

Scientific and Technological Controversies

(BASC 201)

Microbes, past & present - Code & coders/hackers

Department of Communication Studies, McGill University
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Tuesday & Thursday—2:35 PM - 3:25 PM

Office Hours = West Arts 285 by appointment

Fall 2016

Overview

This class uses the angle of controversy to introduce students to various academic and popular approaches to the social scientific and humanistic study of science and technology. The class draws on classic academic works in diverse fields, such as the history and philosophy of science, anthropology, and bio-ethics, while also integrating a broad base of engaging and accessible material (editorials, national policies on science, legal regulations, and scientific controversies to name just a number examples) that educate as well as evoke critique and transformation of the complex contemporary practices, methods, and politics of science and technology.

This year the course will be organized around two specific topics: microbes, past and present, and code and coders/hackers. Among many other themes, the course will examine: the nature of truth and paradigm shifts in science, managing epidemics through public health campaigns and software, the role of values and bias in the design of technological production and scientific discovery, fights for openness and transparency in science and technology, the politics of software algorithms and cybersecurity, surveillance, and leaking.

Class is organized around two weekly lectures and a weekly discussion-based conference session.

Readings

Most readings are available via links on this syllabus or on our course website.

David Greene, the librarian for Communication Studies, is available for support and research assistance. He can be reached at david.greene@mcgill.ca.

The following books are required and available for purchase at Paragraph Books (2220 Av McGill College):

Stuart Firestein, *Ignorance*. Oxford University Press, 2012. (also available as an e-book).

Requirements, Methods of Examination, and Grading

1. Midterm exam + Essay 30% (multiple choice and one take-home essay)
2. Exam 20% (multiple choice)
3. Eight pop quizzes 25% (the lowest of the eight will be dropped)
4. Policy Brief 25% (separate instructions provided)

Attendance at lectures and conference sections is mandatory. If you have to miss the lecture, please arrange to get notes and any videos shown in class from a classmate. All cellphones, electronic devices, and wireless connections *must be turned off for the duration of class*. **After our first midterm, computers will be banned and you will have the option of writing an extra credit essay comparing class before and after the ban.**

To ensure students keep up with the readings, we will have eight pop quizzes during the course of the semester. They will be short, ten-minute exams covering basic concepts and facts from the reading. The lowest of the six will be dropped.

GRADING

Grade Breakdown

Grade	Grade point	Percentages
A	4.0	85–100
A-	3.7	80–84
B+	3.3	75–79
B	3.0	70–74
B-	2.7	65–69
C+	2.3	60–64
C	2.0	55–59
D	1.0	50–54
F (Fail)	0	0–49

Grade Appeals

I am always happy to meet to discuss in further detail the criteria used for grading. Please come see me in office hours or make an appointment, if you would like to meet with me to clarify my standards and procedures. It is rare for me to change grades unless it was based on a calculation of error, which has happened on occasion. Academics place serious weight on the process of peer review, which is based on the ideas that qualified outsiders are the best judge of the quality and strength of work. If you would like to discuss or appeal your grade, please follow the process detailed below.

1. I will correct calculation errors, at any time with apologies.

2. Please set up an appointment or come to my office hours to seek explanation for a grade.

The most likely course of action will be to discuss improvement for subsequent assignments.

3. If a student wishes to dispute a grade, you may choose to follow the university's standard appeals process (note: if an appeal is heard at the university level, it is considered *sui generis*, meaning that the grade could stay the same, be raised or lowered and will be graded by another professor in the University).

Email Policy

During the academic year, I receive a considerable amount of email. In order for me to respond to my email efficiently, please follow the following guidelines:

1. If you cannot see me during my office hours, email me to set up an appointment; I will try to respond as soon as possible but I usually cannot accommodate a meeting in 24 or even 48 hours.

2. I read and reply to email once a day and usually do not read or reply to email after 5 PM or weekends.

3. Grade inquiries and disputes will not be considered or discussed via email. For all grade inquiries and questions about assignments, please set up an appointment with me (see above).

4. I will not reply to email inquiries regarding course matters (assignment requirements, due dates, exam structure, readings, etc.) that arise from missing class or inattention to the course syllabus. Inquiries requesting clarification will receive replies, though I would strongly prefer these inquiries to be made in class or during office hours.

Other Information and McGill Policies

Language: In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

Accommodations: Students requiring special testing accommodations or other classroom modifications should notify Prof. Coleman and the Office for Students with Disabilities as soon as possible. The OSD is located in Suite 3100, Brown Student Services Building, ph: 398-6009 (voice), 398-8198 (TDD), www.mcgill.ca/osd/.

Academic Integrity: McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism, and other academic offenses under the Code of Student Conduct and Disciplinary Procedures. (for more information, see www.mcgill.ca/students/srr/honest/.) L'université McGill attache une haute importance à l'honnêteté académique. Il incombe par conséquent à tous les étudiants de comprendre ce que l'on entend par tricherie, plagiat et autres infractions académiques, ainsi que les conséquences que peuvent avoir de telles actions, selon le Code de conduite de l'étudiant et des procédures disciplinaires (pour de plus amples renseignements, veuillez consulter le site www.mcgill.ca/students/srr/honest/).

Academic resources: Students looking for additional assistance with academic reading, study, research and writing skills should consult the McGill academic resources website at: www.mcgill.ca/students/academicresources/.

Counseling: McGill's Counseling Service provides extensive personal, academic, and career counseling to undergraduate and graduate students, including workshops on study skills, multiple-choice exams, text anxiety/stress management. They are located in Brown Student Services Bldg. 398-3601 www.mcgill.ca/counselling/. A list of groups and workshops can be found at: www.mcgill.ca/counselling/groups/

Illness: Students are responsible for material covered in all classes, including anything missed due to illness. Examinations will not be rescheduled and assignment due date extensions will not be provided, for any reason other than documented illness. Students unable to attend examinations or complete assignments due to illness are expected to contact me prior to the examination or due date by email and by phone. Appropriate documentation will be required to support requests for special consideration due to illness (see <http://www.mcgill.ca/students/advising/faq#a14>).

Schedule

The following is a “working schedule.” ***Class materials are subject to change based on the interests, understanding, and general pace of the class.*** It is your responsibility to keep on top of any schedule changes, whether you are in class or not. If you have a concern about any of the materials, please speak to me or the teaching assistants.

Week 1

September 6: Introductions

Henry Petroski, “Numeracy and Literacy: The Two Cultures and the Computer Revolution.” The Virginia Quarterly Review, Spring 1985. <http://www.vqronline.org/essay/numeracy-and-literacy-two-cultures-and-computer-revolution>

Lorretta Jackson Heyes, “We don’t need more STEM majors. We need more STEM majors with liberal arts training.” Washington Post, 2015. <https://www.washingtonpost.com/posteverything/wp/2015/02/18/we-dont-need-more-stem-majors-we-need-more-stem-majors-with-liberal-arts-training/>

Cindy May, “A Learning Secret: Don’t Take Notes with a Laptop.” Scientific American, June 3, 2014. <http://www.scientificamerican.com/article/a-learning-secret-don-t-take-notes-with-a-laptop/>

September 8: The Disorder and Ignorance of Science

Stuart Firestein, “Ignorance: How It Drives Science.” 2015. (Introduction, Chapter 1, 2)

John Dupre, “The Disorder of Things: Metaphysical Foundations of the Disunity of Science.” Proceedings and Addresses of the American Philosophical Association, 1995.

* No Conference Sections

Week 2

September 13: Ignorance continued

Stuart Firestein, "How Ignorance Drives Science." 2015 (Chapters TBD)

Abraham Flexner, "The Usefulness of Useless Knowledge." Harper's Magazine, 1962.

<https://library.ias.edu/files/UsefulnessHarpers.pdf>

Bryan Nelson, "Humpback whales around the globe are mysteriously rescuing animals from orcas." Mother Nature Network, July 30, 2016. <http://www.mnn.com/earth-matters/animals/stories/humpback-whales-around-globe-are-mysteriously-rescuing-animals-orcas>

September 15: The Limits of Enlightenment Rationality and the Question of Truth

Friedrich Nietzsche, "On Truth and Lies." Unpublished manuscript, 1873.

[http://oregonstate.edu/instruct/phl201/modules/Philosophers/Nietzsche/Truth and Lie in a n Extra-Moral Sense.htm](http://oregonstate.edu/instruct/phl201/modules/Philosophers/Nietzsche/Truth%20and%20Lie%20in%20an%20Extra-Moral%20Sense.htm)

Horst W. J. Rittel & Melvin M. Webber, "Dilemmas in a General Theory of Planning." Policy Sciences, 1973.

Conference Sections: Rationality and the Desire for Perfection, Gone Amok

Michael Sandel, "The Case Against Perfection." The Atlantic, 2014.

<http://www.theatlantic.com/magazine/archive/2004/04/the-case-against-perfection/302927/>

Watch "The Sterilization of Leilani Muir" (Glynis Whiting, 1996) and "My 93 year old Flatmate" (SBS Report, 2016) before our conference sections.

Week 3

September 20: The Politics of Language and Truth/Reality

John Colapinto, "The Interpreter: Has a remote Amazonian tribe upended our understanding of language?" The New Yorker, 2007 <http://www.newyorker.com/magazine/2007/04/16/the-interpreter-2>

Susan Sontag, "Illness as Metaphor." 1978. (excerpts)

September 22: Values in Science and Technology

Helen Nissenbaum, "Values in Technical Design." Encyclopedia of Science, Technology and Ethics, 2005. <http://www.nyu.edu/projects/nissenbaum/papers/valuesintechndesign.pdf>

Heather Douglass, "Rejecting the Ideal of Value-Free Science." Value-Free Science? Ideals and Illusions, 2007. <http://joelvelasco.net/teaching/3330/douglas-rejectingvaluefreeideal.pdf>

Conference Sections: Class Discussion

Debate and discuss this week's readings, especially Colapinto and Douglass. Yael Grauer. "Dark Patterns are designed to trick you (and they're all over the Web)." Ars Technica, 2016.

<http://arstechnica.com/security/2016/07/dark-patterns-are-designed-to-trick-you-and-theyre-all-over-the-web/>

MICROBES, PAST AND PRESENT

Week 4

September 27: Establishing Truth (is Not So Easy)

Nancy Tomes, "The Gospel Emergent." *The Gospel of Germs*, 1998.

Science Satire Serpent, "Heroes of Science-Barry J. Marshall." 2012.

<http://sciencedevil.wordpress.com/2012/12/21/hero-of-science-barry-j-marshall/>

September 29: In-Class Film

"Resistance" (Michael Graziano, 2015) screening in class.

Conference Sections: Antibiotic Resistance

Nancy Tomes, "The Gospel in Retreat: The Waning of Enthusiasm." *The Gospel of Germs*, 1998.

Hannah Landecker, "Antibiotic Resistance and the Biology of History." *Body and Society*, 2015.

Week 5

October 4: A New Paradigm Emerges

Thomas Kuhn, "The Structure of Scientific Revolutions." 1962. (Excerpts)

Ed Yong, "I Contain Multitudes: The Microbes Within Us and a Grander View of Life." 2016.

(Chapter 2)

October 6: A New Paradigm Emerges in Some Places

Alex Nading, "Evidentiary Symbiosis: On Paraethnography in Human—Microbe Relations."

Science as Culture. 2016.

Conference Sections: Rethinking the Brain/Gut/Microbe Connection

Peter Andrey Smith, "Can the Bacteria in Your Gut Explain Your Mood?" *The New York Times*

Magazine, June 23, 2015. http://www.nytimes.com/2015/06/28/magazine/can-the-bacteria-in-your-gut-explain-your-mood.html?_r=0

Christie Wilcox, "Toxoplasma's Dark Side: The Link Between Parasite and Suicide." *Scientific*

American, July 4, 2012. <http://blogs.scientificamerican.com/science-sushi/toxoplasmas-dark-side-the-link-between-parasite-and-suicide/>

Week 6

October 11: Pandemics, Microbes and Secrecy

Carlo Caduff, “Experiments of Concern.” *The Pandemic Perhaps: Dramatic Events in a Public Culture of Danger*. 2015.

Michael Specter, “The Trouble with Scientific Secrets.” *The New Yorker*, December 22, 2011.
<http://www.newyorker.com/news/news-desk/the-trouble-with-scientific-secrets>

CODE AND CODERS/HACKERS

October 13: Hackers

Gabriella Coleman, “Hacker.” *Digital Keywords*, 2016. <http://culturedigitally.org/wp-content/uploads/2016/07/Coleman-2016-Hacker-Digital-Keywords-Peters-ed.pdf>

Conference Sections: Responding to Pandemics—the Case for Open Source Software

Dr. Suerie Moon et al., “Will Ebola change the game? Ten essential reforms before the next pandemic. The report of the Harvard-LSHTM Independent Panel on the Global Response to Ebola.” *The Lancet*, November 28, 2015.

Watch “How Open Source Software, second hand laptops and hackers helped stop Ebola (and stopped an apocalypse)” (Salton Arthur Massally et al., 2015) before our conference sections.
<https://media.ccc.de/v/32c3-7561-how-open-source-software-second-hand-laptops-and-hackers-helped-stop-ebola-and-stopped-an-apocalypse>

Week 7

October 18: What is Intellectual Property Law?

Carla Hesse, “The rise of intellectual property, 700 B.C. —A.D. 2000: an idea in the balance.” *Daedalus*, 2002.

October 20: In-class Exam

Multiple-choice exam // take-home essay due at the end of class.

Conference Sections

No conference sections. Use the time to study or to relax after the exam but you are required to watch “The Internet’s Own Boy” (Brian Knappenberger, 2014). We will be discussing some of this material the following week.

<https://archive.org/details/TheInternetsOwnBoyTheStoryOfAaronSwartz>

Week 8

October 25: What Is Code? What is Free Software

Paul Ford, “What is Code?” *Bloomberg Businessweek*, June 11, 2015. (read first half)
<http://www.bloomberg.com/graphics/2015-paul-ford-what-is-code/>

Richard Stallman, "What is Free Software?" 2014. <http://www.fsf.org/about/what-is-free-software>.

October 27: Freeing Software, Open Science

Paul Ford, "What is Code?" Bloomberg Businessweek, June 11, 2015. (read second half)

<http://www.bloomberg.com/graphics/2015-paul-ford-what-is-code/>

Karl Fogel, "Free" Versus "Open Source." Producing Open Source Software, 2005.

<http://producingoss.com/en/introduction.html#free-vs-open-source>

Skype Lecture Guest: Titus Brown, Associate Professor of Population Health and Reproduction, UC Davis, open source software hacker, and open science proponent. He will be discussing the use of software in scientific discovery and how to credit programmers who write software that is increasingly indispensable for invention/discovery.

Conference Sections: How Free Should Science and Technology Be?

Alex Blumberg & Laura Sydell, "When Patents Attack." This American Life (podcast transcript),

July 22, 2011. <http://www.npr.org/sections/money/2011/07/26/138576167/when-patents-attack>

Noah Smith, "Patent Law Hold Back Science." Bloomberg, March 23, 2016.

<https://www.bloomberg.com/view/articles/2016-03-23/rigid-patent-laws-pose-risk-of-a-new-dark-ages>

Simon Oxenham, "Meet the Robin Hood of Sciences." Big Think. February 16, 2016.

<http://bigthink.com/neurobonkers/a-pirate-bay-for-science>

Discussion of the Internet's Own Boy.

Week 9

November 1: Algorithms and Accountability in Software

Julia Angwin, "Make Algorithms Accountable." The New York Times, August 1, 2016.

<http://www.nytimes.com/2016/08/01/opinion/make-algorithms-accountable.htmlh>

Tarleton Gillespie, "Algorithm." Digital Keywords, 2016. [http://culturedigitally.org/wp-](http://culturedigitally.org/wp-content/uploads/2016/07/Gillespie-2016-Algorithm-Digital-Keywords-Peters-ed.pdf)

[content/uploads/2016/07/Gillespie-2016-Algorithm-Digital-Keywords-Peters-ed.pdf](http://culturedigitally.org/wp-content/uploads/2016/07/Gillespie-2016-Algorithm-Digital-Keywords-Peters-ed.pdf)

November 3: McGill Neurological Institute and Opening Science

Class visit TBD

Daniel McCabe, "A bold experiment in open science." McGill News, May 24, 2016.

<http://publications.mcgill.ca/mcgillnews/2016/05/24/a-bold-experiment-in-open-science/>

Conference Sections: When Openness is Not Enough

Micah Zenko, "Introduction." Red Teaming, 2015.

Margaret Heffernan, "Dare to Disagree." TED Global 2012.

<https://www.ted.com/talks/margaret-heffernan-dare-to-disagree?language=en>

Week 10

November 8: Running an Open Source Business

Class lecturer: Thomas Erikson, CEO of open source firm Acquia <https://www.acquia.com/>

November 10: No class

* No Conference Sections

Week 11

November 15: Gender, Diversity, and Computing

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

Robert Sutton, "Why I Wrote the No Asshole Rule." Harvard Business Review, March 17, 2007.
<https://hbr.org/2007/03/why-i-wrote-the-no-asshole-rule>

November 17: Exam Number 2

In-class exam.

Conference Sections: Gender and Computer Science

Selena Simmons-Duffin, "Talking While Female." NPR Shots, October 24, 2014.

<http://www.npr.org/sections/health-shots/2014/10/24/357584372/video-what-women-get-flak-for-when-they-talk>

Colleen Flaherty, "Bias Against Female Instructors." Inside Higher Ed, January 11, 2016.

<https://www.insidehighered.com/news/2016/01/11/new-analysis-offers-more-evidence-against-student-evaluations-teaching>

Shankar Vedantam, "How Stereotypes Can Drive Women to Quit Science." All Things Considered (podcast transcript), July 12, 2012. <http://www.npr.org/2012/07/12/156664337/stereotype-threat-why-women-quit-science-jobs>

Week 12

November 22: Security and Code

Guest Lecturer: Oliver Bilodeau, security researcher, hacker, and co-founder of Montréhack
<http://montrehack.ca>

Micah Zenkto, "Competitors: Private Sector Read Teaming." Red Team, 2015.

CyberSquirrel, "The Threat to America's Electrical Grid is Much Bigger Than You Can Possibly Imagine." Foreign Policy, July 31, 2016. http://foreignpolicy.com/2016/07/31/the-threat-to-americas-electrical-grid-is-much-bigger-than-you-can-possibly-imagine-cyberwar-squirrels-rodents-hackers/?wp_login_redirect=0

November 24: Surveillance and Privacy

Julian Angwin, "State of Surveillance" and "Freedom of Association." Dragnet Nation, 2014.
Moxie Marlinspike, "Why 'I Have Nothing to Hide' is the Wrong Way to Think About Surveillance."
Wired, June 13, 2013. <http://www.wired.com/2013/06/why-i-have-nothing-to-hide-is-the-wrong-way-to-think-about-surveillance/>

Conference Sections: Is There Too Much Surveillance? Is CyberWar a Real Threat?

Watch "Citizen Four" (Laura Poitras, 2014) before our conference sections.
Molly Sauter, "When is a Hack an Act of War?" Motherboard, July 28, 2016.
<http://motherboard.vice.com/read/policy-directive-41-cyber-incidents>

Week 13

November 29: Anonymity in the Age of the Internet

Helen Nissenbaum, "The meaning of anonymity in an information age." The Information Society, 1999. http://www.nyu.edu/projects/nissenbaum/paper_anonimity.html
Gabriella Coleman, "Epilogue." Hacker, Hoaxer, Whistleblower, Spy, 2015.
<http://gabriellacoleman.org/wp-content/uploads/2015/11/hhws-epilogue-extract.pdf>
Nicole Bogart, "Forget anonymity: Internet trolls are more abusive when using their real names, study finds." Global News, July 29, 2016. <http://globalnews.ca/news/2855416/forget-anonymity-internet-trolls-are-more-abusive-when-using-their-real-names-study-finds/?sf32078832=1>

December 1: Whistle blowing, the Politics of Leaking, and Hackers/Journalism

Lisa Lynch. "That's Not Leaking, It's Pure Editorial: Wikileaks, Scientific Journalism, and Journalistic Expertise." The Canadian Journal of Media Studies. 2012.
<http://cjms.fms.uwo.ca/issues/special/Lynch.pdf>
Colby Itkowitz, "The heroic professor who helped uncover the Flint lead water crisis has been asked to fix it." The Washington Post, January 27, 2016.
<https://www.washingtonpost.com/news/inspired-life/wp/2016/01/26/meet-the-heroic-professor-who-helped-uncover-the-flint-lead-water-crisis/>

Conference Sections: Debating The DNC Leak

Brian Fung & Andrea Peterson, "America uses stealthy submarines to hack other countries' systems." The Washington Post, July 29, 2016. <https://www.washingtonpost.com/news/the-switch/wp/2016/07/29/america-is-hacking-other-countries-with-stealthy-submarines/>
Isaac Chotiner, "Is the DNC Hack an Act of War?" Slate, July 25, 2016.
http://www.slate.com/articles/news_and_politics/interrogation/2016/07/is_the_dnc_hack_an_act_of_war_and_is_russia_responsible.html
Kristen Eichensehr, "Cybersecurity, Elections, and Critical Infrastructure at Home and Abroad." Just Security, August 4, 2016. <https://www.justsecurity.org/32276/cybersecurity-elections-critical-infrastructure-home/>
Ron Deibert, "How foreign governments spy using PowerPoint and Twitter." The Washington

Post, August 2, 2016. https://www.washingtonpost.com/posteverything/wp/2016/08/02/how-foreign-governments-spy-using-email-and-powerpoint/?postshare=4961470138208592&tid=ss_tw