HPSC0006

Science, Policy and Politics

Course Syllabus

2023-24 session | Professor Jack Stilgoe | j.stilgoe@ucl.ac.uk

This course introduces ways of thinking about the role of science and technology in policy 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 funding science? What makes an expert? Should scientists be the only ones to make decisions about the direction of scientific research?

Moodle Web site:	https://moodle.ucl.ac.uk/course/view.php?id=7415
Assessment:	One book review (1,000 words) (50%) and one exam (50%)
Timetable:	https://timetable.ucl.ac.uk/
Prerequisites:	No prerequisites
Required texts:	No required texts
Course tutor:	Course convenor: Professor Jack Stilgoe
Contact:	j.stilgoe@ucl.ac.uk
Office location:	22 Gordon Square, room 3.3
Office hours:	Mondays 12-1pm (in person)
	Tuesdays 9-10am (on MS Teams)

Basic course information

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

Торіс	Class Dates
1. Why science policy matters	8/9 Jan
2. Big Science	15/16 Jan
3. 21 st Century science policy	22/23 Jan
4. The sociology of science	29/30 Jan
5. Risk and uncertainty	5/6 Feb
Reading Week	<mark>12-18 Feb</mark>
DEADLINE: Book review	<mark>14th Feb</mark>
6. Science and expert advice	19/20 Feb
7. Science, technology and innovation	26/27 Feb
8. Science, gender, inequalities	5/6 March
9. Global science and global governance	12/13 March
10. Open science	19/20 March
Term 3 Exam revision session (10-11am)	22 April

Assessments

Summary	Description	Deadline	Word limit
Book review (30%)	See list below	Tue 13 February	1,000 word maximum
Exam (70%)	Two hours, three essays from a choice of ten questions		

Assignments – Read Carefully

The assessment for this course consists of one book review and one exam. Book reviews should have a maximum of 1,000 words. Long essays should have a maximum of 2,500 words.

Essential, recommended and additional readings are listed in this document. You should not attempt to read all the recommended reading – be selective and depending on how you want to direct your writing. 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.

Book review

Write a book review of one of the following books:

- 1. Caroline Wagner (2008) The new invisible college: Science for development, Brookings institution press (UCL Library E-book) <u>https://www.jstor.org/stable/10.7864/j.ctt6wphbp</u>
- 2. Donald Stokes (1997) Pasteur's quadrant: Basic science and technological innovation. Brookings Institution Press. (UCL Library)
- 3. Jeremy Farrar and Anjana Ahuja (2021) Spike: The Virus vs. The People (UCL Library E-book)
- Roger Pielke (2007) The Honest Broker: Making sense of science in policy and politics, Cambridge (UCL Library E-book) <u>https://www.cambridge.org/core/books/honest-</u> broker/A41AD4D7D14077165807DBE057B5FAF9
- 5. Mariana Mazzucato (2015) The entrepreneurial state: debunking public vs. private sector myths, Anthem Press (UCL Library E-book)

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 in order to understand the material. There is also recommended reading if you have time and for your written assignments. 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 (Jack Stilgoe and Shobita Parthasarathy): https://podcasts.apple.com/us/podcast/the-received-wisdom/id1476334065
- *Nature.* Stick to the science: When science gets political: <u>https://www.nature.com/articles/d41586-020-03067-w</u>

News and blogs

- <u>https://www.nature.com/news</u>
- <u>https://www.science.org/news</u>
- <u>https://www.theguardian.com/science/science-policy</u>
- <u>https://issues.org/</u>
- https://royalsociety.org/blog/blogsearchpage/?category=News%20and%20views
- http://www.softmachines.org/wordpress/

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]
- ...also read this blog post: Stilgoe, J (2012) Should there be more scientists in parliament? <u>http://jackstilgoe.wordpress.com/2012/11/30/should-there-be-more-scientists-in-parliament/</u>
- ... and this: Ball, P (2021) Should scientists run the country? The Guardian, 27 Sept 2021, https://www.theguardian.com/books/2021/sep/27/should-scientists-run-the-country

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 speeches

- George Freeman MP, Science Minister speech at Keio University in Japan, 13 Dec 2022 <u>https://www.gov.uk/government/speeches/science-minister-speech-at-keio-university-in-japan</u>
- Tony Blair, 'Science Matters' speech, 2002 <u>https://www.ukpol.co.uk/tony-blair-2002-science-matters-speech/</u>

- BBC Website (2017): The iPhone at 10: How The iPhone Got So Smart: <u>http://www.bbc.com/news/business-38320198</u>
- 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)

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, 7, pp.3-25 (electronic copy available on Moodle)
- <u>Shapin, S (2000) 'Don't let that Crybaby in here again', *London Review of Books* 22 (17). <u>https://www.lrb.co.uk/the-paper/v22/n17/steven-shapin/don-t-let-that-crybaby-in-here-again</u></u>

Recommended reading

- Hughes, J (2002), The Manhattan Project: Big Science and the Atom Bomb, Icon Books (Chapter 5) (Module E-reading list on Moodle)
- British Academy (2019) Lessons from the History of UK Science Policy, https://www.thebritishacademy.ac.uk/documents/243/Lessons-History-UK-science-policy.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) <u>https://www.nature.com/articles/d41586-019-02848-2</u>
- Gummett 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). <u>http://spp.oxfordjournals.org/content/18/1/31.abstract</u>
- 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: <u>http://www.historyandpolicy.org/policy-papers/papers/the-haldane-principle-and-other-invented-traditions-in-science-policy</u>)

• Weinberg, B. A. (2009). An Assessment of British Science over the Twentieth Century'. *The Economic Journal*, 119(538), F252-F269.

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, <u>https://www.praxisauril.org.uk/sites/praxisunico.org.uk/files/NCUB%20why%20should%20th</u> e%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. <u>http://www.cato-unbound.org/2013/08/05/terence-kealey/case-against-public-science</u> (A newer version of Kealey's libertarian argument against public science funding)
- Sarewitz, D (2016) Saving Science, New Atlantis https://www.thenewatlantis.com/publications/saving-science

Policy report

• Build Back Better: our plan for growth, UK Treasury, March 2021 (chapter on "Innovation") <u>https://www.gov.uk/government/publications/build-back-better-our-plan-for-growth/build-back-better-our-plan-for-growth-html#innovation</u>

- Royal Society (2010) The Scientific Century: Securing our future prosperity <u>http://royalsociety.org/uploadedFiles/Royal Society Content/policy/publications/</u> 2010/4294970126.pdf
- Salter, A. et al. (2000) Talent: Not Technology: Publicly funded research and innovation in the UK (SPRU, Sussex) (electronic copy available <u>https://www.researchgate.net/publication/246978209_Talent_not_Technology_Publicly_Fun</u> <u>ded Research and Innovation in the UK</u>
- Callon, M. (1994) 'Is Science a Public Good?' *Science, Technology and Human Values,* 19 No.4 pp.395-425
- Nelson, Richard 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). <u>http://www.nber.org/chapters/c2144.pdf</u> (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).
- Godin, B (2006), 'The linear model of innovation: the historical construction of an analytical framework', *Science, Technology & Human Values* 31(6), pp.639-667 (2006)
- 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)

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 <u>https://www.panarchy.org/merton/science.html</u>
- 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 <u>https://www.technologystories.org/it-could-be-otherwise-social-progress-technology-and-the-social-sciences/</u>

- 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)
- Erickson, M (2016 2nd Edition), *Science, Culture and Society: Understanding Science in the 21st Century* (Cambridge: Polity) (Chapter 5: Scientists and Scientific Communities)(UCL Library Ebook)
- Visvanathan, S. (2006). Alternative Science. *Theory, Culture & Society, 23*(2–3), 164–169.
- 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)
- 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. <u>http://www.eea.europa.eu/publications/environmental issue report 2001 22</u>

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. <u>http://thebulletin.org/when-10000-square-miles-</u> 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 (1998) <u>https://www.researchgate.net/profile/Ortwin Renn/publication/248992254 Three d ecades of risk research Accomplishments and new challenges/links/00b7d53c67e3b440b 5000000/Three-decades-of-risk-research-Accomplishments-and-new-challenges.pdf (on different ways of studying risk)
 </u>
- Stirling, A. (2007) Risk, precaution and science: towards a more constructive policy debate. *EMBO reports*, 8(4): 309-315 <u>https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1852772/</u>
- 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, <u>https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3819</u> 06/14-1190b-innovation-managing-risk-evidence.pdf

READING WEEK

No lectures or seminar this week.

Week six

Science and expert advice

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:

• Pielke, R. A. (2007) The Honest Broker: Making sense of science in policy and politics Cambridge (Chapters 1 and 2)[UCL Library E-book]

Recommended reading

- Jasanoff, S. (1990) The fifth branch: science advisors as policy makers, Harvard University Press (First chapter) [Link on Moodle page]
- 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. <u>http://www.csap.cam.ac.uk/media/uploads/files/1/fdsaw.pdf</u> (particularly chapters by Jasanoff, Mulgan and Pielke)

Additional Reading

- Nowotny, H. (2000). Transgressive competence the narrative of expertise. *European Journal of Social Theory*, *3*(1), 5-21.
- 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 <u>http://www.demos.co.uk/publications/receivedwisdom</u>
- 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
- 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)

Policy report

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

Week seven

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

• Stilgoe, J (2022) The politics of tech, in Who's Driving Innovation? https://link.springer.com/book/10.1007/978-3-030-32320-2

Recommended 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)
- Brooks, H (1994) 'The relationship between science and technology'. Research Policy, 23, 477-486, <u>http://sjbae.pbworks.com/f/brooks%2B1994.pdf</u>
- Aditya Chakraborty, How UK wonder substance graphene can't and won't benefit UK, The Guardian, Tuesday 3 December 2013 <u>https://www.theguardian.com/science/2013/dec/03/graphene-wonder-substance-ukeconomy</u>
- Winner, Langdon. "Do Artifacts Have Politics?" Daedalus, vol. 109, no. 1, 1980, pp. 121–136.

- Cowan RS (1985), 'How the Refrigerator Got Its Hum' in *The Social Shaping of Technology* (<u>1st</u> 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* (MIT Press) (3rd ed) (UCL Library E-book)
- 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/
- Lucier, P (2019), 'Can marketplace science be trusted' Nature 574, 481-485 (2019) <u>https://www.nature.com/articles/d41586-019-03172-5</u>
- Pool, R (1997), *Beyond Engineering: How Society Shapes Technology* (OUP), (Chapter 5 'Choices' for lots of examples such as VHS and QWERTY keyboard).

Week eight

Science, gender and inequalities

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

• Sugimoto, C (2023) Equity for women in science, Ch. 1 - Introduction (pdf on Moodle)

Recommended reading

- Schiebinger, L (2007) Getting more women into science. Knowledge issues. *Harvard Journal of Law and Gender*, Vol. 30 pp353-364.
- 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

- Schiebinger, L. *et al* (Eds.) (2011-2018). *Gendered Innovations in Science, Health & Medicine, Engineering and Environment*. Website: <u>http://genderedinnovations.stanford.edu/index.html</u> (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)
- <u>2010, http://www.nature.com/nature/journal/v464/n7293/full/4641268a.html</u> (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 <u>http://www.nature.com/news/scientific-research-must-take-gender-into-account-</u>

<u>1.14814</u>

Policy Document

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

Week nine

Global science and governance (Guest lecturer: Dr Saheli Datta Burton)

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, <u>http://www.brookings.edu/~/media/press/books/2008/newinvisiblecollege/newinvisi</u>

Recommended reading:

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

- 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): <u>http://en.unesco.org/USR-contents</u>
- 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) <u>https://www.nature.com/articles/d41586-019-02937-2</u>
- Royal Society (2011), Knowledge, Networks and Nations report, <u>http://royalsociety.org/policy/projects/knowledge-networks-nations/report/</u>
- Global governance of science report (2009), European Commission, <u>http://ec.europa.eu/research/science-society/document_library/pdf_06/global-governance-020609_en.pdf</u>
- Demos (2007) The Atlas of Ideas, London, Demos, www.demos.co.uk/files/Overview Final1.pdf

Week ten

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

• Michael Nielsen (2011), Reinventing Science, Chapter 1, free online here <u>http://press.princeton.edu/chapters/s9517.pdf</u>

Recommended reading

- B. Nerlich, S. Hartley, S. Raman, & A. Smith (Eds.) (2018), Science and the politics of openness: here be monsters. <u>https://library.oapen.org/handle/20.500.12657/30733</u> (2018). Manchester University Press, especially chapter 2 by Stephen Curry
- 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 <u>http://www.mikehulme.org/wp-</u> <u>content/uploads/2013/06/Extract-from-Chapter-50-Climategate.pdf</u>
 - Hulme, M and Ravetz, J (2009) Show Your Working: What Climategate means, BBC News <u>http://news.bbc.co.uk/1/hi/8388485.stm</u>
 - Grundmann, R. (2013). "Climategate" and the scientific ethos. Science, Technology, & Human Values, 38(1), 67-93.
 https://iourgala.com/b.acm/dei/full/10.1177/0162242011422218
 - https://journals.sagepub.com/doi/full/10.1177/0162243911432318
- On Open Access
 - Peter Suber, 2012, Open Access, Chapter 1, free online here <u>http://mitpress.mit.edu/sites/default/files/titles/content/9780262517638 Open Access PDF Version.pdf</u>

- Mafalda Picarra (2016) Discussion Paper: Researchers and Open Science <u>http://pasteur4oa.eu/sites/pasteur4oa/files/resource/Discussion%20Paper_Researc_hers%20and%20Open%20Science.pdf</u>
- Ziman, J, 1968, Public Knowledge, An essay concerning the social dimension of science, Cambridge University Press, p. 70
- Steven Shapin, 1984, Pump and Circumstance: Robert Boyle's Literary Technology, Social Studies of Science (SAGE, London, Beverly Hills and New Delhi), Vol. 14, 1984 1, 481 -520. <u>https://dash.harvard.edu/bitstream/handle/1/3353764/Shapin_Pump.pdf?sequence=1</u>
- Fecher, B., & Friesike, S. (2014). Open Science: One Term, Five Schools of Thought. In Opening Science (pp. 17-47). Springer International Publishing.
- Carroll, M. W. (2011). Why full Open Access matters. PLoS Biology, 9(11), p.e1001210. <u>https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.1001210</u>

- Michel Callon, (1999), The Role of Lay People in the Production and Dissemination of Scientific Knowledge, Science and Technology Studies, <u>http://sts.sagepub.com/content/4/1/81.full.pdf+html</u>
- Hilgartner, S. (2012). Novel constitutions?; New regimes of openness in synthetic biology. BioSocieties, 7(2), 188-207. <u>https://link.springer.com/article/10.1057/biosoc.2012.5</u>

Policy reports

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

Course expectations

In order to be deemed 'complete' on this module students must attempt both the essay 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 <u>www.ucl.ac.uk/sts/handbook</u>

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