

HPSC0006

Science Policy

Course Syllabus

2019-20 session | Dr Cian O'Donovan | c.o'donovan@ucl.ac.uk

This course offers an introduction to social and political thinking about the role of science and technology in society and the relationship between science and government. Science plays a vital role in shaping policy and society. At the same time, social, cultural and political forces shape the production of scientific knowledge.

We will focus on developments in science policy, using case studies and current theory in science policy research and STS, asking questions such as: What is the role of the state in regulating, promoting and financing science? What makes an expert? Should scientists be the only ones to make decisions about the direction of scientific research?

Everyone attends two lectures and one tutorial per week.

Basic course information

Moodle Web site:	https://moodle.ucl.ac.uk/course/view.php?id=7415
Assessment:	One piece of coursework (2,500 words) (50%) and one exam (50%)
Timetable:	https://timetable.ucl.ac.uk/
Prerequisites:	No prerequisites
Required texts:	No required texts
Course tutor(s):	Course convenor: Dr Cian O'Donovan Teaching assistant: Alessandro Allegra
Contact:	c.o'donovan@ucl.ac.uk a.allegra@ucl.ac.uk
Web:	https://www.ucl.ac.uk/sts/people/dr-cian-odonovan
Office location:	22 Gordon Square, lower ground floor room
O'Donovan office hours:	Tuesdays 12:00-14:00

Aims & objectives

This course aims to introduce students to social and political thinking about science. Students will explore a range of case studies against a backdrop of theory in order to understand science as a social and political process; how science is funded; what science policy is and how it affects our lives; how decisions about science and technology are made; as well as thinking about questions such as: what makes an expert? Should scientists be involved in the policy-making process on science and technology; and to what extent should scientists be held to account in terms of their research?

By the end of this course students will:

- Be able to identify the main themes of science policy studies
- Be able to criticise simplistic and popular notions of the relationship between science, technology and society
- Have detailed knowledge of a number of case studies in science policy (and, in particular, the social and political dimensions of the cases)
- Have developed research skills through the seminar work and course assessment

Schedule

UCL Week	Lecture week	Topic	Lecture Dates
20	1	Why science policy matters	13 and 14 Jan
21	2	Big Science	20 and 21 Jan
22	3	21 st Century science policy	27 and 28 Jan
23	4	The sociology of science	3 and 4 Jan
24	5	Risk and uncertainty	10 and 11 Feb
25	6	Reading Week	17 Feb
26	7	Science, gender, inequalities	24 and 25 Feb
27	8	Science and expert advice	2 and 3 Mar
28	9	Science, technology and innovation	9 and 10 Mar
29	10	Science policy in global context	16 and 17 Mar
30	11	Open access and open science	23 and 24 Mar
DEADLINE: Essay			25 March 2020

Assessments

Summary	Description	Deadline	Word limit
Essay (50%)	Question from essay list in this syllabus	5pm Wed 25 March 2020	2,500 maximum
Exam (50%)	3 Hours	Summer Term	n/a

Assignments

The assessment for this course consists of one essay and an exam. Essays should have a maximum of 2,500 words (worth 50% of your final mark). The third piece of assessment takes the form of a 3 hour unseen exam, worth 50% of your final mark.

Key readings are listed in this document but there are ADDITIONAL reading suggestions for your essays on Moodle. You are expected to read widely for your essays.

Essays must be submitted via Moodle. Please indicate the topic or question number in your file title.

Essays should be minimum 12 point type and 1.5 line spaced. You should have a list of references at the end (which are not part of the word count).

ESSAY – choose one question

1. How should public spending priorities on science, technology and innovation in the UK be decided?
2. The Prime Minister's policy advisors have recently advocated that the UK to adopt a big science model inspired by the US agency, DARPA. Do you agree with this proposal? Discuss benefits and risks.
3. In recent decades, research funders have promoted inter- and transdisciplinary research as a response to societal problems such as climate change. How does the idea of 'Mode 2' knowledge production explain these trends in research policy?
4. Can scientists participate in social movement organisations such as Extinction Rebellion and still practice 'good' science? Discuss some of the issues that arise from such participation with reference to Merton's norms.
5. Using examples, explain how the risks posed by science and technology can be understood in different ways and discuss consequences.
6. How can science expertise in policy making exclude lay-people? What are the implications?
7. Why does the 'leaky pipe-line' for women in science continue to be a problem?
8. In 'Automating Inequality', Eubanks makes the case that technology is used to implement 'policy by other means'. Discuss the implications of this.
9. How can scientists in the UK continue to participate in global science after Brexit? Give specific policy-relevant examples.

Criteria for assessment

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

READING LIST

This section provides details of the readings for each week. Under essential reading I have listed papers or chapters that I expect you to read before the lectures and tutorials in order to understand the material. There is also recommended reading if you have time. Additional reading for the seminars, essays and exam will be posted on Moodle where appropriate. I encourage you to also do your own research to find readings and sources that are not included here.

You should also start taking an interest in live science policy debates. Have a look at these sources:

Podcasts:

- The Received Wisdom: <https://podcasts.apple.com/us/podcast/the-received-wisdom/id1476334065>
- Flash Forward. <https://flashforwardpod.com>
- Your Undivided Attention <https://humanetech.com/podcast/>
- Everything Hertz <https://everythinghertz.com/>
- Digital Science <https://www.digital-science.com/resources/podcasts/>

Blogs

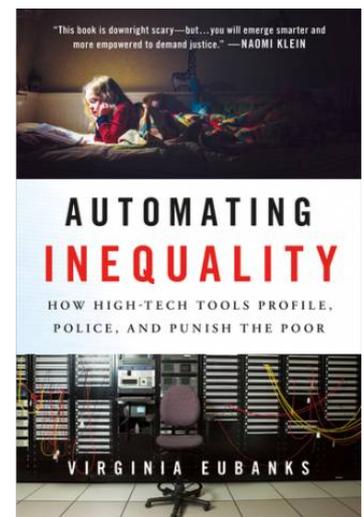
- <http://blogs.nature.com/news/>
- <http://news.sciencemag.org/scienceinsider/>
- <https://www.genderportal.eu/blog>
- <http://blogs.royalsociety.org/in-verba/>
- <https://www.nesta.org.uk/blog/>
- <http://www.softmachines.org/>
- <https://rogerpielkejr.com/>



The STS 1 Book

Each year, STS asks all students and staff to read one book as a community. Virginia Eubanks' "Automating Inequality" is the STS1Book for 2019-20. We will be drawing examples from this book in various lectures and seminars throughout the year, so please do have a read.

More info here: <https://www.ucl.ac.uk/sts/sts-current-students/sts1book-programme>



Note: Readings for lectures beyond week three will be subject to minor alterations prior to the start of term.

Week one

Why science policy matters

Science and technology are vital parts of social and political life, but they are often overlooked by politicians and the media. In the first week, we'll be looking at why science matters, why it matters for policy and why policy matters for science. We'll also start to think about what features make science and technology similar to and different from other areas of policy.

Essential reading

- Henderson, M (2012) The Geek Manifesto: Why science matters, Corgi (Chapter 2 – Geeking the vote)
- ...also read this blog post, <http://jackstilgoe.wordpress.com/2012/11/30/should-there-be-more-scientists-in-parliament/>

Recommended reading:

1. Mazzucato, M. (2013) The Entrepreneurial State, Anthem (Chapter 5 – The state behind the iPhone)
2. Pielke, R. A. (2007) The Honest Broker: Making sense of science in policy and politics, Cambridge (Chapter 3 on science and decision making)

Policy documents

1. Tony Blair, 'Science Matters' speech, 2002, <http://www.ukpolitics.org.uk/node/1863>

Week two

Big Science and the evolution of science policy

The shape and size of science changed hugely during the twentieth century. Rich countries spend vastly more money on science than they did before World War 2. Science has got big.

Essential reading:

- Capshew, JH and Rader, K (1992), 'Big Science: Price to the Present' in A. Thackray (ed.), Science after '40, Special edition of the journal Osiris (1992) 7, pp.3-25 (electronic copy available on Moodle)

Recommended reading

1. Hughes, J (2002), The Manhattan Project: Big Science and the Atom Bomb, Icon Books (Chapters 1 and 2)
2. Flanagan, K. and Keenan, M. (1998) 'Trends in UK science policy' in Cunningham, P. (ed.) Science and Technology in the United Kingdom Cartermill, available here...
<https://www.escholar.manchester.ac.uk/api/datastream?publicationPid=uk-ac-man-scw:3b4379&datastreamId=FULL-TEXT.PDF>
3. Sarewitz, D (1996) Frontiers of Illusion. Temple University press (Chapter 1: The end of the age of physics)

Week three

21st century science policy

In the 21st Century, science is seen as a vital source of economic growth, but the financial crisis of 2008 has forced countries to cut spending. Why should we spend money on science when there are other pressing needs? The ways in which money is allocated to science are changing. Politicians and the public want to know more about how their money is being spent. Are we moving from 'Mode 1' to 'Mode 2' science?

Essential reading

- Reid, G (2014) Why should the taxpayer fund science and research?, Report for the National Centre for Universities and Business, <https://www.ucl.ac.uk/public-policy/why-should-taxpayer-fund-science-and-research>

Recommended reading

1. Hessels, LK and van Lente, H (2008), 'Re-thinking new knowledge production: A literature review and a research agenda', Research Policy 37(4):740-760

Policy documents

2. Ensuring a successful UK research endeavour A Review of the UK Research Councils by Paul Nurse, November 2015
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/478125/BIS-15-625-ensuring-a-successful-UK-research-endeavour.pdf
3. Our plan for growth: Science and innovation, BIS and Treasury, December 2014 (A "Long Term strategy to make the UK the best place in the world for science and business"),
<https://www.gov.uk/government/publications/our-plan-for-growth-science-and-innovation>

Week four

The sociology of science

Scientists and philosophers offer explanations for how scientific knowledge is supposed to progress. Sociologists of science instead ask what science is really like and how it is really done. Does it live up to the ideal image that we are often presented with? Are there alternative ways of knowing and if so, what are the implications?

Essential reading

- Sismondo, S (2004), *An Introduction to Science and Technology Studies* (Oxford: Blackwell) Chapter 3 (Questioning Functionalism in the Sociology of Science) (on Moodle)

Recommended reading

1. Merton, RK (1973), 'The Normative Structure of Science', in *The Sociology of Science* (Chicago: University of Chicago Press), Chapter 13 pp267-278 [TC 1264].
2. Nowotny, H., & Schot, J. (2018). It Could Be Otherwise: Social Progress, Technology and the Social Sciences. *Technology's Stories*, available from <https://www.technologystories.org/it-could-be-otherwise-social-progress-technology-and-the-social-sciences/>
3. Visvanathan, S. (2006). Alternative Science. *Theory, Culture & Society*, 23(2–3), 164–169.

Week five

Risk and uncertainty

Science and technology have vast potential benefits. But this increased power also brings new risks. We may be able to calculate these risks, or we may be completely uncertain.

Essential reading

- European Environment Agency (2002) Late lessons from early warnings, Chapter 1 - Introduction.
http://www.eea.europa.eu/publications/environmental_issue_report_2001_22

Recommended reading

1. Lupton, D (1999), *Risk* (Routledge). (Chapters 1 and 2). (Introduction to the sociology of risk).
2. Weinberg, A. M. (1972). Science and trans-science. *Minerva*, 10(2), 209-222.

Week six

READING WEEK

No lectures or seminar this week.

Week seven

Science and gender

Women are underrepresented in science. There are many ways of thinking about the causes and effects of this pattern? How do structures and cultures of science lead to discrimination? Are science and technology are in some way 'masculine'? How might insights into science and gender translate to other underrepresented groups?

Essential reading

- Schiebinger, L (2007) Getting more women into science. Knowledge issues. Harvard Journal of Law and Gender, available here
http://www.law.harvard.edu/students/orgs/jlg/vol302/365-378_Schiebinger.pdf

Recommended reading

1. Saini, Angela. 2017. *Inferior: How Science Got Women Wrong and the New Research That's Rewriting the Story*. London: Harper Collins. Specifically, the *Introduction* and *Chapter 4 The Missing Five Ounces of the Female Brain*.
[Note: This is the STS OneBook for 2018-19, see <https://www.ucl.ac.uk/sts/sts-current-students/sts1book-programme>]
2. Schiebinger, L (1999), *Has Feminism Changed Science?* (Harvard) (Chapter 4 'The Clash of Cultures) [Electronic Version Available]

Policy document

3. Campaign for Science and Engineering, 2014, *Improving Diversity in STEM*,
<http://sciencecampaign.org.uk/CaSEDiversityinSTEMreport2014.pdf>

Week eight

Science, expert advice and policy-making

Scientists are often asked to help government with particular policy questions as expert advisers. This relationship is not straightforward. Scientists do not simply 'speak truth to power'.

Essential Reading:

- Jasanoff, S. (1990) The fifth branch: science advisors as policy makers, Harvard University Press (First chapter)

Recommended reading

1. Pielke, R. A. (2007) The Honest Broker: Making sense of science in policy and politics Cambridge (Chapters 1 and 2)
2. Sarewitz, D. (2004). How science makes environmental controversies worse. Environmental science & policy, 7(5), 385-403.
<http://www.sciencedirect.com/science/article/pii/S1462901104000620>
3. **See also the chapters in this collection:**
Doubleday, R., & Wilsdon, J. (2013). Future directions for scientific advice in Whitehall.
<http://www.csap.cam.ac.uk/media/uploads/files/1/fdsaw.pdf>
(particularly chapters by Jasanoff, Mulgan and Pielke)

Policy documents

4. BIS (2010) Guidelines on the use of engineering and scientific advice in policy making https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/293037/10-669-gcsa-guidelines-scientific-engineering-advice-policy-making.pdf

Week nine

Science, technology and innovation

Thinking about technology is different from thinking about science, even if we can't draw a clear line between the two. How is science related to technology? Is technology just 'applied science' or is it more complicated? And is innovation always a good thing?

Essential reading

- Chang, H-J (2011) The washing machine has changed the world more than the internet has, 'Thing 4' in 23 things they don't tell you about capitalism, Penguin (on Moodle)

Recommended reading

1. Stirling, A., O'Donovan, C., & Ayre, B. (2018). Which Way? Who says? Why? Questions on the Multiple Directions of Social Progress. Available at <http://www.technologystories.org/which-way-who-says-why-questions-on-the-multiple-directions-of-social-progress/>
2. Brooks, H (1994) 'The relationship between science and technology'. Research Policy, 23, 477-486, <http://sjbae.pbworks.com/f/brooks%2B1994.pdf>

Week ten

Science policy in a global context

Science, innovation and the production of knowledge has never been confined to the research labs of Europe and North America. Science is being done in new ways in many places. Are European and American science under threat from emerging science powerhouses such as China and India or is global science good for everyone? And what role does science and technology policy play in addressing global challenges such as the Sustainable Development Goals.

Essential Reading:

- Caroline Wagner, 2008, *The new invisible college: Science for development*, Brookings institution press, chapter 1, available online, http://www.brookings.edu/~media/press/books/2008/newinvisiblecollege/newinvisiblecollege_chapter.pdf

Recommended reading:

1. The STEPS Centre. (2010). *Innovation, Sustainability, Development: A New Manifesto*. Brighton: The STEPS Centre. Available from http://steps-centre.org/aneumanifesto/wp-content/uploads/steps-manifesto_small-file.pdf
2. UN SDN 2015, Chapter 1: Getting to know the Sustainable Development Goals. Available from <https://sdg.guide/chapter-1-getting-to-know-the-sustainable-development-goals-e05b9d17801>

Week eleven

Open access and open science

The growth of the Internet has prompted some scientists and others to push for greater openness – improved access to scientific information and new ways of doing science online.

Essential reading (two short pieces on 'Climategate')

- Hulme (2013) Extract from Chapter 50 in Exploring climate change through science and in society: an anthology of Mike Hulme's essays, interviews and speeches, Routledge, chapter available here <http://www.mikehulme.org/wp-content/uploads/2013/06/Extract-from-Chapter-50-Climategate.pdf>
- Hulme, M and Ravetz, J (2009) Show Your Working: What Climategate means, BBC News <http://news.bbc.co.uk/1/hi/8388485.stm>

Recommended reading

On Open Access

1. Peter Suber, 2012, Open Access, Chapter 1, free online here http://mitpress.mit.edu/sites/default/files/titles/content/9780262517638_Open_Access_PD_F_Version.pdf

On Open Science

2. Michael Nielsen, Reinventing Science, Chapter 1, free online here <http://press.princeton.edu/chapters/s9517.pdf>

Policy documents

3. The Finch Report (2012) – Accessibility, sustainability, excellence: how to expand access to research publications. <http://www.researchinfonet.org/wp-content/uploads/2012/06/Finch-Group-report-FINAL-VERSION.pdf>
4. Royal Society (2012) *Science as an Open Enterprise* https://royalsociety.org/~media/royal_society_content/policy/projects/sape/2012-06-20-saoe.pdf (electronic copy available on Moodle)

Course expectations

In order to be deemed 'complete' on this module students must attempt both essays and the exam.

Important policy information

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

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