “Toward a Hermeneutics of Data.” *Annals of the History of Computing, IEEE* 37, no. 3 (2015): 70–75.

boyd, danah, and Kate Crawford. “Six Provocations for Big Data.” Accessed April 29, 2014. [https://papers.ssrn.com/sol3/Delivery.cfm/SSRN\\_ID1926431\\_code1210838.pdf?abstractid=1926431&mirid=2](https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1926431_code1210838.pdf?abstractid=1926431&mirid=2).

Leonelli, Sabina. 2014. “What Difference Does Quantity Make? On the Epistemology of Big Data in Biology.” *Big Data & Society* 1, No. 1. doi:10.1177/2053951714534395.

Jones, Matthew. “Querying the Archive.” (forthcoming)

Frank Pasqual, *Black Box Society*, selections”

#### Session 15. Cyberwar, encryption and surveillance (4/26) [PETER]

[READINGS FORTHCOMING]

Diffie and Landau, “And then it all changed,” *Privacy on the Line*, (MIT), ch. 10

John Arquilla and David Ronfeldt, “Cyberwar Is Coming!” and Bruce D. Berkowitz, “Warfare in the Information Age” in *In Athena’s Camp: Preparing for Conflict in the Information Age* (1997) at [http://www.rand.org/pubs/monograph\\_reports/MR880.html](http://www.rand.org/pubs/monograph_reports/MR880.html)

Landau, Susan. “Making Sense from Snowden.” Accessed November 18, 2013. <http://privacyink.org/html/MakingSense.pdf>.

Optional: DeNardis, Laura. “The Internet Design Tension between Surveillance and Security.” *Annals of the History of Computing, IEEE* 37, no. 2 (2015): 72–83.

Books to purchase

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Ordered at Book Culture, 112<sup>th</sup> St.

Chris Kelty, *Two Bits* (Duke, 2009),

Paul Edwards, *The Closed World: Computers and the Politics of Discourse in Cold War America* (The MIT Press, 1996),

Nathan Ensmenger, *The Computer Boys Take Over* (MIT, 2010),

Janet Abbate, *Inventing the Internet* (MIT Press 1999),

Campbell-Kelly, Martin, William Aspray, Nathan Ensmenger, and Jeffrey Yost. *Computer: A History of the Information Machine*. Boulder, CO: Westview Press, a member of the Perseus Books Group, 2014.

## Evaluation

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Every student will complete the “workshop” assignments.  
Development of a thesis topic, over the course of the semester, in the workshop sessions. This will culminate in a 15-20 page research paper.  
Each student will take on a presentation.

### Grading breakdown

30% participation

15% small assignments leading to final project

10% presentation of one section

45% final project (15-20 pp. paper OR equivalent iPython research notebook or other dh project)

### Intellectual integrity:

The intellectual venture in which we are all engaged requires of faculty and students alike the highest level of personal and academic integrity. As members of an academic community, each one of us bears the responsibility to participate in scholarly discourse and research in a manner characterized by intellectual honesty and scholarly integrity.

Scholarship, by its very nature, is an iterative process, with ideas and insights building one upon the other. Collaborative scholarship requires the study of other scholars’ work, the free discussion of such work, and the explicit acknowledgement of those ideas in any work that inform our own. This exchange of ideas relies upon a mutual trust that sources, opinions, facts, and insights will be properly noted and carefully credited.



In practical terms, this means that, as students, you must be responsible for the full citations of others' ideas in all of your research papers and projects; you must be scrupulously honest when taking your examinations; you must always submit your own work and not that of another student, scholar, or internet agent.

Any breach of this intellectual responsibility is a breach of faith with the rest of our academic community. It undermines our shared intellectual culture, and it cannot be tolerated. Students failing to meet these responsibilities should anticipate being asked to leave Columbia.

### **Disability-Related Accommodations:**

To receive disability-related academic accommodations, students must first be registered with Disability Services (DS). More information on the DS registration process is available online at [www.health.columbia.edu/ods](http://www.health.columbia.edu/ods). Faculty must be notified of registered students' accommodations before exam or other accommodations will be provided. Students who have (or think they may have) a disability are invited to contact Disability Services for a confidential discussion at (212) 854-2388 (Voice/TTY) or by email at [disability@columbia.edu](mailto:disability@columbia.edu).