Science, Technology, and Society in the Twentieth Century

Fall 2018 LSHV-411-01 CRN: 34625

Instructor:	John Shook, PhD	
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Dates:	Aug 29 – Dec 21, 2018	
Class Meetings:	Tue 6:30pm – 9:30pm	Intercultural Center Room 211A
Office Hours:	Tue 4pm – 6pm or by appointment	

Course Description

The development of new scientific advances and novel technologies powerfully interact with the cultural context of moral norms, social institutions, political forces, and legal regulations, which in turn shape the utilization of emerging technosciences. This course examines these engagements during the twentieth century in terms of public understanding of science and technology, ethical viewpoints on important technosciences, and the broader social impacts due to technoscience on global scales.

Course Narrative and Objectives

The course provides students in Liberal Studies with a rich understanding of the multiple roles played by the 20th Century's dominant scientific fields and the transformative technologies that those fields made possible. In approximate order, the sciences under consideration are chemistry, biology (towards human genetics and anthropology), medicine and medical technologies (arousing bioethics), psychology, atomic and quantum physics, computing and artificial intelligence, the brain sciences (arousing neuroethics), digital communications, and environmental sciences (and environmentalism).

If the 20th Century was an Age of Technology, it also was an age of reflection upon humanity's hopes and fears about our growing dependency on technology. Reflecting on the dramatic scientific and technological changes during that era is also an opportunity to reconsider the nature of science and the meaning of technology. They cannot be static or predictable matters, as if they developed by their own momentum and inner *telos* in some independent manner. Rather, their purposes are fundamentally *our* purposes, even if recognizing our complicity usually arrives later rather than sooner. In retrospect, then, we have the opportunity to ask interdisciplinary questions and consider various answers:

> How have conceptions of science and expectations for science changed during the 20th century?
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> Where have scientific research programs functioned as dynamic social forces shaping the wider reception of theoretical discoveries?
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> Why do technological imperatives – decisions about what technique or tool is urgently needed – shape the direction of scientific research as much as "rational" empirical methodologies?
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> How have technoscience developments been far from "value-free" enterprises, by manifesting principled values at every stage – from hypothesis and laboratory experiment to the consensus of a scientific community and the concrete application in a new technology?
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> What kinds of roles have the public understanding of science, and the ethical evaluation of new technoscience, played in the development and deployment of new technologies?
>
> Where can we learn lessons about when and how to examine surprising events at the frontiers of science, so we can deliberate upon our communal priorities and social agendas?

While exploring these questions, students will acquire a facility with the major scientific advances in various scientific and technological fields, along with an appreciation for the history and philosophy of

science, the history of technology, science and ethics, and the complexities of science policy. Students will also achieve individualized learning objectives. Students will:

- explore how controversies over scientific "progress" are always multi-dimensional and many-layered, rather than just a matter of "pro" or "con";
- examine different perspectives on the public's engagement with policy issues arising from scientific and technological innovations;
- imagine how scientific research agendas could have proceeded very differently under different socio-cultural conditions or divergent historical scenarios; and
- join their own voices to ongoing debates about scientific controversies by contributing their well-informed assessments for academic consideration.

Required Texts

Bowler PJ, Morus IR. *Making Modern Science: A Historical Survey.* University of Chicago Press, 2005. ISBN: 978022606860-9. (Readings listed as *MMS* in class schedule)

John Krige and Dominique Pestre. *Companion to Science in the Twentieth Century*. Routledge, 2003. ISBN: 9780415286060. (Readings listed as *CSTC* in class schedule)

Sandler RL (ed). *Ethics and Emerging Technologies*. Palgrave Macmillan, 2014. ISBN 9780230367036. (Readings listed as *EET* in class schedule)

Additional Readings: Handouts provided during the semester.

Recommended Reading

Agar J. *Science in the Twentieth Century and Beyond*. Polity Press, 2012. ISBN: 9780745634692.

Joshua Schimel. *Writing Science: How to Write Papers That Get Cited and Proposals That Get Funded*. Oxford University Press, 2011. ISBN 978-0199760244

Course Requirements

1. Class Participation. Regular participation in class discussion, and a 10-minute classroom presentation of the term paper (see below). 200 points possible. 20% of total grade.

2. Issue Brief. 1000 words, fully referenced. On a topic chosen from the issues raised during the first 2 weeks of the course. This Brief will outline the significance of a new industrial technology during 1870-1920, by either (a) lending support to optimism about the expanding powers of humanity for beneficial goals, or (b) lending supporting to pessimism about the tendency of humanity to use new powers in ways far more harmful than helpful. Your Brief must only have an optimistic, or a pessimistic, perspective. Stay close to the facts, but be as persuasive as possible to contemporary readers. 100 points possible. 10% of total grade.

3. Short Paper. 3000 words, fully referenced. On a topic of students' choice, selected from the course's topics during the first 8 weeks. This paper will recount the public reception of a specific scientific discovery: how was this discovery's significance represented to society, how did the cultural context react in response, and how were public resources mobilized to produce a new technology from that discovery?

You will first develop a one-page prospectus outlining your paper's plan, to be approved by the instructor during week 5 of the semester. The short paper is due during week 9 of the semester. 300 points possible. 30% of total grade.

4. Term Paper (5000 words minimum, fully referenced) upon a topic of students' choice, except for the scientific discovery chosen for the short paper. This term paper will focus on broader social and global implications from the deployment of a twentieth century scientific advance in concrete technological terms. Those implications should include lasting impacts on social norms and institutions, problems requiring political and/or legal action, and lingering ethical issues. A successful paper will synthesize relevant information gained throughout the course (lectures and readings), information from a selected body of secondary literature, and the student's academic background and interests. 400 points possible. 40% of total grade.

Citation Style: The APA Style (APA Publication Manual 6th Edition) is used widely in SCS courses. Consult http://pitt.libguides.com/citationhelp/APA

5. Final Grade

Total Points	Grade	Quality Points
920-1000	A	4.00
900-919	A-	3.67
881-899	B+	3.33
800-880	B	3.00
781-799	B-	2.67
761-780	C+	2.33
700-760	C	2.00
690-699	C-	1.67
680-689	D+	1.33
660-679	D	1.00
Less than 660	F	0.00

Course Policies

Students' Religious Observances: The following is university policy: Georgetown University promotes respect for all religions. Any student who is unable to attend classes or to participate in any examination, presentation, or assignment on a given day because of the observance of a major religious holiday or related travel shall be excused and provided with the opportunity to make up, without unreasonable burden, any work that has been missed for this reason and shall not in any other way be penalized for the absence or rescheduled work. Students will remain responsible for all assigned work. Students should notify professors in writing at the beginning of the semester of religious observances that conflict with their classes.

Disabilities: If you are a student with a documented disability who requires accommodations or if you think you may have a disability and want to inquire about accommodations, please contact the Academic Resource Center at 202-687-8354 or arc@georgetown.edu. Individuals with disabilities have the right to

specific accommodations that do not fundamentally alter the nature of the course. Some accommodations might include note takers, books on tape, extended time on assignments, and interpreter services among others. Students are responsible for communicating their needs to the Academic Resource Center before the start of classes to allow time to review the documentation and make recommendations for appropriate accommodations. The University is not responsible for making special accommodations for students who have not declared their disabilities and have not requested an accommodation in a timely manner. Also, the University need not modify course or degree requirements considered to be an essential requirement of the program of instruction. For the most current and up-to-date policy information, please refer to the Georgetown University Academic Resource Center website. Students are highly encouraged to discuss the documentation and accommodation process with an Academic Resource Center administrator.

Extreme weather, Emergencies, and Instructional Continuity: During inclement weather or other emergencies on a day when we are scheduled to meet face-to-face, check the university's Web site or call (202) 687-7669 for information on whether the university is open. If the university is open, this class will meet. If the university is closed, this class will meet through distance means such as online videoconferencing; check your e-mail for a message from me on how we will proceed in that situation. Due dates for written assignments submitted through Blackboard will not be changed due to campus closings. The university recently has acquired the capability to send text messages and recorded messages about emergencies to cell phones and other mobile devices. Sign up on MyAccess.

Georgetown Honor System: All students are expected to follow Georgetown's honor code unconditionally. We assume you have read the honor code material located at http://scs.georgetown.edu/academic-affairs/honor-code, and in particular have read the following documents: Honor Council Pamphlet, What is Plagiarism, Sanctioning Guidelines, and Expedited Sanctioning Process. Papers in this course will all be submitted to turnitin.com for checking. Submitting material in fulfillment of the requirements of this course means that you have abided by the Georgetown honor pledge: *In the pursuit of the high ideals and rigorous standards of academic life, I commit myself to respect and uphold the Georgetown Honor System: To be honest in any academic endeavor, and to conduct myself honorably, as a responsible member of the Georgetown community, as we live and work together.*

Plagiarism: In accord with university policy, all incidents of suspected plagiarism or other Honor Code violations will be reported to the Honor Council without fail. If the Honor Council finds that a student has plagiarized or has violated the Honor Code in any other way, the student may receive a grade of F for the course.

Turnitin.com: Students acknowledge that by taking this course all required papers can be submitted for a Textual Similarity Review to Turnitin.com for the detection of plagiarism. Use of the Turnitin.com service is subject to the terms of use agreement posted on the Turnitin.com site.

Sexual Misconduct: Title IX of the Education Amendments of 1972 ("Title IX") prohibits discrimination based on sex in any educational programs, which includes sexual harassment or any acts of sexual misconduct. Title IX requires the University, upon becoming aware of any incident of sexual harassment and misconduct to respond appropriately to protect and maintain the safety of the University community, including students, faculty, and staff. Georgetown University prohibits sexual misconduct, including sexual harassment, sexual assault, domestic/dating violence, and stalking. Discrimination based on sex, including sexual misconduct and discrimination based on pregnancy or parenting status, subverts the University's mission and threatens permanent damage to the educational experience, careers, and well-being of students, faculty, and staff. Please know that as a faculty member I am committed to supporting survivors of sexual misconduct, including relationship violence and sexual assault. However, University policy also requires me to report any disclosures about sexual misconduct to the Title IX Coordinator, whose role is to coordinate the University's response to sexual misconduct. Georgetown has a number of

fully confidential professional resources who can provide support and assistance to survivors of sexual assault and other forms of sexual misconduct. These resources include:

Jen Schweer, MA, LPC
Associate Director of Health Education Services for Sexual Assault Response and Prevention
(202) 687-0323
jls242@georgetown.edu

Erica Shirley
Trauma Specialist
Counseling and Psychiatric Services (CAPS)
(202) 687-6985
els54@georgetown.edu

More information about campus resources and reporting sexual misconduct can be found at: https://sexualassault.georgetown.edu/get-help.

Pregnancy Adjustments and Accommodations: Georgetown University is committed to creating an accessible and inclusive environment for pregnant and parenting students. Students may request adjustments based on general pregnancy needs or accommodations based on a pregnancy-related complication. Specific adjustments will be handled on a case by case basis and will depend on medical need and academic requirements. Students seeking a pregnancy adjustment or accommodation should follow the process laid out at: https://titleix.georgetown.edu/student-pregnancy.

Class Schedule

This tentative schedule is subject to change as necessary.

Week	Topic	Readings, Events
Week 1. Sept 4	Emerging Technologies, Entrenched Frameworks Novel technoscience is never entirely "new" – the development of a scientific/technological area carries along a framework of expectations and understandings about its meaning and potential.	*CSTC*: Chaps. 1, 2, 39, 42 *MMS*: Chaps. 1, 2
Week 2. Sept 11	The Industrial Revolution and Scientific Optimism World War I brought technoscience tribalism to new levels. Like Nobel's dynamite before it, and the atom bomb after it, did chemical warfare – a "weapon to end all wars" – show that science could not be rationally managed and morally trusted?	*CSTC*: Chaps. 7, 12 *MMS*: Chaps. 3 Issue Brief assignment
Week 3. Sept 18	Biology: Contesting Darwin's Legacy Is science value-neutral? Interpreting the meaning of evolution and the implications of genetics. How is humanity "supposed" to evolve? Ideology and biology. The pursuit of eugenics. Sexuality and gender. Cultural relativism.	*CSTC*: Chaps. 16, 21, 25, 35 *MMS*: Chaps. 7, 8, 13, 18
Week 4. Sept 25	Psychology and Sociology – Sciences of Mind? The separation of empirical psychology from philosophy. The use of intelligence tests during WW I. The emergence of psychiatry and new models of mental disorders. Behaviorism and determinism.	MMS: Chap. 13 Handouts: W. James, J. Watson, B.F. Skinner
Week 5. Oct 2	Miracle Drugs and Miraculous Surgeries From the doctor to the surgeon: new statuses for the medical professional. From antibiotics to the defibrillator. The controversies surrounding the first heart transplant.	*CSTC*: Chaps. 13, 23, 24 Prospectus Due
Week 6. Oct 9	After Nuremburg: Capability, Culpability and Accountability How new technoscience gives rise to new rights. Research ethics, clinical ethics, and limits on government power to administrate the pursuit of public health. The Nazi experiments. The Tuskegee Study.	*CSTC*: Chaps. 4, 22 Handouts: Nuremberg Code, Tuskegee Study
Week 7. Oct 16	Biomedicine and the rise of Medical Ethics Life-saving technologies and the prevention of death at all costs. Patient's rights and the quality of life debate. Euthanasia. Reproductive technologies. Stem cell research.	*CSTC*: Chap. 25 *MMS*: Chap. 19 *EET*: Chaps. 5, 7, 8, 9
Week 8. Oct 23	Physics, Atomics, Warfare Splitting the atom. Dual-use technologies from the military & NASA. Arms races and nuclear proliferation. Radioactive waste and nuclear meltdowns. What is "peaceful" nuclear energy?	*CSTC*: Chaps. 11, 15, 28, 30 *MMS*: Chap. 11, 20 Handouts: Einstein, Dooms-day Clock, SALT treaties
Week 9. Oct 30	Pause for Reflection Does humanity shape technology, or does technology shape humanity? *Homo faber* – the tool-user. M. Foucault on biopolitics. N. Postman: from technocracy to technopoly.	*CSTC*: Chaps. 3, 4, 9 *MMS*: Chaps. 17, 21 *EET*: Chap. 1, 4 Handouts: Postman Short Paper Due
Week 10. Nov 6	Computers: Designed as Useful Tools, and Thinking Machines? The Turing Test, the debate over computer intelligence, and the threat to the uniqueness of human consciousness and thinking. What will autonomous AI be like? Can AI be held to ethical norms?	*CSTC*: Chaps. 14, 31 *EET*: Chaps. 23, 24, 25 Handouts: A. Turing, H. Dreyfus, J. Searle
Week 11. Nov 13	Brain Science and Neuroethics The fall of dualisms: cognitive v. affective; internal v. external. Anti-representationalism. The transformation of moral psychology. The ethics of modifying the brain for enhancement.	*EET*: Chaps. 11, 12, 14–16 Handouts: moral psychology, J. Haidt

Week 12. Nov 20	<u>Communication and Information Technologies</u> From the radio and TV to the internet, communications have promised to educate and enlighten populations. How are democracy and international relations affected? Anonymity and privacy?	*EET*: Chaps.18, 19, 20, 21, 22 Handouts: Facebook, Google, Twitter
Week 13. Nov 27	Environmental Sciences and Ecological Ethics Scientific agriculture and feeding the planet. Ecology as both science and philosophy. The rise of environmentalism. GMOs. The Gaia hypothesis. Climate change and global warming.	*CSTC*: Chap. 20, 36 *MMS*: Chap. 9 *EET*: Chaps. 28, 30–33 Handouts: A. Naess, Carson
Week 14. Dec 4	<u>Popularized Science, Pseudo-Science</u> "Popular science" competes with pseudo-scientific thinking. Is the earth a living organism? Does quantum physics imply a cosmic consciousness? Will the "Singularity" of AI make us immortal?	*CSTC*: Chap. 17 *MMS*: Chap. 16 *EET*: Chap. 26 Student Presentations
Week 15. Dec 18	<u>Utopias, and Dystopias</u> Predicting our future: may be good or bad, but definitely not just more of the same.	*CSTC*: Chap. 18 *EET*: Chap. 6, 14, 15 Term Paper Due Student Presentations