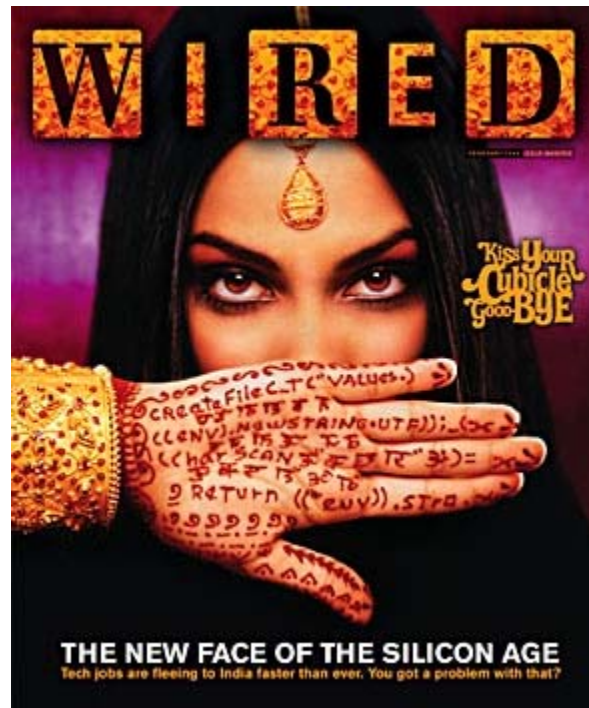


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IMAGINING THE COMPUTER, WIRING THE WORLD (STS 180)



Objectives

This is a class about the relationship between information technology and the stories we tell about it. We will critically examine five overlapping stories, with the aim of understanding how they have shaped, and been shaped by, technological changes. The course treats the past seventy years of computing somewhat chronologically, but it is primarily organized around the ebb and flow of key ideas about computing.

- ***Machines Taking Over.*** To what extent have machines replaced and reshaped human activities and experience? Computers have long been promoted as labor-saving devices, offering employers the opportunity to cut costs (and employees). Dystopian science fiction such as Kurt Vonnegut's *Player Piano* amplified this theme. The widespread adoption of computers in the workplace eventually brought transformations, but not necessarily the ones that employers expected.
- ***Becoming Cyborgs.*** Why do humans experience a real-time, symbiotic relationship with their computers? Early computers were really just giant calculators, but a few influential individuals dreamed of a human-machine symbiosis, or a cyborg. We will discuss where these visions came from, and how they contributed to the rise of more "personal" computing.

- ***Hidden Risks.*** Has computerization reduced or created new risks for society? The most innovative kinds of computing grew out of Cold War anxieties about nuclear war. Computers were designed to solve problems that no human could. But by the late 1960s, the tables had turned: computers themselves seemed risky. We will discuss the emergence of discourse about these risks, and the recurrence of this theme in events ranging from military disasters to the Toyota recall.
- ***Virtual Community.*** What notions of community have shaped computer networking and the rise of mobile communications? How, in turn, have our social selves changed with the rise of the internet and mobile technology? We will discuss the historical rationale for creating computer networks, and the unexpected consequences of modern connectivity.
- ***A World Without Borders.*** Have information and communications technologies created a world without borders? In what ways do these technologies enable new political movements and transformation, and in what ways do they reinforce existing power relations? We will discuss the influence of new media on the practices of producing and consuming news, running political campaigns, as well as the multiple ways that geographic locality continues to uphold traditional forms of governance.

We will consider how these stories are a part of the “mutual shaping” of technology and society. That is, we will examine how technology is shaped by social interests, visions, and practices, and how technology in turn shapes social values and practices.

Course Materials

Most of the course materials will be available online through CourseWork, with the exception of readings from the following books:

- Martin Campbell-Kelly and Bill Aspray, *Computer: a history of the information machine* (New York: Basic Books, 1996).
- Tracy Kidder, *The Soul of a New Machine* (New York: Modern Library, 1997).

Non-circulating copies of these books may be found and read in the Lane Room in Green Library. They are part of the HAS-DIGIT collection; see <http://library.stanford.edu/depts/green/about/rooms/lane/lanecollections.html> for a guide to location. Green Library also has several circulating copies of *Computer* and *Soul of a New Machine*, and I will place copies of each on reserve upon request. All three of these books are available through Amazon.com at reasonable cost.

Computer provides an excellent survey of the development and use of information technology, with an emphasis on the second half of the twentieth century. It was written by two scholars for a general audience, with an emphasis on developments that we take for granted today (i.e. the personal computer and world-wide web). The style is oriented towards analysis rather than story-telling.

Soul of a New Machine is a popular non-fiction book written by a talented journalist. It tells the story of the development of the first minicomputers in the 1970s. Though this may seem dated,

the issues discussed remain pertinent to computer workers today, and the book continues to sell in volume.

Requirements And Grading

Reading Responses (25%)

Required readings will average between 100-150 pages per week. As a guide, I have included the total pages of required reading for each class meeting in the schedule below. However, numbers can be deceptive, as the longer readings tend to be written for popular audiences, and come with short pages and quite entertaining prose. Some of the shorter readings may actually take more time and thought. I will post some discussion questions in advance of class to help guide you in the reading.

A short response, summarizing the reading and posing questions of your own, is due 24 hours in advance of each class meeting. Late responses may help you prepare for class, but they will not receive credit. Do your best to *synthesize* ideas from multiple readings, not to treat each of them individually. Ask yourself: what is the main theme that runs through these readings? How do they agree, or disagree, with one another? Sometimes it helps to look for the sentence that you think best captures the central theme, quote it, and explain why you chose that as central.

These short responses are not to be a recitation of every detail of the reading (you are encouraged to skim). They are also not to be a response to all (or even any) the questions that I will pose online. They ARE to be a demonstration of your original analysis and response to the assigned readings.

Class Discussion (25%)

Some of the questions that you post online will be used for in-class discussion. When you come to class, be prepared to participate actively, explaining your own questions, listening to the questions of others, and posing possible answers.

One absence will be excused, no questions asked. The second and all subsequent absences will be excused only if an illness or other personal matter requires the absence, AND permission is requested in advance, AND a 1-2 page response to the day's reading and questions is submitted within one week of the class meeting that is missed.

Final Paper and Presentation (50% Total)

There is no final exam in this class. Instead, a research paper (approximately 3000-6000 words in length) will be due at the end of finals period. The paper must treat the history of an artifact, social movement, or other aspect of modern computing, and must explicitly consider the mutual shaping of society and technology. That is, it should show how technology has shaped social practices, and how social practices have in turn shaped technology. Possible topics might include:

- iTunes
- Video games
- The one laptop per child program

- The Free Software movement
- Software outsourcing
- Text messaging
- Social networking websites (i.e. Myspace, Facebook, or SixDegrees)
- Virtual Reality games (i.e. SimCity)
- Open journal software
- Amazon.com

These are NOT your only options – just some suggestions.

The research paper is worth 50% of the final class grade, and it consists of four parts:

- Paper proposal: 10% final class grade, due Friday, April 17
- Draft Paper: 15% final class grade, due Friday, May 15
- Final Paper: 15% final class grade, due Wednesday, June 10
- Final Presentation: 10% final class grade, due Wednesday, June 10

For a more detailed description of each part of this assignment, see the “Materials” section of CourseWork.

READING AND DISCUSSION SCHEDULE

Subject to Small Changes—Dates to be revised for Future Quarter

Tuesday, 3/3: Introduction

MACHINES TAKING OVER

Thursday 4/1: When Computers were Women

Required Reading [68 pages]

- “Inventing the Computer,” Chapter 4 in *Computer*, 79-104.
- Jennifer Light, “When Computers Were Women,” *Technology and Culture* 40 (1999): 455-483.
- [ENIAC Press Release](#) - February 16, 1946.
- Edmund Callis Berkeley, “The Future: Machines that Think, and What they Might Do for Men,” in *Giant Brains: Machines That Think* (New York: John Wiley & Sons, 1949), 180-195.

Tuesday 4/6: Conservative Revolutions: IBM and the Seven Dwarfs

Required Reading [49 pages]

- “The Computer Becomes a Business Machine,” Chapter 5 in *Computer*, 105-130.
 - “The Maturing of the Mainframe,” Chapter 6 in *Computer*, 131-153.
 - D.A.Jardine, “Obituary for Operating System/360,” August 9, 1972.
<http://ldworen.net/fun/os360obit.html>
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Thursday 4/8: “Systems Men” and “Computer Boys”

Required Reading [35 pages]

- Nathan Ensmenger, “Letting the Computer Boys Take Over: Technology and the Politics of Organizational Transformation,” *International Review of Social History* 48 (2003): 153-80.
 - Thomas Haigh, “Software in the 1960s as Concept, Service, Product,” *IEEE Annals of the History of Computing* 24, no. 1 (2002): 5-13.
 - (OPTIONAL) Thomas Haigh, “Inventing Information Systems: The Systems Men and the Computer, 1950-68,” *Business History Review* 75 (2001): 15-61.
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BECOMING CYBORGS

Tuesday 4/13: Computing in Real-time

Special Discussion with Dr. Henry Lowood, Curator of Stanford’s Special Collections in the History of Science and Technology

Required Reading [70 pages]

- Paul Edwards, “SAGE,” Chapter 3 in *The Closed World: Computers and the Politics of Discourse in Cold War America* (Cambridge, MA: MIT Press, 1996), 72 -111.
 - “Reaping the Whirlwind,” Chapter 7 in *Computer*, 157-181.
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Thursday 4/15: Human-Machine Symbiosis

Required Reading [69 pages]

- “The Phenomena Surrounding Computers,” Ch 6 in *The Dream Machine*, 196-258.
 - [JCR Licklider, “Man-Computer Symbiosis,” *IRE Transactions on Human Factors in Electronics*, volume HFE-1, pages 4-11, March 1960.](#)
 - “Computer design from the programmer's viewpoint,” AFIPS Joint Computer Conferences Papers and discussions presented at the Eastern Joint Computer Conference: Modern computers: objectives, designs, applications, Philadelphia, Pennsylvania, December 3-5, 1958, pages 46-51. <http://portal.acm.org/citation.cfm?doid=1458043.1458055>
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Tuesday 4/20: Soul of a New Machine

Required Reading [125 pages]

- “New Modes of Computing,” Chapter 9 in *Computer*, 207-229.
 - Tracy Kidder, Chapters 1-3, 5, 12-13 and 15 in *The Soul of a New Machine* (Boston: Little, Brown, 1981), 1-66, 86-110, 221-248 and 268-276.
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Thursday 4/22: Getting Personal

Required Reading [86 pages]

- Sherry Turkle, “Hackers: Loving the Machine for Itself,” Chapter 6, pages 196-238 in *The Second Self: Computers and the Human Spirit* (New York: Simon and Schusters, 1984)
<http://quod.lib.umich.edu/cgi/t/text/text-idx?c=acls;idno=heb01158>
 - “The Shaping of the Personal Computer,” Chapter 10 in *Computer*, 238-258.
 - “The Shift to Software,” Chapter 11 in *Computer*, 259-82.
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HIDDEN RISKS

Tuesday 4/27: What Software Crisis?

Required Reading [~50 pages]

- Debate over Formal Proof, 1977-8
 - “Social processes and proofs of theorems and programs,” Proceedings of the 4th ACM SIGACT-SIGPLAN symposium on Principles of programming languages, 1977. 206 – 214. <http://portal.acm.org/citation.cfm?id=512970>
 - Objections from Dijkstra *Software Engineering Notes*, 3(2), 14-16
<http://portal.acm.org/citation.cfm?doid=1005888.1005890>
 - Response of DeMillo, Perlis, Lipton *Software Engineering Notes*, 3(2), 16-17
<http://portal.acm.org/citation.cfm?id=1005888.1005891>
 - Fred Brooks, “Preface,” “The Tar Pit,” and “The Mythical Man-Month,” in *The Mythical Man-Month: Essays on Software Engineering, 20th Anniversary Edition*. (Reading, MA: Addison-Wesley, 1995), 1-28.
 - Fred Brooks, “No Silver Bullet—Essence and Accidents of Software Engineering,” *Information Processing 86*. H.J. Kugler, ed. Amsterdam: Elsevier Science Publishers B.V. (North Holland): 1069-1076. (Invited paper, International Federation of Information Processing (IFIP) Congress ‘86, Dublin, Ireland, September 1986.) [Available online.](#)
 - OPTIONAL: “Software,” Chapter 8 in *Computer*, 181-205.
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Thursday 4/29: *Wargames* (1983)

Friday 4/30: Paper Proposal Due

Tuesday 5/4: Safety Critical Systems

Discuss Wargames

Required Reading [120 pages]

- Gene Rochlin, *Trapped in the Net: The Unanticipated Consequences of Computerization*, Chapters 7-10 (Princeton University Press, 1997), pp 108-184.
<http://press.princeton.edu/books/rochlin/>
- Peter Singer, *Wired for War*, (New York: Penguin Press, 2009), pp 315-359.

VIRTUAL COMMUNITY

Thursday 5/6: Creating the Intergalactic Network

Required Reading [64 pgs]

- Janet Abbate, “White Heat and Cold War: The Origins and Meanings of Packet Switching,” and “The Most Neglected Element: Users Transform the Internet,” Chapters 1 and 3, pages 7-41, 83-112 (Cambridge, MA: MIT Press, 1999).

Tuesday 5/11: From Counterculture to Cyberculture

Required Reading [56 pages]

- Fred Turner, “Virtuality and Community on the WELL,” Chap. 5 in *From Counterculture to Cyberculture* (Chicago: U. of Chicago Press, 2006), 141-74.
- William Gibson, “Burning Chrome,” in *Burning Chrome* (New York: Ace Books, 1986) 168-191.

Thursday 5/13: Life on, and off, the Screen: Social Identity and the Internet

Required Reading [37 pages]

- Sherry Turkle, “Tiny Sex and Gender Trouble,” Chapter 8 of *Life on the Screen: Identity in the Age of the Internet* (Simon and Schuster, November 1995), pp 210-232.
- Michael Hardey, “Life beyond the screen: embodiment and identity through the internet,” *The Sociological Review*, Volume 50, Number 4, November 2002 , pp. 570-585(16)

Tuesday 5/18: Constant Contact, Constant Absence

Required Reading [52 pages]

- Gerard Goggin, “Making Voice Portable: the Early History of the Cell Phone,” Chapter 2, pp 19-40. *Cell Phone Culture: Mobile Technology in Everyday Life* (Routledge, 2006).

- Sherry Turkle, “Always On, Always On You,” Chapter 10, pp 121-138 in *Handbook of Mobile Communications Studies*, James Katz (ed) (Cambridge, MA: MIT Press, 2008) <http://library.books24x7.com/toc.asp?bookid=26390>
 - Kenneth J. Gergen, “The challenge of absent presence,” Chapter 14, pp 227-41 in James Katz, *Perpetual Contact: Mobile Phones, Private Talk, Public Performance* (Cambridge University Press, 2002) <http://lib.myilibrary.com/browse/open.asp?id=43045&loc=>
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A WORLD WITHOUT BORDERS

Thursday 5/20: The Old-New Economy

Required Reading [60+ pages]

- Fred Turner, “Wired” Ch 7 *From Counterculture to Cyberculture*, (Chicago: University of Chicago Press, 2006), 207-236.
 - Esther Dyson, George Gilder, George Keyworth, and Alvin Toffler “Cyberspace and the American Dream: A Magna Carta for the Knowledge Age,” Progress and Freedom Foundation (1994) <http://www.hartford-hwp.com/archives/45/062.html> .
 - Langdon Winner, “Cyberlibertarian Myths and the Prospects for Community,” *ACM SIGCAS Computers and Society* 27, No. 3 (1997): 14-19.
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Friday 5/21 Draft Paper Due

Tuesday 5/25: Governing a Borderless World

Required Reading [86 pages]

- Jack Goldsmith and Tim Wu, *Who Controls the Internet? Illusions of a Borderless World* Chapter 1-5, p 1-85 (Available to Stanford-affiliated users online at: <http://site.ebrary.com/lib/stanford/docDetail.action?docID=10160558>
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Thursday 5/27: Liberation Technology?

Required Reading [31 pages]

- Mohammad Ibarine “Mobile Communication and Sociopolitical Change in the Arab World,” Chapter 19, pp 257-72, in *Handbook of Mobile Communications Studies*, James Katz (ed) (Cambridge, MA: MIT Press, 2008) <http://library.books24x7.com/toc.asp?bookid=26390>
 - Daniel Kreiss, “Developing the ‘Good Citizen’: Digital Artifacts, Peer Networks, and Formal Organization During the 2003-2004 Howard Dean Campaign.” *Journal of Information Technology and Politics*, 6(3): 281-297, 2009.
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Tuesday 6/1: New Media News

Required Reading [40 pages]

- Pablo Boczkowski, “Technology, monitoring and imitation in contemporary news work,” *Communication, Culture & Critique*, 2 (2009): 39-58.
<http://www3.interscience.wiley.com/cgi-bin/fulltext/122234941/PDFSTART>
- Susan Douglas, “The Turn Within: The Irony of Technology in a Globalized World,” *American Quarterly* 58, No. 4 (2006): 619-638.