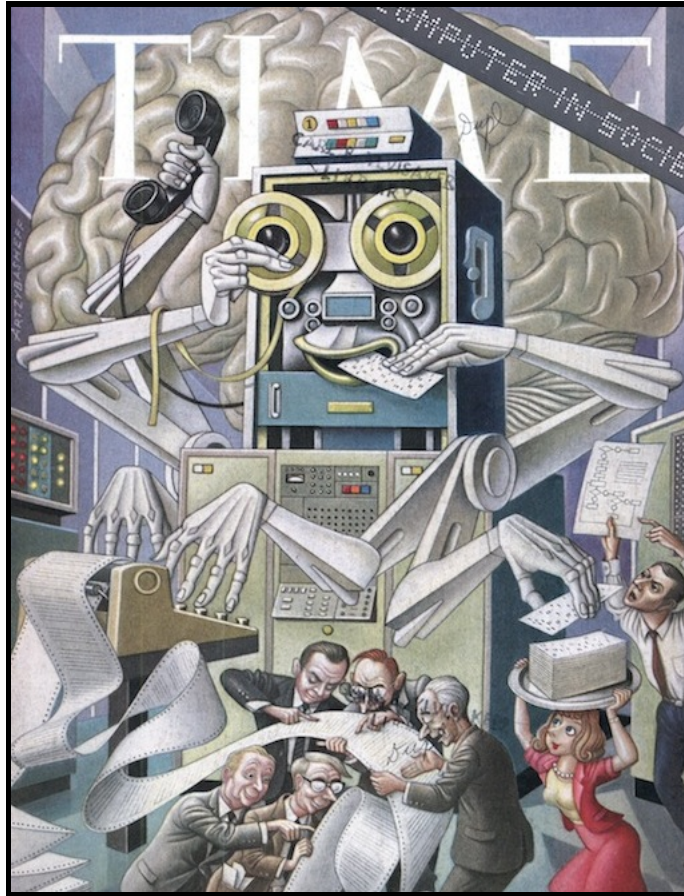


Computers & Communications

HSSC 515 • Spring 2010



The history of computing is about more than just the electronic digital computer. It is the story of a wide range of human activities, scientific practices, and technological developments. The story begins in the early 19th century with the emergence of new demands for information management – from scientific researchers, expanding government bureaucracies, and increasingly national and international corporations. It includes not only “computers” (itself a large and diverse category) but data processing, communications, and visualization technologies, as well as people, practices, and organizational structures.

In this course we will explore the history of computing in all of its forms and varieties. We will situate the computer in the broader history of technology, but also consider it from the perspectives of the history of science, labor history, and social history.

Professor Nathan L. Ensmenger
nathanen@sas.upenn.edu

Revision Date: December 21, 2009

Course Schedule:

In addition to doing the required readings and preparing for discussions, each participant will select two supplementary readings to review and present to the class.

I You say you want a revolution . . .

January 14: intro to the information age; bad historiography; planning for the future.

Required Reading(s):

Michael Mahoney, "The History of Computing in the History of Technology," *Annals of the History of Computing* 10 (1988): 113–118

Sherry Turkle, "The Subjective Computer: A Study in the Psychology of Personal Computation," *Social Studies of Science* 12, no. 2 (1982): 173–205

James R. Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Harvard University Press Cambridge, 1986)

II The Origins of the Information Age

January 21: historicizing information "revolutions"; statistics & quantification; print culture; the emergence of modern science

Required Reading(s):

Daniel Headrick, *When Information Came of Age: Technologies of Knowledge in the Age of Reason and Revolution, 1700-1850* (Oxford University Press, 2000)

Supplementary Readings/Reports:

Elizabeth Eisenstein, *The Printing Revolution in Early Modern Europe* (Cambridge University Press Cambridge, 1983); Adrian Johns, *The nature of the book: print and knowledge in the making* (University of Chicago Press, 1998); Theodore Porter, *Trust in Numbers: the pursuit of objectivity in science and public life* (Princeton University Press, 1995)

III The Annihilation of Space & Time

January 28: communications & transportation; geography & information tech

Required Reading(s):

David M. Henkins, *The Postal Age: The Emergence of Modern Communications in Nineteenth-Century America* (University of Chicago Press, 2006). Excerpts.

Alfred Chandler and James Cortada, eds., *A Nation Transformed By Information: How Information Has Shaped the United States from Colonial Times to the Present* (Oxford University Press, 2000). Excerpts.

Supplementary Readings/Reports:

Edwin Gabler, *The American telegrapher: a social history, 1860-1900* (Rutgers University Press, 1988); Gregory Downey, *Telegraph messenger boys: labor, technology, and geography, 1850-1950* (Routledge, 2002); Tom Standage, *The Victorian Internet: the remarkable story of the telegraph and the nineteenth century's on-line pioneers* (Walker / Co., 1998)

IV Computing Before the Computer . . .

February 4: the office machines industry of the 19th century; corporate control and communications; "industrializing" information

Required Reading(s):

JoAnne Yates, *Structuring the Information Age: Life Insurance and Technology in the Twentieth Century* (Johns Hopkins University Press, 2005)

Supplementary Readings/Reports:

James Cortada, *Before the Computer: IBM, Burroughs and Remington Rand and the Industry They Created, 1865-1956* (Princeton: Princeton University Press, 1993); James R. Beniger, *The Control Revolution: Technological and Economic Origins of the Information Society* (Harvard University Press Cambridge, 1986)

V The Government Machine

February 11: technology and the state; computing as metaphor; administrative control

Required Reading(s):

Lars Heide, *Punched-card systems and the early information explosion, 1880-1945* (Johns Hopkins University Press, 2009)

Supplementary Readings/Reports:

Cindy Sondik Aron, *Ladies and gentlemen of the civil service: middle-class workers in Victorian America* (Oxford University Press, 1987); Jon Agar, *The Government Machine: A Revolutionary History of the Computer* (MIT Press, 2003)

VI When Computers Were Human

February 18: scientific computing; labor; when computers were women.

Required Reading(s):

David Alan Grier, *When computers were human* (Princeton University Press, 2005)

Supplementary Readings/Reports:

Charles Yood, "Argonne National Laboratory and the Emergence of Computer and Computational Science, 1946-1992" (PhD diss., Pennsylvania State University, 2005); Atsushi Akera, *Calculating a natural world: scientists, engineers, and computers during the rise of U.S. cold war research* (MIT Press, 2007)

VII Giant Brains

February 25: computing and war; electronics and computing; control systems; cybernetics

Required Reading(s):

David A Mindell, *Between human and machine: feedback, control, and computing before cybernetics* (The Johns Hopkins University Press, 2002). Excerpts.

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

Supplementary Readings/Reports:

Kenneth Flamm, *Creating the computer government, industry, and high technology A History of Modern Computing* (Brookings Institute MIT Press, 1988); Atsushi Akera and Frederik Nebeker, eds., *From 0 to 1: an authoritative history of modern computing* (Oxford University Press, 2002); Paul Ceruzzi, *Reckoners: The Prehistory of the Digital Computer, From Relays to the Stored Program Concept, 1935-1945* (Greenwood Press Westport, CN, 1983)

VIII Reinventing the Computer

March 4: business data processing; mini-computers; innovation and venture capital; work and organizational politics

Required Reading(s):

Martin Campbell-Kelly and William Aspray, *Computer: A History of the Information Machine* (Basic Books, 1996)

Supplementary Readings/Reports:

Paul Ceruzzi, *A history of modern computing* (MIT Press, 2003)

IX Spring Break!

March 11: Woo-hoo.

X New Modes of Organization: Software & Systems

March 18: software and the socio-technical system; systems analysis and operations research; computing as business process; gender

Required Reading(s):

Martin Campbell-Kelly, *From airline reservations to Sonic the Hedgehog: a history of the software industry* (MIT Press, 2003)

Nathan Ensmenger, "Making Programming Masculine," in *Gender Codes: Women and Men in the Computing Professions* (Wiley, 2010)

Supplementary Readings/Reports:

Ulf Hashagen, Reinhard Keil-Slawik, and Arthur L. Norberg, *History of Computing - Software Issues* (Springer-Verlag, 2002); Shoshana Zuboff, *In the Age of the Smart Machine: The Future of Work and Power* (Basic Books, 1988);

XI Silicon Valley 1.0

March 25: semiconductors; computers and chemistry; geography; the military-academic-industrial complex; environmental consequences

Required Reading(s):

Ross Knox Bassett, *To the Digital Age: Research Labs, Start-Up Companies, and the Rise of Mos Technology* (Johns Hopkins, 2002)

Supplementary Readings/Reports:

Christophe Lécuyer, *Making Silicon Valley: innovation and the growth of high tech, 1930-1970* (MIT Press, 2006); AnnaLee Saxenian, *Regional advantage: culture and competition in Silicon Valley and Route 128* (Harvard University Press, 1994)

XII Hippies & Hackers

April 1: narratives; user communities; personal computers; politics; ideology

Required Reading(s):

Fred Turner, *From counterculture to cyberculture: Stewart Brand, the Whole Earth Network, and the rise of digital utopianism* (University of Chicago Press, 2006)

Supplementary Readings/Reports:

Thierry Bardini, *Bootstrapping: Douglas Englebart, Coevolution, and the Origins of Personal Computing* (Stanford University Press, 2000); Robert X Cringely, *Accidental empires: how the boys of Silicon Valley make their millions, battle foreign competition, and still can't get a date* (Addison-Wesley, 1992)

XIII Intergalactic Digital Networks

April 8: the emergence of technical standards; defense funding; network effects; utopianism

Required Reading(s):

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

Supplementary Readings/Reports:

Arthur Norberg, Judy O'Neill, and Kerry Freedman, *Transforming Computer Technology: Information Processing for the Pentagon, 1962-1986* (Johns Hopkins University Press,

1996); M. Mitchell Waldrop, *The dream machine: J. C. R. Licklider and the revolution that made computing personal* (Viking, 2001); Alex Roland and Philip Shiman, *Strategic Computing: DARPA and the Quest for Machine Intelligence, 1983-1993* (2002)

XIV The Architecture of the Internet

April 15: networked societies; big picture theories

Required Reading(s):

Manuel Castells, *The network society: a cross-cultural perspective* (Elgar, 2004). Excerpts.
Lawrence Lessig, *Code, and Other Laws of Cyberspace* (Basic Books, 1999). Excerpts.

Supplementary Readings/Reports:

Marshall McLuhan, *The Gutenberg galaxy: the making of typographic man* (University of Toronto Press, 1966); Gene Rochlin, *Trapped in the Net: The Unanticipated Consequences of Computerization* (Princeton University Press, 1997)

XV Big Finish

April 22: everything else; cyberculture; ethnographies; social science research; digital divide

Required Reading(s):

TBD.