

# HPSC0006

## Science, policy and politics

### Course Syllabus

2021-22 session | Professor Jack Stilgoe | [j.stilgoe@ucl.ac.uk](mailto:j.stilgoe@ucl.ac.uk)

This course introduces 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?

## Basic course information

Moodle Web site:	<a href="https://moodle.ucl.ac.uk/course/view.php?id=7415">https://moodle.ucl.ac.uk/course/view.php?id=7415</a>
Assessment:	One short essay (1,000 words) and one long essay (2,500 words)
Timetable:	<a href="https://timetable.ucl.ac.uk/">https://timetable.ucl.ac.uk/</a>
Prerequisites:	No prerequisites
Required texts:	No required texts
Course tutor(s):	Course convenor: Professor Jack Stilgoe Teaching assistant: Ryan Francis
Contact:	<a href="mailto:j.stilgoe@ucl.ac.uk">j.stilgoe@ucl.ac.uk</a>
Office location:	22 Gordon Square, room 3.3
Office hours:	Mondays 1-3pm

## 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	Topic	Seminar Dates
20	1. Why science policy matters	10 January
21	2. Big Science	17 Jan
22	3. 21 <sup>st</sup> Century science policy	24 Jan
23	4. The sociology of science	31 Jan
24	5. Risk and uncertainty	7 Feb
25	<b>Reading Week – First essay due</b>	
26	6. Scientific advice to policy	21 Feb
27	7. Science, gender, inequalities	28 Feb
28	8. Science, technology and innovation	7 Mar
29	9. Science and social movements	14 Mar
30	10. Science policy in global context	21 Mar

**End of term – Second essay due after holidays**

## Assessments

Summary	Description	Deadline (to be confirmed)	Word limit
Short Essay (50%)	Question from essay list in this syllabus	Wed 16 Feb, 5pm	1,000 words maximum
Long Essay (50%)	Question from essay list in this syllabus	Wed 20 April, 5pm	2,500 words maximum

## Assignments – Read Carefully

The assessment for this course consists of one short essay and one long essay. Short essays should have a maximum of 1000 words. Long essays should have a maximum of 2,500 words (2,273 words +/- 10%).

**Key and recommended readings** are listed in this document. You should not attempt to read all the recommended reading – be selective and be guided by the way you want to address the essay question. Also, don't expect to read everything in the same amount of depth (be guided by the terms 'essential', 'recommended', 'additional'). That said, you are expected to read widely to demonstrate a broad and extensive knowledge of the topic. There is no set number of references that make a good essay – but the short essay should use 3-4 references as a guideline.

*The two essays must be on different topics.*

For the short essay you can tackle a question we have not yet reached in class – this will be taken into account in the marking where it will be assumed that you have done the readings only and no other asynchronous or synchronous work on that topic.

### Essay

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). *While you can include examples from non-academic sources such as newspaper reports etc, essays that do not cite material from the reading list are unlikely to score well.*

There is advice and guidance on reading and writing at university level on the module Moodle page under 'Assessment'.

**ESSAY – choose one question for your short essay and one question for your long essay**

1. Briefly outline the main features of 'big science'. What is the significance of the Manhattan Project in understanding the development of 'big science'?
2. How should public spending priorities on science, technology and innovation in the UK be decided?
3. Research funders now promote inter- and transdisciplinary research as a response to societal problems such as climate change. How does the idea of 'Mode 2' knowledge production explain this trend in research policy?
4. Is the conduct of science governed by Mertonian norms?
5. What are the limits of risk assessment when it comes to risks produced by science and technology?
6. Why does policymaking for issues like the Covid-19 pandemic involve more than just "following the science"?
7. Why should policymakers attempt to fix the 'leaky pipe-line' for women in science?
8. Using examples, explain how technology is related to science
9. 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 the literature on science and social movements and Merton's norms.
10. As China, India and other countries increase their investments in science, how should UK policymakers respond?

**Criteria for assessment**

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

<https://www.ucl.ac.uk/sts/sites/sts/files/sts-student-handbook.pdf>

## 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. There is also recommended reading if you have time and for your written assignments. Additional reading for the seminars and essays 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:

- *Nature*. Stick to the science: When science gets political <https://www.nature.com/articles/d41586-020-03067-w>
- The Received Wisdom <https://podcasts.apple.com/us/podcast/the-received-wisdom/id1476334065>
- Flash Forward <https://flashforwardpod.com>
- Everything Hertz <https://everythinghertz.com/>

### 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/>

## 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) [On Moodle site]
- ...also read this blog post, <http://jackstilgoe.wordpress.com/2012/11/30/should-there-be-more-scientists-in-parliament/>

#### Recommended reading:

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

#### Policy documents

- Tony Blair, 'Science Matters' speech, 2002, <https://www.ukpol.co.uk/tony-blair-2002-science-matters-speech/>

#### Additional Reading

- BBC Website (2017): The iPhone at 10: How The iPhone Got So Smart: <http://www.bbc.com/news/business-38320198>
- Wilsdon, J. Wynne, B. and Stilgoe, J. (2005) 'The Public Value of Science: Or how to ensure that science really matters' Demos, London (Chapter 1), <http://www.demos.co.uk/files/publicvalueofscience.pdf>
- Bowler, P and Morus, I (2005), 'The Organisation of Science' in Making Modern Science: A Historical Survey (Chicago: Uni. Chicago Press) (Chapter 14) (UCL Library E-book)
- Francis Bacon, The New Atlantis (1624/1627) in Bacon, The Advancement of Learning, and, New Atlantis, edited by Arthur Johnston (Oxford: Clarendon Press, 1974) – pages 239-247 only. (available online from Project Gutenberg, <https://www.gutenberg.org/files/2434/2434-h/2434-h.htm> (Read from "God bless thee, my son; I will give thee the greatest jewel I have. For I will impart unto thee, for the love of God and men, a relation of the true state of Salomon's House" to the end).
- Turner, F (1978), 'The Victorian Conflict between Science and Religion: A Professional Dimension', *Isis* 69(3):356-376.
- Turner, F (1980), 'Public Science in Britain, 1880-1919', *Isis* 71(4):589-608

## 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

- Hughes, J (2002), *The Manhattan Project: Big Science and the Atom Bomb*, Icon Books (Chapter 5) (Module E-reading list on Moodle)
- Flanagan, K. and Keenan, M. (1998) 'Trends in UK science policy' in Cunningham, P. (ed.) *Science and Technology in the United Kingdom*, available here...  
<https://www.escholar.manchester.ac.uk/api/datastream?publicationPid=uk-ac-man-scw:3b4379&datastreamId=FULL-TEXT.PDF>
- Sarewitz, D (1996) *Frontiers of Illusion*. Temple University press (Chapter 1: The end of the age of physics) [E-book UCL Library]

#### Additional Reading

##### On big science

- Ravetz, J (2006), *The No-Nonsense Guide to Science*, New Internationalist, (Chapter 4 'Little Science, Big Science, Mega Science') (E-book UCL Library)
- Weinberg, Alvin M. (21 July 1961). "Impact of Large-Scale Science on the United States". *Science* 134 (3473): 161–164.
- Vermeulen, N., Parker, J.N., & B. Penders (2010). '[Big, Small or Mezzo?: Lessons from Science Studies for the ongoing debate about 'Big' versus 'Little' Science](#)'. *EMBO reports*, 11, 420-423.

##### On science policy trends

- Kaiser, D (2019), 'Discovery is always political' *Nature* **573**, 487-490 (2019)
- <https://www.nature.com/articles/d41586-019-02848-2>
- Gummert P (1991), "The Evolution of Science and Technology Policy: A UK Perspective", *Science and Public Policy* Vol.18 No.1 pp31-37. (Good short overview, unfortunately ends in 1990). <http://spp.oxfordjournals.org/content/18/1/31.abstract>
- Hull, A (1999), 'War of Words: The Public Science of the British Scientific Community and the Origins of the Department of Scientific and Industrial Research 1914-16', *British Journal for History of Science* 32:461-81.
- Edgerton, D. (2009) 'The Haldane Principle and other invented traditions in science policy' (available online at: <http://www.historyandpolicy.org/policy-papers/papers/the-haldane-principle-and-other-invented-traditions-in-science-policy> )
- Weinberg, B. A. (2009). An Assessment of British Science over the Twentieth Century'. *The Economic Journal*, 119(538), F252-F269.

## Week three

### 21<sup>st</sup> century science policy

In the 21<sup>st</sup> Century, science is seen as a vital source of economic growth, but the financial crisis of 2008 forced some countries to cut spending. Why should taxpayers' money be spent 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.praxisauril.org.uk/sites/praxisunico.org.uk/files/NCUB%20why%20should%20the%20taxpayer%20fund%20science%20and%20research.pdf>

#### Recommended reading

- 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
- Kealey, T, (2013) 'The Case against Public Science', Cato Unbound. <http://www.cato-unbound.org/2013/08/05/terence-kealey/case-against-public-science> (A more recent version of Kealey's libertarian argument against public science funding)

#### Policy documents

- UK Innovation Strategy: leading the future by creating it, UK Government, 2021 <https://www.gov.uk/government/publications/uk-innovation-strategy-leading-the-future-by-creating-it>
- Royal Society (2010) *The Scientific Century: Securing our future prosperity* [http://royalsociety.org/uploadedFiles/Royal\\_Society\\_Content/policy/publications/2010/4294970126.pdf](http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2010/4294970126.pdf)

#### Additional Reading

- Salter, A. et al. (2000) Talent: Not Technology: Publicly funded research and innovation in the UK (SPRU, Sussex) (electronic copy available [https://www.researchgate.net/publication/246978209\\_Talent\\_not\\_Technology\\_Publicly\\_Funded\\_Research\\_and\\_Innovation\\_in\\_the\\_UK](https://www.researchgate.net/publication/246978209_Talent_not_Technology_Publicly_Funded_Research_and_Innovation_in_the_UK))
- Callon, M. (1994) 'Is Science a Public Good?' *Science, Technology and Human Values*, 19 No.4 pp.395-425
- Nelson, R. (1959). "The Simple Economics of Basic Scientific Research." *Journal of Political Economy* 77: 297-306.
- Arrow, K. (1962). Economic welfare and the allocation of resources for invention. In *The rate and direction of inventive activity: Economic and social factors* (pp. 609-626). <http://www.nber.org/chapters/c2144.pdf> (rather dense economics, but an important source)

- Pavitt, K (1991), 'What makes basic research economically useful?', *Research Policy*, vol 20, no 2, pp109-20 (argues that the benefits from basic science are far broader than the knowledge produced).
- Pielke, R. A. (2007) *The Honest Broker: Making sense of science in policy and politics* Cambridge (read Chapter 6 on how science policy shapes science) (UCL Library E-book)
- Hessels, L. K., Van Lente, H., & Smits, R. (2009). In search of relevance: the changing contract between science and society. *Science and Public Policy*, 36(5), 387-401 \_

## 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) (E-book UCL Library)

#### Recommended reading

- Merton, RK (1973), 'The Normative Structure of Science', in *The Sociology of Science* (Chicago: University of Chicago Press), Chapter 13 pp267-278  
<https://www.panarchy.org/merton/science.html>
- Mulkay, M (1976), 'Norms and Ideology in Science' *Social Science Information*, 15(4/5) pages 637-656
- 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/>

#### Additional Readings:

- Erickson, M (2016 2<sup>nd</sup> Edition), *Science, Culture and Society: Understanding Science in the 21st Century* (Cambridge: Polity) (Chapter 5: Scientists and Scientific Communities)(UCL Library E-book)
- Visvanathan, S. (2006). Alternative Science. *Theory, Culture & Society*, 23(2–3), 164–169.
- Mitroff, I (1974), 'Norms and counter-norms in a select group of Apollo moon scientists', *American Sociological Review* Vol.39 pp579-95. (Pay attention to the main points of the introduction and conclusion)
- Grundmann, R. (2013). "Climategate" and the scientific ethos. *Science, Technology, & Human Values*, 38(1), 67-93.
- Shapin, S (2008), *The Scientific life: a moral history of a late modern vocation*, University of Chicago Press (Chapter 1 – Knowledge and Virtue) [I have tried to avoid books where there is no e-version, but there's no alternative here and it's not essential to read]
- Panofsky, A. L. (2010). A critical reconsideration of the ethos and autonomy of science. in Calhoun, C. (Ed.). (2010). *Robert K. Merton: sociology of science and sociology as science*. Columbia University Press. (UCL Library E-book)

## 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](http://www.eea.europa.eu/publications/environmental_issue_report_2001_22)

#### Recommended reading

- Lupton, D (1999), 'Introduction: Risk and Sociocultural Theory' in Lupton, D (ed) *Risk and Sociocultural Theory: New Directions and Perspectives* (Cambridge: Cambridge University Press) (UCL Library E-book)

#### Additional Readings

- Jasanoff, S. (2007). 'Technologies of humility'. *Nature*, 450(7166), 33-33.
- Gilinsky, V (2017), 'When 10,000 square miles of contamination is an acceptable risk, *Bulletin of the Atomic Scientists*, 29 January. <http://thebulletin.org/when-10000-square-miles-contamination-acceptable-risk-nrc's-faulty-concept10459>
- Bradbury, J. (1989). 'The Policy Implications of Differing Concepts of Risk'. *Science, Technology, & Human Values*, 14(4), 380-399.
- Ravetz, J (2006), *The No-Nonsense Guide to Science* (New Internationalist), Chapters 5 and 6 (Scientific Objectivity; Uncertainty) (UCL Library E-book)
- Funtowicz, S. O. and Ravetz, J. R.: 1993, 'Science for the Post-Normal Age', *Futures* 25, 739–755.
- Renn, O, 1998, Three decades of risk research, *Journal of Risk Research* 1 (1), 49–71 (on different ways of studying risk)
- Stirling, A. (2007) Risk, precaution and science: towards a more constructive policy debate. *EMBO reports*, 8(4): 309-315 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1852772/>
- Pate-Cornell, E. (2012) On black swans and perfect storms: risk analysis and management when statistics are not enough. *Risk Analysis*, 32(11): 1823-1833.
- Verweij, M (2006), Clumsy Solutions for a Complex World: The Case Of Climate Change, *Public Administration*, Volume84, Issue4, Pages 817-843 (Uses grid-group analysis of risk)
- Rayner, S., & Cantor, R. (1987). How Fair Is Safe Enough? The Cultural Approach to Societal Technology Choice. *Risk Analysis*, 7(1), 3-9.
- Gigerenzer, G. (2004). Dread risk, September 11, and fatal traffic accidents. *Psychological science*, 15(4), 286-287.

#### Policy report

- *Innovation - Managing risk, not avoiding it*, Department of Business Innovation and Skills, 2014, [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/381906/14-1190b-innovation-managing-risk-evidence.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/381906/14-1190b-innovation-managing-risk-evidence.pdf)

## Week six

### READING WEEK

No lectures or seminar this week.

## Week seven

### 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) [Link on Moodle page]

#### Recommended reading

- Pielke, R. A. (2007) *The Honest Broker: Making sense of science in policy and politics* Cambridge (Chapters 1 and 2)[UCL Library E-book]
- Sarewitz, D. (2004). How science makes environmental controversies worse. *Environmental science & policy*, 7(5), 385-403.  
<http://www.sciencedirect.com/science/article/pii/S1462901104000620>
- **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

- The UK response to covid-19: use of scientific advice, UK Parliament Science and technology committee, May 2021  
<https://publications.parliament.uk/pa/cm5801/cmselect/cmsctech/136/13603.htm>

#### Additional Reading

- Nelkin, D, *Science, Technology and Public Policy*, History of Science Society Newsletter, Volume 16, No. 2 (April 1987)  
See <http://depts.washington.edu/hssexec/newsletter/1997/nelkin.html>
- Millstone, E., & van Zwanenberg, P. (2001). Politics of expert advice: lessons from the early history of the BSE saga. *Science and public policy*, 28(2), 99-112.
- Stilgoe, J., Irwin, A., & Jones, K. (2006). The received wisdom: Opening up expert advice. Demos <http://www.demos.co.uk/publications/receivedwisdom>
- Nelkin, D, (1975) The Political Impact of Scientific Expertise, *Social Studies of Science*, Vol. 5, No. 1, pp. 35-54,

- Collingridge, D. and Reeve, C. (1986) *Science speaks to power: the role of experts in policymaking*, Frances Pinter; London  
[http://www.andreasaltelli.eu/file/repository/Science\\_Speaks\\_to\\_Power.pdf](http://www.andreasaltelli.eu/file/repository/Science_Speaks_to_Power.pdf)
- Irwin, A. (1995) 'Science and the policy process' Chapter 3 in *Citizen Science: a study of people, expertise and sustainable development* (London: Routledge) (UCL Library E-book)
- Brooks, H. (1965). Scientific concepts and cultural change. *Daedalus*, 66-83.

## Week eight

### 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*, Vol. 30 pp353-364.

#### Recommended reading

- Schiebinger, L (1999), Has Feminism Changed Science? (Harvard) (Chapter 4 'The Clash of Cultures) [Electronic Version Available – Moodle Site Library Resources (Right Hand Side) Reading List]
- Chimba, M and Kitzinger, J (2010), 'Bimbo or boffin? Women in science: an analysis of media representations and how female scientists negotiate cultural contradictions', *Public Understanding of Science* 19(5):609-624. <https://journals.sagepub.com/doi/abs/10.1177/0963662508098580>

#### Additional Reading

- Schiebinger, L. *et al* (Eds.) (2011-2018). *Gendered Innovations in Science, Health & Medicine, Engineering and Environment*. Website: <http://genderedinnovations.stanford.edu/index.html> (A rich resource with definitions, theory and cases studies produced by Stanford University)
- Huan, J *et al* (2020), 'Historical comparison of gender inequality in scientific careers across countries and disciplines', *PNAS* March 3, 2020 117 (9) 4609-4616;
- Etzkowitz, H *et al* (2007), 'The Coming Gender Revolution in Science', in Hackett, EJ *et al* (eds) *The Handbook of Science and Technology Studies*, Third Edition (Cambridge: MIT Press). [UCL Library E-book]
- Schiebinger, L. (1987). The history and philosophy of women in science: A review essay. *Signs: Journal of Women in Culture and Society*, 12(2), 305-332
- Wenneras, W and Wold, A (1997), 'Nepotism and Sexism in Peer Review', *Nature* Vol.387 (22 May) pp341-343.
- Sismondo, S (2004), *An Introduction to Science and Technology Studies* (Oxford: Blackwell) Chapter 4 (Stratification and Discrimination) also Chapter 13 if you want to explore arguments that science is inherently masculine. (UCL Library E-book)
- 2010, <http://www.nature.com/nature/journal/v464/n7293/full/4641268a.html> (on Dorothy Hodgkin)
- Ferry, G (2010) 'The exception and the rule: women and the Royal Society 1945–2010' *Notes and Records of the Royal Society* 64 S163–S172.
- Schiebinger, 2014, Scientific research must take gender into account, *Nature* <http://www.nature.com/news/scientific-research-must-take-gender-into-account->

[1.14814](#)

**Policy Document**

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

- Winner, Langdon. "Do Artifacts Have Politics?" *Daedalus*, vol. 109, no. 1, 1980, pp. 121–136.

#### Recommended reading

- 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/>
- Brooks, H (1994) 'The relationship between science and technology'. *Research Policy*, 23, 477-486, <http://sibae.pbworks.com/f/brooks%2B1994.pdf>
- Aditya Chakraborty, How UK wonder substance graphene can't and won't benefit UK, *The Guardian*, Tuesday 3 December 2013 <https://www.theguardian.com/science/2013/dec/03/graphene-wonder-substance-uk-economy>

#### Additional Reading

- Cowan RS (1985), 'How the Refrigerator Got Its Hum' in *The Social Shaping of Technology* (1st edition) (Milton Keynes: Open University Press) pp202-218 (Detailed case study of how technology is affected by social forces). [Electronic Version Available – See Moodle Page, Library Resources electronic reading list, right-hand column]
- Nye, D (2007) *Technology Matters: Questions to Live With* (Cambridge Mass: MIT Press) Chapter 4 'How Do Historians Understand Technology?' (Chapter 4 in Electronic Version Available – See Library Resources electronic reading list, right-hand column of Moodle page]
- Wyatt, S (2007), 'Technological Determinism Is Dead; Long Live Technological Determinism' in Hackett, EJ (et al), *The Handbook of Science and Technology studies* (Cambridge, Mass.; London : MIT Press) (3rd ed) (UCL Library E-book)
- Lucier, P (2019), 'Can marketplace science be trusted' *Nature* **574**, 481-485 (2019) <https://www.nature.com/articles/d41586-019-03172-5>
- Pool, R (1997), *Beyond Engineering: How Society Shapes Technology* (OUP), (Chapter 5 'Choices' for lots of examples such as VHS and QWERTY keyboard). [Electronic Version Available – See Library Resources electronic reading list, right-hand column of this Moodle page]

## Week ten

### Science and Social Movements

Scientists sometimes become campaigners over issues such as climate change. Science, however, is not just the province of professional scientists, it is put to use by social movements. This topic focusses on social movements, such as the environmental movement (up to and including Extinction Rebellion) and by way of comparison the peace movement, and how they put science to use.

#### Essential Reading

- Jamison, A. (2010), Climate change knowledge and social movement theory. *WIREs Clim Change*, 1: 811-823

#### Recommended Reading

- Breyman, S *et al* (2016), 'STS and Social Movements: Pasts and Futures', in (Chapter 10) in *The Handbook of Science and Technology Studies 4<sup>th</sup>*, edited by Ulrike Felt *et al.* (Cambridge MA: MIT Press) [Available online through UCL Library]
- Yearley, S (1989), 'Bog Standards: Science and Conservation at a Public Inquiry', *Social Studies of Science* Vol.19 pp.421-38. (esp. pp.29-33). (Case study of an attempt to mobilize expertise to save a peat bog habitat)

#### Additional Reading

- Hess, D *et al* 'Science, Technology and Social Movements' in Hackett, EJ (et al) (2007), *The Handbook of science and technology studies* (Cambridge, Mass. ; London : MIT Press) (3rd ed) [UCL Library E-book]
- Jamison, A (2001), *The Making of Green Knowledge* (esp Chapter 2 Social Movements and Knowledge Making). (UCL Library E-book)
- Martin, B (1997) 'Science, Technology and Nonviolent Action: The Case for a Utopian Dimension in the Social Analysis of Science and Technology' *Social Studies of Science*, Vol. 27, No. 3, 439-463 (1997)
- Balmer, B (2020), "Science was digging its own grave": The Women's International League for Peace and Freedom and the campaign against Chemical and Biological Warfare, *The Nonproliferation Review* (in press but should be published by the time we teach this, otherwise I will make a version available on Moodle).
- Kraft, Alison (2018), 'Dissenting Scientists in Early Cold War Britain: The "Fallout" Controversy and the Origins of Pugwash, 1954–1957', *Journal of Cold War Studies*, Volume 20, Number 1, Winter 2018, pp. 58-100

## Week eleven

### 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](http://www.brookings.edu/~media/press/books/2008/newinvisiblecollege/newinvisiblecollege_chapter.pdf) (Also UCL Library E-book)

#### Recommended reading:

- 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](http://steps-centre.org/aneumanifesto/wp-content/uploads/steps-manifesto_small-file.pdf)
- 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>

#### Additional Reading

- Kandekar, A *et al* (2017), 'STS for Development', in Felt, U *et al* (eds) *The Handbook of Science and Technology Studies* (4th Edition), Ch 23 [UCL Library E-book]
- UNESCO (2015) *UNESCO Science Report: Toward 2030* (read the executive summary, which is available as an electronic copy ): <http://en.unesco.org/USR-contents>
- Laredo, P. *et al.* (eds.) (2001) *Research and Innovation Policies in the New Global Economy: An international perspective*
- Wu, S (2019), 'Science: How China made a superpower', *Nature* **574**, 25-28 (2019) <https://www.nature.com/articles/d41586-019-02937-2>
- Royal Society (2011), *Knowledge, Networks and Nations* report, <http://royalsociety.org/policy/projects/knowledge-networks-nations/report/>
- *Global governance of science report* (2009), European Commission, [http://ec.europa.eu/research/science-society/document\\_library/pdf\\_06/global-governance-020609\\_en.pdf](http://ec.europa.eu/research/science-society/document_library/pdf_06/global-governance-020609_en.pdf)
- Demos (2007) *The Atlas of Ideas*, London, Demos, [www.demos.co.uk/files/Overview\\_Final1.pdf](http://www.demos.co.uk/files/Overview_Final1.pdf)

## **Course expectations**

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

## **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](http://www.ucl.ac.uk/sts/handbook)

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

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