

# HPSC0061/HPSC0092 Emerging Technologies and responsible innovation

## Course Syllabus

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### Course description

This course goes inside technology to discuss its political and ethical dimensions. Technologies shape our future in powerful and largely unaccountable ways. Are they inevitable, or can we control the technologies that we get, anticipate the implications, prevent hazards and share the benefits? Is innovation a form of 'organised irresponsibility'? As science introduces new risks and ethical questions, what should governments do to control research and innovation? The course teaches students to think and write clearly and critically about new technologies. Case studies include AI, self-driving cars, geoengineering, genetic engineering and drum machines. We will use ideas from ethics, sociology of science, philosophy of technology and science policy studies. Assessment is through an essay and a pair of blog posts.

### Basic course information

Moodle Web site:	HPSC0061 (3 <sup>rd</sup> year undergraduate) or HPSC0092 (MSc)
Assessment:	Coursework 1: two blog posts (total 2,000 words) Coursework 2: essay (2,000 words) (50% each)
Timetable:	<a href="http://www.ucl.ac.uk/sts/hpsc">www.ucl.ac.uk/sts/hpsc</a>
Prerequisites:	No pre-requisites.
Required texts:	No required texts for the course overall, but particular readings are required for each week
Course tutors:	Course leader: Professor Jack Stilgoe Teaching assistants: Rokia Ballo and Santiago Guzman Gamez
Contact:	<a href="mailto:j.stilgoe@ucl.ac.uk">j.stilgoe@ucl.ac.uk</a>
Office location:	JS: 22 Gordon Square, Room 3.3
Office hours:	JS: Tuesdays, 1-2pm (in person, in the office) Wednesdays, 9am-10am (on MS Teams)

## Schedule

UCL Week	Week beginning	Topic	Activity
6	3 Oct	'Tech'	Do essential reading before each seminar
7	10 Oct	The politics of technology	
8	17 Oct	Problems, solutions and technological fixes	
9	24 Oct	Technology as a social experiment	Draft blog post one due 26 Oct
10	31 Oct	Risk and uncertainty	
12	7 Nov	Reading Week	
11	14 Nov	Expectations and hype	
13	21 Nov	Standards and platforms	
14	28 Nov	Science, technology and inequality	
15	5 Dec	Responsibility	Both blog posts due 7 Dec
16	12 Dec	Automation and music	No seminar. Optional essay discussions
			Essay due 11 Jan

## Assessments

	Description	Deadline	Word limit
<b>Blog posts</b>	Draft blog post one (submitted to the Moodle forum)	12 pm, 26 Oct	Total 2,000
	Blog posts one and two (uploaded via Turnitin)	5 pm, 7 Dec	
<b>Essay</b>	See titles below (uploaded via Turnitin)	5pm, 11 Jan	2,000

## Assignments

To be deemed 'complete' on this module, students must attempt the blog posts and the essay.

### Blog posts

The blog posts and the essay must be submitted via Moodle. Blog posts should be published

online, where they can be viewed and commented upon by others. Blog posts should be fully hyperlinked. We will discuss in class what makes for a good blog post, and students will be supported in their writing. Students will be expected to demonstrate that they have understood the ideas and approaches of the course and are able to apply them in a readable way to topical and emerging issues. They will be expected to research issues online and demonstrate this with hyperlinks. Students will be assessed on style as well as substance. The assumption will be that students' blogging skills develop over the course of the term, with help from their colleagues and course tutors.

To maximise the time for discussion in seminars, we will do most of the workshopping of blog posts online, using a Moodle forum. Students will propose blog topics early in the term to get feedback and post a draft of their first post to be read by other students.

### **Essay Titles**

1. What are the implications of the Collingridge dilemma for how we should govern new technologies?
2. Could geoengineering offer a technological fix for the problem of climate change?
3. If we think of the development of self-driving cars as a social experiment, how does this affect how the technology should be governed?
4. Does the 1975 Asilomar meeting provide a good model for governing the risks of gene editing?
5. Do new technologies tend to widen social inequalities? If so, what role could policy play?
6. Using at least two case studies (e.g. cryptocurrencies, self-driving cars, Theranos or genome editing), discuss the advantages and disadvantages of technological hype.
7. What do drum machines and the use of AI art tell us about technological unemployment?

(Students are free to suggest their own alternative essay topics, but they must be agreed with me)

### **Criteria for assessment**

The departmental marking guidelines for individual items of assessment can be found in the STS Student Handbook.

### ***Blogs***

Above these criteria, the blog posts will also be marked for the accessibility and clarity of their writing in blog posts.

### ***Essay***

In addition to the criteria indicated in the STS Student Handbook, the following are the main criteria on which your essay will be marked. There are no set numbers/ percentages associated with these criteria but we will give you qualitative feedback based on them.

#### **1. Answer the question**

Read the question carefully and answer it specifically – do not give irrelevant material or drift into answering other questions.

## **2. Organisation**

Is the essay organized into an introduction, main body and conclusion? Does each part flow naturally into the next one? Is the evidence in a logical order? Using signposting sentences (in this section I will argue that...) will help.

## **3. Introduction**

You should give an introduction to your essay in no more than one or two paragraphs. Introduce your topic and your line of argument, no more. Good introductions are concise and precise.

## **4. Clarity**

We place great emphasis on clarity of argument and expression. Avoid ambiguity and vagueness. Do not assume your reader already knows what you are talking about. Try to keep your line of argument clear. It often helps clarity to divide the main body of the essay into sections (typically three or four for a 2000 word essay). Accurate spelling, grammar, punctuation and simple, active sentence structure also improve clarity.

## **5. Argumentation**

Is the main argument of the essay clear, coherent and persuasive? Is it properly supported by the evidence available?

## **6. Conclusion**

Your essay should have a conclusion that is clearly marked as such (new paragraph, 'In conclusion...'). It should be substantial in summing up what you have argued and exploring the implications of what you have argued.

## **7. Reading/ use of sources**

How well have the readings and other resources been used? Does the essay reflect them accurately? Is the essay overly dependent on one source?

## **8. Independent critique?**

Does the essay offer some independent critique or thought on the question or does it merely report what is in the literature?

## **9. Referencing**

You must reference all quotes and all references/ summaries of books, etc. Pick one system for referencing and stick to it. Refer to individual page numbers, not just whole texts, whenever possible. Making use of ideas from or paraphrasing material without clearly referencing the original source is plagiarism and incurs serious penalties.

## **10. Bibliography**

You need to supply a bibliography of all works referenced at the end of your essay. You must supply author, title, date, place of publication and publisher.

## Aims & objectives

The aims of this course are to get students to think and write critically about the directions of science and technology, taking into account social, political, economic and ethical questions. By the end of this course, students will be familiar with a number of case studies of emerging technologies and they will be able to apply the lessons from these to other areas of science and technology. The idea is to study concepts and cases in lectures, discuss them in seminars and apply them to new areas at the frontiers of science and innovation through students' own writing. In addition to assessment via essay, the course also asks students to write accessibly and publicly, via a blog, about new technologies.

## Reading list

**Essential** readings are for discussion in class. You are expected to have read and be able to talk about the essential reading. If you have time, you should also read some of the **recommended** pieces. It is also expected that you will explore additional material to inform your blogs, essays and class discussions.

Additional readings, referred to in lectures and to inform discussion, blog posts and essays, will be put on Moodle.

## General readings

- There are some useful readings in this collection: Johnson, D. G., & Wetmore, J. M. (2009). *Technology and society: building our sociotechnical future*. MIT Press. Available [online](#)
- For an introduction to the course and so you want to know what Jack Stilgoe thinks about these issues, see Stilgoe, J (2020) *Who's Driving Innovation? New technologies and the collaborative state* (Palgrave). Available online through [UCL library](#) or here <https://link.springer.com/book/10.1007%2F978-3-030-32320-2>

### 1. 'Tech'

The first week will introduce the module's key questions, case studies and approaches. We will ask what technology does in the world and why we should care about it.

In the seminar, we will discuss our relationships with technology and what these tell us about policy.

## Essential reading

- Ch. 1 – The Power of Technology, in Jasanoff, S. (2016). *The Ethics of Invention: Technology and the Human Future*. WW Norton & Company. Available on Moodle or through Google Books
  - (While reading this, focus on the important argument near the end about intended and unintended consequences)

- Stilgoe, J. (2020) Who Killed Elaine Herzberg? Chapter one of Stilgoe, J. (2020) Who's Driving Innovation? New technologies and the collaborative state (Palgrave), reprinted here: <https://onezero.medium.com/who-killed-elaine-herzberg-ea01fb14fc5e>
  - The book is available online here:  
<https://link.springer.com/book/10.1007%2F978-3-030-32320-2>

### Recommended reading

- Rotolo, D., Hicks, D., & Martin, B. R. (2015). What is an emerging technology?. Research Policy, 44(10), 1827-1843.  
<https://www.sciencedirect.com/science/article/abs/pii/S0048733315001031>
- Kranzberg, M Technology and History: "Kranzberg's Laws", Technology and Culture Vol. 27, No. 3 (Jul., 1986), pp. 544-560, <http://journals.sagepub.com/doi/pdf/10.1177/027046769501500104>
- Feenberg, A, 2003, What Is Philosophy of Technology? <http://www.sfu.ca/~andrewf/komaba.htm>
- Langdon Winner, 1977, 'Frankenstein's Problem', Ch. 8 in Autonomous Technology <https://www.ratical.org/ratville/AoS/AutonomousTechnology.pdf>
  - (On technology as legislation. Also read the first few pages of the book to get a feel for his argument)
- Latour, B (2012) Love Your Monsters Why We Must Care for Our Technologies As We Do Our Children, Breakthrough, Feb 14, 2012  
<https://thebreakthrough.org/journal/issue-2/love-your-monsters>

## 2. The politics of technology

Do technologies have politics built into them? Can we tell in advance who is likely to benefit, what the side effects are and whether we are likely to be able to reverse course if things go wrong?

In the seminar, we will discuss the Collingridge dilemma.

Online, we will start discussing blog post topics.

### Essential reading

- David Collingridge, (1980), The Social Control of Technology, Open University Press, Chapter 1, pp. 13-21
  - (Explains the 'dilemma of control'. Pay attention to all of the examples used.)

### Recommended reading

- Latour, B writing as Johnson, J. (1988). Mixing humans and nonhumans together: The sociology of a door-closer. Social problems, 35(3), 298-310.
- Winner, L, (1980), Do Artifacts have politics, Daedalus, 109(1) pp 121-136,

<https://www.cc.gatech.edu/~beki/cs4001/Winner.pdf>

- (This paper is often discussed because of the bridges example. But the tomato harvester example is better, starting on p. 126)
- Lessig, L (2000) “Code Is Law” 181, From Code: And Other Laws of Cyberspace (New York: Basic Books, 1999), pp. 3–8; 85–90, 241–242, 254–255. Reprinted in this [online collection](https://bayanbox.ir/download/9108585351007635206/eBOOK-Deborah-G.-Johnson-Jameson-M.-Wetmore-Technology-and-Society-Building-Our-Sociotechnical-Future-Inside-Technology-2008.pdf) <https://bayanbox.ir/download/9108585351007635206/eBOOK-Deborah-G.-Johnson-Jameson-M.-Wetmore-Technology-and-Society-Building-Our-Sociotechnical-Future-Inside-Technology-2008.pdf>
- Genus, A., & Stirling, A. (2018). Collingridge and the dilemma of control: Towards responsible and accountable innovation. *Research policy*, 47(1), 61-69. <https://www.sciencedirect.com/science/article/pii/S0048733317301622>
- Dave Guston. 2008. Innovation Policy: Not Just a Jumbo Shrimp. *Nature* 454:940-41, <http://www.nature.com/nature/journal/v454/n7207/full/454940a.html>
- Stilgoe, J. (2020) Who’s Driving Innovation? New technologies and the collaborative state (Palgrave), Chapters 2 and 3 (‘Innovation Is Not Self-Driving’ and ‘The Politics of Tech’)

### 3. Problems, solutions and technological fixes

This week, we will be looking how technologies are imagined as solutions to problems. What problems can’t technology solve and what problems are caused by technological change?

In the seminar, we will talk about the relationships between social problems and technological fixes.

#### Essential reading

- Dan Sarewitz and Richard Nelson, 2008, ‘Three rules for technological fixes’, *Nature*, 2008, <https://www.nature.com/articles/456871a> (Asks how we can tell good fixes from bad)
- Weinberg, A. M. (1966). Can technology replace social engineering?. *Bulletin of the Atomic Scientists*, 22(10), 4-8. <https://bentleyhcsfa15.files.wordpress.com/2015/04/weinberg-can-technology-replace-social-engineering.pdf>

#### Recommended reading

- Ch. 1 – Solutionism and its discontents, in Morozov, E, (2013). *To Save Everything, Click Here: Technology, Solutionism, and the Urge to Fix Problems that Don't Exist*. Allen Lane
  - And other pieces Morozov has written
    - <https://www.theguardian.com/technology/2014/jul/20/rise-of-data-death-of-politics-evgeny-morozov-algorithmic-regulation>
    - <http://www.nytimes.com/2013/03/03/opinion/sunday/the-perils-of-perfection.html>
    - <https://slate.com/technology/2013/03/to-save-everything-click-here->

[how-to-vanquish-technological-defeatism.html](https://www.ieee.org/publications_standards/publications/rights/default)

- Johnston, S. F. (2018). The Technological Fix as Social Cure-All: Origins and Implications. IEEE Technology and Society Magazine, 37(1), 47-54.  
<https://ieeexplore.ieee.org/document/8307139>
- Wetmore, J. (2007) "Amish Technology: Reinforcing Values and Building Community" IEEE Technology & Society Magazine 26, no. 2 (Summer 2007): 10–21. Reprinted in this [online](https://bayanbox.ir/download/9108585351007635206/eBOOK-Deborah-G.-Johnson-Jameson-M.-Wetmore-Technology-and-Society-Building-Our-Sociotechnical-Future-Inside-Technology-2008.pdf) collection <https://bayanbox.ir/download/9108585351007635206/eBOOK-Deborah-G.-Johnson-Jameson-M.-Wetmore-Technology-and-Society-Building-Our-Sociotechnical-Future-Inside-Technology-2008.pdf>
- Stilgoe, J. (2020) Who's Driving Innovation? New technologies and the collaborative state (Palgrave), Chapter 3 ('The Politics of Tech')

#### 4. Is technology a social experiment?

This week we will be asking if the uncertainties of technology make it a form of 'social experiment'. If so, where is the laboratory and who is experimenting upon whom?

In the seminar, we will probably focus on gene drives as a case study of a social experiment. Find out what they are in advance.

#### Essential reading

- van de Poel, I. (2015). An Ethical Framework for Evaluating Experimental Technology. Science and engineering ethics, 1-20.  
<http://link.springer.com/article/10.1007/s11948-015-9724-3>

#### Recommended reading

- Wolfgang Krohn & Peter Weingart (1987). Commentary: Nuclear power as a social experiment: European political "fall out" from the Chernobyl meltdown. Science, Technology, and Human Values, 52-58.
  - (Argues that complex technologies are experimental)
- Weinberg, A. M. (1972). Science and trans-science. Minerva, 10(2), 209-222.  
<https://link.springer.com/content/pdf/10.1007/BF01682418.pdf>
  - (Discusses questions that science is asked, but is unable to answer)
- Sheila Jasanoff, (2003) "Technologies of Humility: Citizen participation in governing Science," Minerva 41:223-244, (for a quick digest of this, have a look here <http://2020science.org/2008/12/24/a-manifesto-for-socially-relevant-science-and-technology/>)
- On geoengineering...
  - Hulme, M. (2014), Can science fix climate change? A case against climate engineering, Polity Press (Preface and chapter four – 'Living in an experimental world')
- On self-driving cars...
  - Stilgoe, J (2018) Machine learning, social learning and the governance of self-

driving cars, *Social Studies of Science* 48, no. 1 (2018): 25-56.

## 5. Can we know the risks of technology?

Technologies bring risks as well as benefits. Can we know the risks we face? How safe is safe enough? And what if we don't know how to assess the risks? How should we govern these risks and uncertainties?

In the seminar, we will concentrate on the 1975 Asilomar meeting and ask whether it provides a good model for risk governance.

### Essential reading

- Ch. 2 – Risk and responsibility, in Jasanoff, S. (2016). *The Ethics of Invention: Technology and the Human Future*. WW Norton & Company.
- Dorothy Nelkin. 2001. Beyond risk: reporting about genetics in the post-Asilomar press. *Perspectives in Biology and Medicine*  
[https://muse.jhu.edu/journals/perspectives\\_in\\_biology\\_and\\_medicine/v044/44.2nelkin.pdf](https://muse.jhu.edu/journals/perspectives_in_biology_and_medicine/v044/44.2nelkin.pdf)
  - (an analysis of Asilomar in its historical and policy context)

### Recommended reading

- Charles Perrow, 1981, 'Normal Accident at Three Mile Island', *Society*, Volume 18, Number 5, 17-26, <http://www.penelopeironstone.com/Perrow.pdf>
  - (Argues that accidents are inevitable and more technology can't help)
- Ch. 3 – The ethical anatomy of disasters, in Jasanoff, S. (2016). *The Ethics of Invention: Technology and the Human Future*. WW Norton & Company.
- Jasanoff, S. (1995) 'Product, process, or programme: three cultures and the regulation of biotechnology', in M. Bauer (ed.), *Resistance to New Technology*, pp. 311–31, Cambridge University Press. <http://sheilajasanoff.stsprogram.org/wp-content/uploads/39-Product-Process-or-Programme.pdf>
- European Environment Agency, 2002, *Late lessons from early warnings*, Chapter 1: Introduction.  
[http://www.eea.europa.eu/publications/environmental\\_issue\\_report\\_2001\\_22](http://www.eea.europa.eu/publications/environmental_issue_report_2001_22)
  - (Explains the rationale for precaution)
  - The debate on precaution in this post's links is also helpful  
<https://www.theguardian.com/science/political-science/2013/jul/10/science-policy1>
- On Asilomar
  - Michael Rogers, 1975, *The Pandora's Box Congress*, *Rolling Stone* magazine, June 19th 1975  
[http://web.mit.edu/indy/www/readings/RollingStone\(189\)37.pdf](http://web.mit.edu/indy/www/readings/RollingStone(189)37.pdf)
  - Hurlbut, J. B. (2015). Limits of responsibility: genome editing, Asilomar, and the politics of deliberation. *Hastings Center Report*, 45(5), 11-14.

## 6. Expectations and hype

Science and innovation are forward-looking, and the future is unknown and profoundly uncertain. When scientists and innovators talk about the future they are therefore making political claims. We need to think about how to hold these claims to account.

In the seminar, we will consider the hype around self-driving cars and ask whether it is a good thing.

### Essential reading

- Borup, M., Brown, N., Konrad, K., & Van Lente, H. (2006). The sociology of expectations in science and technology. *Technology analysis & strategic management*, 18(3-4), 285-298.  
<http://www.tandfonline.com/doi/abs/10.1080/09537320600777002>

### Recommended reading

- Rayner, S. (2004). The novelty trap: why does institutional learning about new technologies seem so difficult? *Industry and Higher Education*, 18(6), 349-355. (UCL seems not to have this, so I've uploaded a version on Moodle)
  - (Explains how technology is often sold as 'new', until the regulators come knocking).
- Jasanoff, S. (2015) Future imperfect. Chapter one in *Dreamscapes of Modernity*, version available here <http://iglp.law.harvard.edu/wp-content/uploads/2014/10/Jasanoff-Ch-1.pdf>
- Selin C (2008). The sociology of the future: tracing stories of technology and time. *Sociology Compass*, 2(6):1878–1895.  
<https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1751-9020.2008.00147.x>
- Nathaniel Comfort, 2016. Why the hype around medical genetics is a public enemy, *Aeon*, <https://aeon.co/ideas/why-the-hype-around-medical-genetics-is-a-public-enemy>
- Campolo, A., & Crawford, K. (2020). Enchanted determinism: Power without responsibility in artificial intelligence. *Engaging Science, Technology, and Society*, 6, 1-19. <https://estsjournal.org/index.php/ests/article/view/277>
- Stilgoe, J. (2020) Who's Driving Innovation? New technologies and the collaborative state (Palgrave), Chapter 4 ('In Dreams Begins Responsibility')

## 7. Standards and platforms

New technologies are built on infrastructures, platforms and standards that are often invisible or seen as neutral. Who decides what these infrastructures and rules should look like?

In the seminar, we will hunt for and discuss the hidden rules that shape our technological lives.

### Essential reading

- Star, S. L., & Lampland, M. (2009). Reckoning with standards. In M. Lampland & S.L. Star (Eds.), Standards and their stories: How quantifying, classifying, and formalizing practices shape everyday life (pp. 3-34).  
<https://sociology.ucsd.edu/files/people/lampland/Star%20and%20Lampland%20Reckoning%20Introduction%20to%20Standards%20and%20their%20Stories.pdf>

### Recommended reading

- Gillespie, T. (2018). Platforms are not intermediaries. *Georgetown Law Technology Review*, 2(2), 198-216.
- Introduction, in Busch, L. (2011) *Standards: Recipes for Reality*, MIT Press  
<http://ieeexplore.ieee.org/xpl/bkabstractplus.jsp?bkn=6517054> (accessible with UCL ID – read “Front Matter”)
- Ch. 7 – Whose knowledge, whose property?, in Jasanoff, S. (2016). *The Ethics of Invention: Technology and the Human Future*. WW Norton & Company.

## 8. Science, technology and inequality

Technologies are often justified on the grounds that they will disrupt existing power structures and offer benefits to people who are poor or marginalised. Is this true?

In the seminar, we will ask whether science and innovation widen or narrow the gap between powerful and marginalized groups.

### Essential reading

- Andrew Russell and Lee Vinsel, 2017, *Whitey on Mars*, Aeon,  
<https://aeon.co/essays/is-a-mission-to-mars-morally-defensible-given-todays-real-needs>
  - (Argues against “trickle-down innovation”)
- Woodhouse, E., and D. Sarewitz. 2007. Science policies for reducing societal inequities, *Science and Public Policy* 34 (2): 139–150.
  - (Discusses whether technology makes inequality worse and what policies might improve things)

### Recommended reading

- Stilgoe, J. (2020) *Who’s Driving Innovation? New technologies and the collaborative state* (Palgrave), Chapter 3 (‘The Politics of Tech’)
- On AI, algorithms and data
  - Campolo, A., & Crawford, K. (2020). Enchanted determinism: Power without responsibility in artificial intelligence. *Engaging Science, Technology, and Society*, 6, 1-19. <https://estsjournal.org/index.php/ests/article/view/277>

- And, for a longer discussion, Crawford, K (2021) The Atlas of AI, Yale university press
- Benjamin, R (2019) Assessing risk, automating racism, Science, Vol 366, Issue 6464 pp. 421-422 <https://www.science.org/doi/full/10.1126/science.aaz3873>
  - Refers to a few key books, by Benjamin, Eubanks, Nelson and Noble
- Eubanks, V. (2018). Automating inequality: How high-tech tools profile, police, and punish the poor. St. Martin's Press.
- Irani, L. (2015). Justice for "data janitors". Public Books. <http://www.publicbooks.org/nonfiction/justice-for-data-janitors>
- Doctorow, C, (2020) How to destroy Surveillance Capitalism <https://onezero.medium.com/how-to-destroy-surveillance-capitalism-8135e6744d59>

## 9. Responsibility

If science and technology are powerful forces, where is the responsibility that should come with this power?

In the seminar, we will look at gene editing and ask whether scientists' own models of responsibility are an adequate response.

### Essential reading

- Hurlbut, B (2020). Imperatives of governance: human genome editing and the problem of progress. Perspectives in biology and medicine, 63(1), 177-194 <https://muse.jhu.edu/article/748059>
  - (Hurlbut was a witness to the He Jiankui episode)
  - Hurlbut is on this episode of The Received Wisdom podcast <https://shobitap.org/the-received-wisdom/2020/9/17/episode-10-envisioning-a-just-future-with-or-without-crispr-ft-ben-hurlbut>
- Douglas, H. E. (2003). The moral responsibilities of scientists (tensions between autonomy and responsibility). American Philosophical Quarterly, 59-68. <http://www.jstor.org/discover/10.2307/20010097?uid=2129&uid=2&uid=70&uid=4&sid=21101531219477>
  - (Asks what we should expect scientists to take responsibility for)

### Recommended reading

- Stilgoe, J, Owen, R and Macnaghten, P, (2013), Developing a framework for responsible innovation, Research Policy (open access) <http://www.sciencedirect.com/science/article/pii/S0048733313000930>
  - (just look at the first bit, which provides background to new approaches to responsible innovation)
- Walter D. Valdivia and David H. Guston (2015) Responsible innovation: A primer for policymakers, Brookings institution, May 2015 <http://www.brookings.edu/~media/research/files/papers/2015/05/05-responsible->

[innovation-valdivia-guston/valdivia-guston\\_responsible-innovation\\_v9.pdf](#)

- (An American, policy-focussed take on responsible innovation)
- Langdon Winner, 1977, 'Frankenstein's Problem', Ch. 8 in Autonomous Technology  
<https://www.ratical.org/ratville/AoS/AutonomousTechnology.pdf>
  - (Also read the first few pages of the book to get a feel for his argument)
- Latour, B (2012) Love Your Monsters: Why We Must Care for Our Technologies As We Do Our Children, Breakthrough, Feb 14, 2012  
<https://thebreakthrough.org/journal/issue-2/love-your-monsters>
- Kirksey, E (2020) The mutant project, Bristol University Press
  - An insider's account of the He Jiankui controversy
  - See his lecture here <https://www.youtube.com/watch?v=YG4jBt0kgL4>

## 10. Automation and music

The final week asks how the use of new technologies change musical outputs, musical taste, and musical labour.

No seminars this week, as it's the last one of term. Instead, we will be doing essay drop-ins where students can discuss readings, essay questions and essay plans.

### Essential Reading

- Iverson Jennifer (2021) TR-808: Race, Groove, and Drum Machines,  
<https://music.uchicago.edu/news/jennifer-iverson-tr-808-race-groove-and-drum-machines>

### Additional Reading

- Frey, C. B., & Osborne, M. A. (2017). The future of employment: How susceptible are jobs to computerisation?. Technological forecasting and social change, 114, 254-280.  
<https://www.sciencedirect.com/science/article/abs/pii/S0040162516302244>
  - (a simplistic, problematic but highly influential account of possible technological unemployment)

## Course expectations

In addition to submitting assessed material, students are expected to watch all lectures, join all seminar discussions and critically read all essential readings. They are expected to be able to discuss the essential reading each week and be willing to discuss the lecture content. Students are expected to conduct online research into areas of new technology. Students are also expected to publish blog posts online so that other members of the class can read them.

## Important policy information

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Details of college and departmental policies relating to modules and assessments can be found in the STS Student Handbook [www.ucl.ac.uk/sts/handbook](http://www.ucl.ac.uk/sts/handbook)

All students taking modules in the STS department are expected to read these policies.