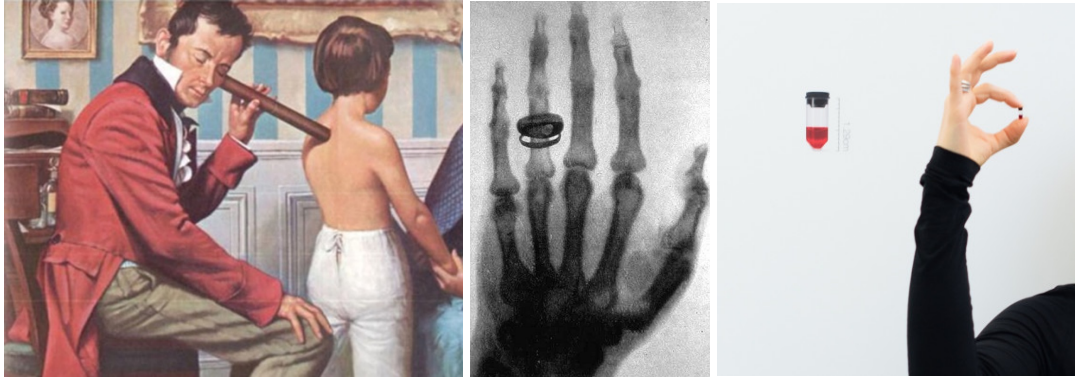


# HS 152vp – Technology and Modern Medicine: From the Stethoscope to Nanotech



Harvard University  
Department of the History of Science  
Tues and Thurs, 3pm to 4:15pm – Sever 214  
HS152vp

Yvan Prkachin  
Office Hours: TBD  
Sci Center 454

**Course Description:** Since the beginning of the nineteenth century, through the rise of modern biomedicine, the healing arts have been profoundly affected by the development, implementation and social construction of new medical technologies. What have been the effects of these new technologies on the practice of medicine, on our conception of our bodies, and on the success of medical care? This course will examine a number of these issues, and will attempt to integrate insights from the history of medicine and the history of technology. In doing so, we will try to address a number of related and important historical questions: how do we decide which medical technologies to pursue, and which to ignore? How have we balanced medical progress and technological advancement with a concern for those who are sick now? How have medical technologies been shaped by the broader culture? And, ultimately, has technology been good for medicine? Topics to be examined will include the rise of clinical medicine in early nineteenth century France and its reliance on new diagnostic technologies; visual technologies and diagnosis; microscopical technology and the emergence of bacteriology; technologies of management and the rise of the modern hospital; the x-ray and the emergence of new diagnostic technologies; the technologies of nursing and other health-care professions; antibiotics, drugs and the technologies of mass-production; technology and disease identity; technology, gender and sexuality; technology, race and genetic medicine; contraception, obstetrics and the technologies of reproduction; digital technologies and the computerization of medical records; implantation, prosthesis, and technologies of the body. Throughout the course, we will pay particular attention to the way in which medical technologies have

interacted with social categories such as race, class, gender and nationality, as well as to the unique relationship between American medicine and the world of high technology.

**Assessment:**

Attendance and Participation in Class and Discussion Sections: 20%

Blog Assignment: 20%

Midterm: 20%

Podcast Assignment: 20%

Final Exam: 20%

No prior background in the history of science or medicine is necessary.

**Participation:** This is a lecture-based course. You will be expected to complete required readings each week and reflect on them in discussion sections. The exact way in which participation will be graded is open to revision. Medical technologies are frequently in the news, and *extra participation* credit will be considered for those students who participate in the Canvas site discussion board.

**Exams:** The midterm examination will be an in-class exam, consisting of 5 short ID questions, and a short essay, for which you will have 75 minutes.

The final examination will be an open-book, take-home, consisting of two short essay questions. You will have access to course slides and readings, and you will be expected to make use of the readings in your answers. You will have 48 hours from the time the exam questions are posted to submit your answers on Canvas. Exam date TBD.

Assignment Descriptions:

**Blog Post:** You will prepare a 1000-word entry for our course blog, which will be on the history of a piece of medical technology that predates the 1930s. You should consult your Teaching Fellow to help you select an interesting piece of medical technology. Your blog post should engage not only with the technological artifact itself, but should also engaged secondary historical literature that discusses the technology; the machine/device/instrument is your 'primary source,' and you will use good secondary literature to help you 'read' your device and place it in historical context. You should explain what your piece of technology is, how it works, and how it affected medicine – did it change the doctor/patient relationship? Did it change how people experienced illness? Did it change how people thought about their bodies? Did it work? Did it change how medicine worked? Feel free to use images, video links, animation – anything to help explain your technology.

**Podcast Assignment:** You and two other classmates will collaborate on a 10-12-minute podcast about the history of a twentieth-century medical technology. You will research the technology, write a script, and record the podcast (resources to do so will be provided). You will submit your script, along with a bibliography of references, and an mp3 of the recording via the Canvas

site. With your permission, we will make the recordings available as *MED/TECH: The Harvard Medical Technologies Podcast*.

\*indicates primary source



## Course Schedule

### Part 1. Diagnosis, Technology and 'Modern' Medicine

#### Week 1

- September 3: Introduction – From the Stethoscope to...Theranos?  
No readings!
- September 5: Medicine before Technology? – Examining and Treating the Patient in the Eighteenth Century  
Rothstein, W. G. "Ch 2 - The Colonial Period." In *American Physicians in the Nineteenth Century: From Sects to Science*, 26–38. Johns Hopkins University Press, 1992.  
Case histories from *Medical Cases, selected from the Records of the Public Dispensary at Edinburgh*, 1781.

#### Week Two

- September 10: To See with a Better Eye – The Stethoscope and the Birth of the Clinic  
Kligfield, Paul. "Laennec and the Discovery of Mediate Auscultation." *American Journal of Medicine* 70 (February 1981): <https://www.theguardian.com/science/the-word/2016/feb/17/rene-laennec-stethoscope-a-new-way-of-listening-to-patients>  
OPTIONAL: Starobinski, Jean. "Gazing at Death - The Birth of the Clinic: An Archaeology of Medical Perception." Translated by Peter France. *The New York Review of Books*, January 22, 1976.  
Something from Ackerknecht.
- September 12: Microbehunters! – The Microscope and the Cellular World  
\*C. Heitzman, "The Aid which Medical Diagnosis Receives from recent discoveries in Microscopy," *Archives of Medicine* 1

“Ch 1 - Virchow and Koch: The Cell and the Self in the Age of Miasmas and Microbes.” In *Membranes: Metaphors of Invasion in Nineteenth-Century Literature, Science, and Politics*, 8–37. Baltimore: Johns Hopkins University Press, 2000.

### Week Three

- September 17: Blood, Sweat, Snot and Urine – Making the Chemical Laboratory  
Chapter 3 - Howell, J. D. *Technology in the Hospital: Transforming Patient Care in the Early Twentieth Century*. Johns Hopkins University Press, 1995.  
Coley, N. G. “Medical Chemists and the Origins of Clinical Chemistry in Britain (circa 1750-1850).” *Clinical Chemistry* 50, no. 5 (May 1, 2004): 961–72.
- September 19: The Graphic Age – Charting the Body in the Nineteenth Century  
Braun, L. “Spirometry, Measurement, and Race in the Nineteenth Century.” *Journal of the History of Medicine and Allied Sciences* 60, no. 2 (April 1, 2005): 135–69.  
OPTIONAL - Frank, Robert G. “The Telltale Heart: Physiological Instruments, Graphic Methods, and Clinical Hopes, 1854-1914.” In *The Investigative Enterprise: Experimental Physiology in Nineteenth-Century Medicine*, edited by William Coleman and Frederic L. Holmes, 211–90. Los Angeles: University of California Press, 1988.

### Week Four

- September 24: “Hidden Solids Revealed!” The X-ray in the Hospital  
Ch 4 - Howell, J. D. *Technology in the Hospital: Transforming Patient Care in the Early Twentieth Century*. Johns Hopkins University Press, 1995.
- September 26: “Roentgen's Curse”– The X-ray in Popular Culture  
Ch 5 - Kevles, B. *Naked to the Bone: Medical Imaging in the Twentieth Century*. Rutgers University Press, 1997

### Week Five

#### BLOG POST DUE AT BEGINNING OF CLASS

- October 1: A Calculus of Suffering – Anesthesia, Antisepsis and the Technologies of Surgery  
Pernick, Martin S. “The Calculus of Suffering in Nineteenth-Century Surgery.” *The Hastings Center Report* 13, no. 2 (April 1983): 26.  
Schlich, Thomas. “Negotiating Technologies in Surgery: The Controversy about Surgical Gloves in the 1890s.” *Bulletin of the History of Medicine* 87, no. 2 (2013): 170–97.
- October 3: Making the Hospital  
Ch 1, Howell, J. D. *Technology in the Hospital: Transforming Patient Care in the Early Twentieth Century*. Johns Hopkins University Press, 1995.

### Week Six

- October 8: **Midterm**

## Part 2. Treating with Technology in the Twentieth Century

October 10: Technology and the Nurse  
Ch 4 - Sandelowski, M. *Devices & Desires: Gender, Technology, and American Nursing*. University of North Carolina Press, 2000

### Week Seven

October 15: Artificial Parts, Practical Lives – Making Prosthetics  
Brown, Elspeth. “The Prosthetics of Management: Motion Study, Photography, and the Industrialized Body in World War I America.” In *Artificial Parts, Practical Lives: Modern Histories of Prosthetics*, edited by K. Ott, D. Serlin, and S. Mihm, 249–81. NYU Press, 2002.

October 17: Magic Bullets – Antibiotics and Industrial Production  
Ch 2 - Bud, R. *Penicillin: Triumph and Tragedy*. Oxford University Press, 2007

### Week Eight

October 22: Drawing Blood - Technology and Disease Identity 1  
Ch 5 Wailoo, K. *Drawing Blood: Technology and Disease Identity in Twentieth-Century America*. Johns Hopkins University Press, 2002

October 24: Technology and Disease Identity 2 – Diabetes  
Ch 2 - Feudtner, J. C. *Bittersweet: Diabetes, Insulin, and the Transformation of Illness*. University of North Carolina Press, 2003.

### Week Nine

October 29: The Artificial Women – Incubators and Reproductive Technologies  
Ch 4 - Baker, J. P., and Baker. *The Machine in the Nursery: Incubator Technology and the Origins of Newborn Intensive Care*. Johns Hopkins University Press, 1996.

October 31: Atomic Cocktail – Nuclear Medicine  
Ch 9 - Creager, A. N. H. *Life Atomic: A History of Radioisotopes in Science and Medicine*. University of Chicago Press, 2013.

### Week Ten

November 5: Artificial Organs, Real Economics – Technology and American Healthcare  
Ch 5 - Rothman, D. J., and D. J. *Beginnings Count: The Technological Imperative in American Health Care*. Oxford University Press, 1997.

November 7: Does it Work? Technology and Medical Decision Making  
No reading!

### Week Eleven

November 12: The Computer and the Medical Record  
Hedian, Greene, & Niessen. (2018). The Electronic Health Record and the Clinical Examination. *Medical Clinics of North America*, 102(3), 475-483.

<https://www.newyorker.com/magazine/2018/11/12/why-doctors-hate-their-computers>

November 14: Telemedicine  
Nicogossian, A., Pober, D., & Roy, S. (2001). Evolution of telemedicine in the space program and earth applications. *Telemedicine Journal and E-health : The Official Journal of the American Telemedicine Association*, 7(1), 1-15.

### Week Twelve

November 19: Nanotech and the Dream of Theranos  
Carreyrou, John. "Hot Startup Theranos Has Struggled With Its Blood-Test Technology; Silicon Valley Lab, Led by Elizabeth Holmes, Is Valued at \$9 Billion but Isn't Using Its Technology for All the Tests It Offers." *Wall Street Journal (Online)*. October 15, 2015. 1722076931. Business Premium Collection; Latin American Newsstream; The Wall Street Journal.  
<http://search.proquest.com.ezp-prod1.hul.harvard.edu/docview/1722076931?accountid=11311>.  
Ch 10 - Drexler, K. E., C. Peterson, and G. Pergamit. *Unbounding the Future: The Nanotechnology Revolution*. Morrow, 1991  
November 21: Guest Speaker – TBD

**Podcast assignment due 9 December**

**Final exam date TBD**

