
UNIVERSITY COLLEGE LONDON
POLICY ISSUES IN THE LIFE SCIENCES
COURSE OUTLINE

HPSC 2001
Autumn Term 2011

Science & Technology Studies
Convenor: Dr. Inga Kroener
PGTA: Tim Nissen

About this course

The purpose of this course is to provide students with a critical overview of policy issues arising from developments in the biological sciences. The course will cover a variety of issues which will include: medical research policy, the BSE crisis, debates about the social acceptability of recombinant DNA research (GM crops, genetic testing, DNA profiling), controlling biological weapons research, nanotechnology, human and animal experimentation. The course will also introduce students to some of the theories dealing with the complex relationship between science and society.

By the end of this course you should:

- Be able to analyse the social and political dimensions of debates in the life sciences
- Be able to evaluate the consequences of developments in life sciences
- Have detailed knowledge of a number of case studies of policy issues in the life sciences
- Be able to criticize simplistic and popular notions of the relationship between science, technology and society.

About the department:

You are advised to familiarise yourself with the departmental *Student Handbook* and consult them on all procedural matters. The notes are available on the departmental web-site at <http://www.ucl.ac.uk/sts/>

Teaching:

There will be one lecture each week on Thursdays 10 - 11am, in 25 Gordon Street (Room 505), and one seminar each week on Thursday afternoon (1-2pm, 2-3pm; 4-5pm). The seminars are *not* optional.

There will be a reading week, with no lectures or seminars, November 7th-11th.

A poor seminar attendance record, usually 3 undocumented absences, may result in a mark of zero for any further essays submitted during the course. Continued absence will result in an 'incomplete' mark which is equivalent to a fail.

Please note that electronic recording of lectures is not permitted without permission from the course tutor.

Reading:

The notes that you take in lectures will not be detailed enough to understand a topic or to write an essay on that topic. It is therefore essential that you make use of the reading list. **You are *not* expected to read all of the material.** You will be expected to read at least one piece each week in preparation for seminars and you will certainly need to read widely for your essays and may include material from beyond the reading list. However, read critically: you don't have to agree or disagree with everything you read – but you should be able to say why you hold your views.

Where to find the reading material

There is no one text which covers this course. Most of the reading material is kept in the DMS Watson library, material marked [TC *nnnn*] is in the teaching collection so usually available electronically or from the issue desk. The number, *nnnn*, is the teaching collection reference number. Some material is in the library and *also* in the teaching collection. Senate House Library holds some of the material. *The library takes an increasing number of journals on-line, so make sure you check whether articles are available on-line.*

A small number of marked readings marked [D] have been digitized by the Library and can be obtained by clicking Online Resources then Reading Lists on line and searching for the course code. Or go to <http://ls-tlss.ucl.ac.uk/>

You are also encouraged to use the Wellcome Library (183 Euston Road). This a reference library with a large collection of science policy material - including much of the material relevant to the course.

You are also encouraged to use the internet for research. However make sure you reference the full web address, the site title and date visited. Be critical of what you read and be careful of purely descriptive sites such as Wikipedia – I will be looking for evidence of some hard thinking and argument in your essays, not simple regurgitation of basic information. **Also note that plagiarism, particularly involving internet sources, will be treated as a severe exam irregularity.**

Course Assessment

This term's course will be assessed on the basis of *three* written assignments: two essays (one short, one long) and a book review. The three pieces carry equal weight. A list of suggested essay questions is included with this reading list. If you wish to write an essay connected with the course but not on the list you should see me to discuss a title. Students may discuss any aspects of their essays with me during my office hours. There is no exam for this course but you are expected to show evidence of wide reading and critical thought in your essays.

The due dates for essays are as follows:

	Date Due
1st Essay	Friday 4 th Nov (Term 1)
2nd Essay	Thursday 1 st Dec (Term 1)
3rd Essay	Friday 13 th Jan (Week 1, Term 2)

Coursework should be submitted to Moodle where it will be checked using the Turnitin system.

Please do not e-mail work directly to me without prior permission. Late essays will be penalized:

- The full allocated mark will be reduced by 5 percentage points for the first working day after the deadline for the submission of the coursework.
- The mark will be reduced by a further 10 percentage points if the coursework is submitted during the following six days.

Providing the coursework is submitted before the end of the first week of term 3 for undergraduate courses, but had not been submitted within seven days of the deadline for the submission of the coursework, it will be recorded as zero but the assessment would be considered to be complete

Schedule of Lectures

Date	Lecture Topic
Oct 6 th	Introduction - Science and Social Change
Oct 13 th	Medical Research Policy and University- Industry Links
Oct 20 th	Genetic Screening and Testing
Oct 27 th	DNA Fingerprinting
Nov 3 th	GM Crops and Science Policy
Nov 10 th	<i>Reading Week</i>
Nov 17 th	BSE, CJD and Science Advice
Nov 24 th	Biological Weapons Control
Dec 1 st	Nanotechnology and the Life Sciences
Dec 8 th	Human Experimentation
Dec 15 th	Animal Experimentation

Topic 1: Science and Social Change

In order to engage seriously with debates concerning science, technology and society it is important to think beyond oversimplified models of the science-society relationship. This session will introduce you to some of the critical thinking that has taken place on this subject.

Essential Reading:

Bridgstock, M et al (1999), *Science, Technology, and Society : an Introduction* (Cambridge: CUP) Chapter 5 'Controversies Regarding Science and Technology' [Available on-line from library: click Online <http://ls-tlss.ucl.ac.uk/> and search for this course, tick the 'previous year' box to make sure]

Topic 2: Research Policy and the Life Sciences

This topic explores how the landscape of academic research has changed over the past quarter century or so. Given that we cannot spend an infinite amount of money on biomedical research, we have to decide what to fund and what not to fund. 'We' in this context used to mean only scientists – after all, they do the science – but has increasingly included Government, industry and 'consumers'.

Essential Reading:

Johnston, J (2008), 'Conflict of Interest in Biomedical Research' in *From Birth to Death and Bench to Clinic: The Hastings Center Bioethics Briefing Book* <http://www.thehastingscenter.org/Publications/BriefingBook/>

Angell, M (2008), 'Industry-Sponsored Research: A Broken System', *JAMA* 200(9):1069-71

Additional Reading:

Theories:

EITHER

Gibbons, M et al (1994), *The New Production of Knowledge: The Dynamics of Research in Contemporary Societies* (Sage) Introduction and Chapter 1 (see also glossary at the back) (An influential book that attempted to summarise post-WWII changes in the organisation of western science and the production of knowledge. Not an easy read but try and get the general picture.)

OR

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 [Summarises some of the key criticisms of the Mode 1/2 thesis]

Mirowski, P and Sent E (2008), 'The Commercialization of Science and the Response of STS' in Hackett, EJ et al (eds) *The Handbook of Science and Technology Studies*, Third Edition (Cambridge: MIT Press).

Government funding:

Salter, B and Salter, C (2010), 'Governing Innovation in the Biomedicine Economy: Stem Cell Science in the USA', *Science and Public Policy* 32(2):87-100 (Sets out a framework for understanding innovation – a bit of social science jargon in the early parts which may be a bit daunting, but you should be able to get them main messages)

Nightingale, P and Scott, A (2007), 'Peer Review and the Relevance Gap: Ten Suggestions for Policy Makers', *Science and Public Policy* 34(8) 543-533.

Morris, N (2000), 'Science Policy in Action: Policy and the Researcher', *Minerva* Vol.38 pp.425-451 [Also in TC 5062]

Morris, N and Rip, A (2006), 'Scientists' coping strategies in an evolving research system: the case of life scientists in the UK', *Science and Public Policy*, Volume 33, Number 4, 1 May 2006, pp. 253-263.

Hessels, LK *et al* (2009), 'In search of relevance: the changing contract between science and society', *Science and Public Policy* 36(5):387-401

Industry-Academia:

Sergio Sismondo (2009) 'Ghosts in the Machine: Publication Planning in the Medical Sciences', *Social Studies of Science*, Apr 2009; vol. 39: pp. 171 - 198.

Nelkin, D and Andrews, L (1998), 'Homo economicus: commercialisation of body tissue in the age of biotechnology', *Hastings Center Report* Vol.28 pp.30-39.
On-line at: <http://ls-tlss.ucl.ac.uk/cgi-bin/displaylist?module=10HPSC2001>

Weatherall, D (2000), 'Academia and Industry: Increasingly Uneasy Bedfellows', *The Lancet*, Vol. 355 (9215) 1574 (5 May 2000)

Oliveri, NF (2003), 'Patient's Health or Company Profits? The Commercialisation of Academic Research', *Science and Engineering Ethics* Vol.9 No.1 pp.29-41. (Wellcome library)

Weatherall, D (2003), 'Problems for Biomedical Research at the Academia-Industry Interface', *Science and Engineering Ethics* Vol.9 No.1 pp43-48 (Wellcome library).

Behrens, T. R. and D. O. Gray (2001). 'Unintended consequences of cooperative research: impact of industry sponsorship on climate for academic freedom and other graduate student outcomes'. *Research Policy* 30(2): 179-199. (Study of postgrads which found no adverse effects from industrial funding/links (those with a real problem were those without regular funding of any kind)

Nathan, DG and Weatherall D (1999), 'Academia and Industry: Lessons from Unfortunate Events in Toronto', *The Lancet* 353 (9155) 771-772 (6 March).

Topic 3 Genetic Testing and Screening

The Human Genome Project was a global attempt to locate all of the genes in the human genetic complement. The social and ethical implications for health care, insurance and employment have been widely discussed with benefits for health but also possible discrimination in a 'genetic supermarket'.

Essential Reading:

Either

Press, N. (2008) 'Genetic Testing and Screening' Chapter 16 in *From Birth to Death and Bench to Clinic: The Hastings Center Bioethics Briefing Book*
<http://www.thehastingscenter.org/Publications/BriefingBook/>

Or

Pilnick, A (2002), *Genetics and Society* (OUP), Chapter 5.

(If you are a bit unsure about how much genetics you know, take a look at the earlier chapters too)

Also the journal *New Genetics and Society* publishes up-to-date research on this topic.

Additional Reading

Clayton, WE (2003), 'Ethical, Legal and Social Implications of Genomic Medicine', *New England Journal of Medicine*, 349: 562-569 (Short, accessible overview of some of the key issues)

Hennen, L *et al* (2010), 'Direct to Consumer Genetic Testing: Insights from and Internet Scan', *New Genetics and Society* 29(2):167-186.

Saukko, P. *et al* (2006) 'Are genetic tests exceptional? Lessons from a qualitative study on thrombophilia'. *Social Science and Medicine* 63 (7): 1947-1959.

Murray, T (1997), 'Genetic Exceptionalism and 'Future Diaries': Is Genetic Information Different from Other Medical Information?' in *Genetic Secrets: Protecting Privacy and Confidentiality in the Genetic Era* by Rothstein, M (editor) (Yale University Press) [Also in *TC SCIENCE* 4918]

Hallowell, N *et al* (2003), 'Balancing Autonomy and Responsibility: The Ethics of Generating and Disclosing Genetic Information', *Journal of Medical Ethics* 29:74-83.

Human Genetics Commission (2006), *Choosing the Future: Genetics and Reproductive Decision-Making* (Report covers a wider range of issues than testing – but gives a good feel for the current UK situation)
<http://www.hgc.gov.uk/UploadDocs/DocPub/Document/ChooseFuturefull.pdf>

Novas, C and Rose, N (2000), 'Genetic Risk and the Birth of the Somatic Individual', *Economy and Society* 29(4) pp485-513 (Argues that genetic tests do not encourage fatalism but do encourage new types of responsibility)

Mitra, J (2006), 'Genetic exceptionalism' and precautionary politics: regulating for uncertainty in Britain's genetics and insurance policy process', *Science and Public Policy* 33(8): 585-600.

Rennie J (1994), "Grading the Gene Tests", *Scientific American* June 1994 pp66-74. (Older article but raises important and enduring issues) [Teaching Collection 5119]

Draper E (1992), 'Genetic Testing in the Workplace', in Nelkin D (1992), *Controversy: The Politics of Technical Decisions* (3rd Edition) (Newbury Park: Sage). pp147-176 (Still some of the only research to be carried out on testing in the workplace).

Web-Site

Human Genetics Commission: <http://www.hgc.gov.uk/>
(Don't go to www.hgc.org.uk by accident)

Topic 4. DNA Profiling (Fingerprinting)

DNA fingerprinting can be regarded as a new and powerful tool for forensic science. Alternatively, with the possibility of a national DNA fingerprint database, the technology could be regarded as an infringement of civil liberties. This session will cover the debate over the virtues and dangers of the technique.

Essential Reading:

EITHER:

Nuffield Council on Bioethics (2007), *The Forensic Use of Bioinformation: Ethical Issues* (Comprehensive so read selectively, especially look at Ch 3 which deals briefly with the 'if you've nothing to hide, you've nothing to fear' arguments or the Short Guide for a quick overview of the issues):

http://www.nuffieldbioethics.org/go/ourwork/bioinformationuse/publication_441.html

Additional Reading:

Nelkin, D and Andrews, L (1999), 'DNA Identification and Surveillance Creep' in Conrad, P and Gabe, R (eds) *Sociological Perspectives on the New Genetics* (Oxford: Blackwell)

Wallace, H (2006), 'The UK National Database: Balancing Crime Detection, Human Rights and Privacy', *EMBO Reports*, Vol 7 (Special Issue) pp26-30

Simon A. Cole, Michael Lynch (2006) 'The Social and Legal Construction of Suspects' *Annual Review of Law and Social Science*, Vol. 2: 39-60 (Thought-provoking discussion of DNA databases)

Maschke, K (2008) 'DNA and Law Enforcement' in *From Birth to Death and Bench to Clinic: The Hastings Center Bioethics Briefing Book*
<http://www.thehastingscenter.org/Publications/BriefingBook/>

Williams, R and Johnson, P (2005), 'Inclusiveness, Effectiveness and Intrusiveness: Issues in the Developing Uses of DNA Profiling in Support of Criminal Investigations', *Journal of Law, Medicine and Ethics* 33:454-558.

Lynch, M and McNally, R (2003), ' "Science", "common sense", and DNA evidence: a legal controversy about the public understanding of science', *Public Understanding of Science*, 12(1): 83-104. (Detailed case study that challenges the distinction between 'common sense' and 'scientific' evidence)

Linacre, A (2003) 'The UK National DNA Database', *Lancet* 361:1841-42
 AND

Pascali, VL *et al* (2003), 'The Dark Side of the UK National DNA Database', *Lancet* 362:834

Kitcher, P (1996), *The Lives to Come* (Penguin) (Chapter 7)

Lander E (1992), "DNA Fingerprinting: Science, Law and the Ultimate Identifier", in Kevles DJ and Hood L (Eds), *The Code of Codes: Scientific and Social Issues in the Human Genome Project* (Cambridge, Mass. and London, England: Harvard University Press). (Warning: this was published soon after DNA fingerprinting was introduced – it is a classic overview of early problems – both technical and social, but should be read in the context of more recent developments – see Jobling and Gill below).

Billings, PR (ed) (1992), *DNA on Trial: Genetic Identification and Criminal Justice* (NY: Cold Spring Harbor Lab Press) [Older treatment, but covers some issues which are still enduring: Esp. chapters by Billings (pp1-4), Bereano (pp119-128), Shultz (pp19-42)]. [HIST SCI W50 BER]

Cho, M and Sankar, P (2004) 'Forensic genetics and ethical, legal and social implications beyond the clinic', *Nature Genetics* 36:S8-S12

Useful web-site, Human Genetics Commission: <http://www.hgc.gov.uk> [Includes links to the House of Commons Select Committee on Science & Technology report on genetic databases and to the relevant sections of the Criminal Justice and Police Act 2001]

Topic 5. Biotechnology and the Release of GMOs into the Environment

Biotechnology presents modern societies with immense opportunities - but also immense challenges. A key problem is whether or not the deliberate release of genetically modified organisms (GMOs) into the environment is safe – both for human health and the environment. In an area of contested claims and where the evidence is not clear-cut, this topic raises more fundamental issues about the role of science and expertise in the regulation of technology.

Essential Reading

Two sharply contrasting views of the GM Debate – read **both**:

Burke, D (2004), ‘GM Food and Crops: What went wrong in the UK?’, *EMBO Reports* [European Molecular Biology Organisation], Vol 5(5): 432-436

Grove-White, R (2006), ‘Britain’s Genetically Modified Crop Controversies: The Agriculture and Environment Commission and the Negotiation of ‘Uncertainty’’, *Community Genetics* Vol.9: 170-177

Also

If Grove-White’s ideas about precaution and uncertainty seem a bit vague read:
Stirling, A (2007), ‘Risk, Precaution and Science: Towards a More Constructive Debate’, *EMBO Reports* 8(4):309-315

Additional Reading:

Jasanoff, S (1995), “Product, Process, or Programme: Three Cultures and the Regulation of Biotechnology”, in M. Bauer (ed) *Resistance to New Technology: Nuclear Power, Information Technology and Biotechnology* (Cambridge: Cambridge University Press) pp311-331 (An older article but shows how different regulatory frameworks can treat the same technology differently, particularly depending on how they think about the role of science in informing the debate). [Available on-line from library: click Online <http://ls-tlss.ucl.ac.uk/> and search for this course]

Mayer, S and Stirling, A (2004), ‘GM crops, for good or bad? Those who choose the questions, determine the answers’, *European Molecular Biology Organisation Reports*, 5 (11): 1021-24 (On-line under *EMBO Reports* or from Genewatch website).

Jasanoff, S (2005), ‘In the Democracies of DNA: Ontological Uncertainty and Political Order in Three States’, *New Genetics and Society* 24(2):139-156. (Compares GM crops with other biotech issues in three different countries to argue that there are patterns in national responses)

Gaskell, G (2004), ‘Science policy and society: the British debate over GM agriculture’, *Current Opinion in Biotechnology* 15(3): 241-45.

Bonneuil, C *et al* (2008), ‘Disentrenching Experiment: The Construction of GM Crop Field Trials as a Social Problem’, *Science, Technology & Human Values* 33:201-

229 (Uses quite a bit of STS theory, non-STS students persist though, shows how the debate was not just about one thing, but was ‘framed’ differently over time)

Bowring, F (2003), *Science, Seeds and Cyborgs: Biotechnology and the Appropriation of Life* (Verso) Chapter 2 (A particularly critical argument).
Compare with

Batista, R and Oliviera, M (2009), ‘Facts and Fiction of Genetically Engineered Food’, *Trends in Biotechnology* 27(5):277-286 (A particularly supportive argument).

“GM Foods: The Wrong Debate?” Special Edition of *Food Ethics*, (2008), Doubleday (“The Knowledge Economy”) and summaries from various commentators on ‘lessons learnt from the debate’

[http://www.foodethicscouncil.org/files/autumn%2008_Doubleday.pdf

[http://www.foodethicscouncil.org/files/autumn%2008_Big%20Question.pdf

Millstone, E (2009), ‘Science, risk and governance: Radical rhetorics and the realities of reform in food safety governance’ *Research Policy* Volume 38, Issue 4, May 2009, Pages 624-636 [Sets GM debate and its legacy in a wider context]

Topic 6: BSE, CJD and Science Advice

The BSE saga that took place in the UK from 1986 onwards is one of the most dramatic public health crises of the 20th century. Over three million cattle have now been slaughtered and the overall cost of the crisis now exceeds four billion pounds. For years, the Government and its scientific advisers kept repeating that “British Beef is safe”. Yet, in March 1996 they announced that BSE had spread to humans. How can we explain this spectacular shift.

Essential Reading

Two very different views of the BSE affair, read both:

Millstone, E and van Zwanenberg, P (2003) ‘BSE: A Paradigm of Policy Failure’ in *The Political Quarterly* Vol.74 No1. pp27-37

Forbes, I (2004), ‘Making a Crisis out of a Drama: The Political Analysis of BSE Policy-Making in the UK’, *Political Studies* 52: 342-357

Additional Reading

Basic information on BSE: <http://www.who.int/mediacentre/factsheets/fs113/en/>

Millstone, E and van Zwanenberg, P (2001), ‘Politics of Expert Advice: Lessons from the Early History of the BSE Saga’, *Science and Public Policy*, Vol 28 (April) No.2 (More detailed empirical analysis which shows how ‘scientific’ decisions were framed by wider social, economic and political considerations) [TC 5105]

Beck, M et al (2005), ‘Public Administration, Science, and Risk Assessment: A Case Study of the U.K. Bovine Spongiform Encephalopathy Crisis’ *Public Administration Review* Volume 65 Issue 4, Pages 396 – 408 [Besides analysis, this has a useful chronology and overview of key committees]

- Millstone, E (2009), 'Science, risk and governance: Radical rhetorics and the realities of reform in food safety governance' *Research Policy* Volume 38, Issue 4, May 2009, Pages 624-636 [Sets BSE and its legacy in a wider context]
- Millstone, E and van Zwanenberg, P (2005), *BSE: Risk, Science and Governance* (Oxford: OUP).
- Frewer, L and Salter, B (2002), 'Public attitudes, scientific advice and the politics of regulatory policy: the case of BSE', *Science and Public Policy*, 29(2), p137- 45
- Jasanoff, S (1997), 'Civilization and Madness: The Great BSE Scare of 1996', *Public Understanding of Science* Vo.6 pp.221-232
- Miller, D (1999) 'Risk, science and policy: definitional struggles, information management, the media and BSE', *Social Science and Medicine* 49(9), pp.1239-1255
- Goethals, C *et al* (1998), 'The Politics of BSE: Negotiating the Public's Health', in Ratzan, Scott C (ed) *The Mad Cow Crisis: Health and the Public Good* (London: UCL Press) [[Available on-line from library: click Online Resources then Reading Lists and search for this course]
- Winter, M (1996), 'Intersecting Departmental Responsibilities, Administrative Confusion and the role of science in Government: The Case of BSE', *Parliamentary Affairs* Vol.49 No.4 pp.550-565.
- Wilson, Chris (2004), 'Intersecting Discourses: MMR vaccine and BSE', *Science as Culture* 13(1): 75-88.

Topic 7 Biological Weapons Control

In 1991 it was *estimated* that a 20kt nuclear warhead could kill 40,000 people and injure another 40,000; a chemical warhead of 300kg Sarin (nerve gas) could under the same conditions kill 200-3,000 people; a 30kg anthrax bomb would probably kill between 20,000 - 80,000 people. Biological weapons are relatively easy and cheap to make and it is believed that between 8 and 10 countries currently have undeclared biological weapons programmes. This session looks at the nature of biological warfare and possible methods for controlling biological weapons.

Essential Reading:

- Kelle, A *et al* (2006), 'Science, Technology and the BW Prohibition Regime' in Kelle, A *et al*, *Controlling Biochemical Weapons: Adapting Multilateral Arms Control for the 21st Century* (Palgrave) [Available on-line from library: click Online Resources then Reading Lists and search for this course]

Additional Reading:

- Kelle, A M. Dando and K. Nixdorff (2010) Strengthening BWC Prevention of State-sponsored Bioweapons, with, in *Bulletin of the Atomic Scientists*, Vol.66, No.1, pp.18-23
- McLeish, C and Nightingale, P (2007), 'Biosecurity, Bioterrorism and the Increasing Convergence of Science and Security Policy', *Research Policy* Vol.36 No.10 pp.1635-1654
- Littlewood, J (2008), 'Managing Biological Disarmament: The UK Experience', *Science and Public Policy* 35(1): 13-20. [Senate House library, you can get this electronically if you have a Senate House library card]
- Guillemin, J (2005), *Biological Weapons: From State-Sponsored Programs to Contemporary Bioterrorism* (Columbia) (Chapters 1, 8 and 9)
- John Rubin Productions (2007) 'The Living Weapon' (Emmy award winning documentary) <http://www.pbs.org/wgbh/amex/weapon/filmmore/index.html>
- Foreign and Commonwealth Office (2002) *Strengthening the Biological and Toxin Weapons Convention: Countering the Threat from Biological Weapons* (Cmd 5484) (London: TSO). (At <http://www.fco.gov.uk/Files/kfile/btwc290402.pdf>)
- Rappert, B (2003), 'Biological Weapons, genetics and social analysis: emerging responses, emerging issues – I', *New Genetics and Society* Vol.22 No.2 pp.159-181. (Part two in the following number is worth reading too).
- Falk, R (2003), 'The Challenges of Biological Weaponry: A Twenty-First-Century Assessment', in Wright, S (ed), *Biological Warfare and Disarmament: New Problems, New Perspectives* (Rowman and Littlefield) [Available on-line from library: click Online Resources then Reading Lists and search for this course]
- Rappert, B and McLeish, C (2007) (eds), *Web of Prevention: Biological Weapons, Life Sciences and the Governance of Research* (London: Earthscan, 2007) (esp chapter by Atlas)
- Durodie, B (2004), 'Facing the Possibility of Bioterrorism', *Current Opinion in Biotechnology* 15: 264-268.
- Dando M (1994), *Biological Warfare in the 21st Century* (London: Brassey's) (Chapter 4) (A very readable introduction on the nature of BW)) (See also chapters 1,8,10)
- Tucker JB (1994), 'Dilemmas of a Dual-Use Technology: Toxins in Medicine and Warfare', *Politics and the Life Sciences* Vol.13 No.1 pp51-62. (Wellcome Library)

Useful web sites:

Peace Studies, University of Bradford (lots of introductory information and analysis – including videos!): <http://www.brad.ac.uk/acad/sbtwc/>

Stockholm International Peace Research Institute: www.sipri.se/

Harvard Sussex Program on CBW Armament and Arms Limitation:

www.sussex.ac.uk/spru/hsp/

The Program also publishes *The CBW Conventions Bulletin* with news, background and commentary. Back issues available on the web:

<http://www.fas.harvard.edu/~hsp/bulletin/>

Federation of American Scientists (Has initiative on CBW arms control):

www.fas.org/

Topic 8. Nanotechnology and the Life Sciences

Industry, scientists and the government are talking about nanotechnology – the science of small things – as the ‘Next Big Thing’. But it is also seen as an opportunity to do things differently, to avoid the controversy that took place over GM foods and BSE. In this lecture, we will look at what people are saying about nanotechnology, what issues it might raise and what sorts of things we might do to involve members of the public in decisions about new technologies.

Essential Reading:

Michelson, E et al (2008) ‘Nanotechnology’ in *From Birth to Death and Bench to Clinic: The Hastings Center Bioethics Briefing Book*

<http://www.thehastingscenter.org/Publications/BriefingBook/>

Stilgoe, J (2007), *Nanodialogues* (London: Demos). First and last chapters of:

<http://www.demos.co.uk/publications/nanodialogues>

Additional Reading:

HM Government (2010), *UK Nanotechnologies Strategy: Small Technologies Great Opportunities* (BIS) (skim read chapters 1-5)

<http://www.bis.gov.uk/assets/BISPartners/GoScience/Docs/U/10-825-uk-nanotechnologies-strategy>

And critical commentary by Richard Jones: ‘Responsible innovation still needs innovation’ at: <http://www.softmachines.org/wordpress/?p=683>

Marchant, GE and Sylvester, DJ (2006), ‘Transnational Models for Regulation of Nanotechnology’, *Journal of Law, Medicine and Ethics*, Volume 34 Issue 4, (Winter 2006) (p 714-725)

- Thurs, D (2007), 'No Longer Academic: Models of Commercialization and the Construction of a Nanotech Industry', *Science as Culture* 16(2): 169-186
- Whitman, J (2007) 'The governance of nanotechnology', *Science and Public Policy* 34(4) pp. 273-283(11)
- Kearnes, M (2006), 'From Bio to Nano: Learning Lessons from the UK Agricultural Biotechnology Controversy', *Science as Culture* 15(4): 291-307
- Benoit –Joly, P and Kaufmann, A (2008), 'Lost in Translation? The Need for 'Upstream Engagement' with Nanotechnology on Trial, *Science as Culture* 17(3): 225-247 (A fairly sceptical view about the assumptions still embedded in public engagement exercises)
- Rogers-Haydn, T and Pidgeon, N (2006), 'Reflecting Upon the UK's Citizens' Jury on Nanotechnologies: Nanojury UK', *Nanotechnology Law and Business* 3(2):167-178.
- Doubleday, R (2007) 'The laboratory revisited: academic science and the responsible governance of nanotechnology' *NanoEthics*, 1(2): 167-176
- Doubleday, R (2007) 'Risk, public engagement and reflexivity: alternative framings of the public dimensions of nanotechnology' *Health Risk and Society*, 9(2): 211-227
- Rip, Arie (2006) 'Folk Theories of Nanotechnologies', *Science as Culture* 15(4): 349-65
- Matthew Kearnes, Phil Macnaghten, James Wilsdon, 2006, *Governing at the Nanoscale: People, policies and emerging technologies*
<http://www.demos.co.uk/publications/governingatthenanoscale>
- J. Wilsdon, & R. Willis, 2004. *See-through Science: why public engagement needs to move upstream*. London Demos
<http://www.demos.co.uk/publications/paddlingupstream> - Especially chapters 1 and 5
- Royal Society & RAE., 2004: *Nanoscience and Nanotechnologies: Opportunities and Uncertainties*. Royal Society and RAE, available at <http://www.nanotec.org.uk>
- A.H. Arnal, 2003, *Future Technologies, Today's Choices: Nanotechnology, Artificial Intelligence and Robotics: A Technical, Political and Institutional Map of Emerging Technologies*, Greenpeace Environmental Trust: London
www.greenpeace.org.uk/MultimediaFiles/Live/FullReport/5886.pdf
- Stilgoe, J (2007) *Nanodialogues: Experiments in Public Engagement with Science*
<http://www.demos.co.uk/publications/nanodialogues>

Wood, S and Jones, R and Geldart, A (2007) *Nanotechnology: From the science to the Social* (Swindon: Economic and Social Research Council), see www.esrc.ac.uk/ESRCInfoCentre/Images/ESRC_Nano07_tcm6-18918.pdf

K.E. Drexler, 1986: *Engines of Creation: the Coming Era of Nanotechnology*. Anchor Books (Widely cited as the original book that 'hyped up' the potential of nanotechnology)

R. A. L. Jones, 2004: *Soft Machines: Nanotechnology and Life*. Oxford University Press, Oxford

J. Macoubrie, 2005. *Informed Public Perceptions of Nanotechnology and Trust in Government*. Woodrow Wilson International Centre for Scholars, Washington. [available at: <http://www.wilsoncenter.org/news/docs/macoubriereport.pdf>]

Topic 9 Human Experimentation

This topic covers human experimentation from a sociological and policy perspective. Although we will touch on the ethics of human experimentation, we will be more concerned with what motivates people to take part in biomedical research, what (if any) contribution they can make if they are given a 'voice' rather than being treated as passive research material, and how we theorise the researcher-subject relationship.

Essential Reading:

EITHER

Steven Epstein (1995) 'The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials' *Science, Technology & Human Values*, Vol. 20, No. 4, 408-437

OR

Goodare,H., & Lockwood,S. (1999). Involving patients in clinical research. *British Medical Journal* 319 724-725.

OR

Williamson,C. (2001). What does involving consumers in research mean? *Quarterly Journal of Medicine* 94(12), 661-664. [for a consumer perspective]

Additional Reading

Gripping yarns [Books you can dip into – sensational and thoughtful stories about human experimentation. Make a selection]

Goodman,J., McElliot,A., & Marks,L. (2003). *Useful bodies: humans in the service of medical science in the twentieth century*. Baltimore: Johns Hopkins University Press

Lederer, S.E. (1995). *Subjected to science: human experimentation in America before the second world war*. Baltimore: Johns Hopkins University Press.

Moreno, J. (2001). *Undue risk: secret state experiments on humans*. London: Routledge

Oakley, A (2000). Chapter 11 of *Experiments in knowing: gender and method in the social sciences*, Polity Press, Cambridge.

Governance of research on humans [Useful background; get the gist]

DoH/Department of Health (2001). *Research Governance framework for health and social care*. London: Department of Health

Nuremberg Code (1949). [find this and others on the web or reprinted in: Vanderpool, H. Y. (1996). *The ethics of research involving human subjects*. Frederick, MD: University Pub. Group].

World Medical Association (2002). *Declaration of Helsinki*. Washington DC: World Medical Association.

Fisher, J A (2007) 'Governing human subjects research in the USA: individualized ethics and structural inequalities', *Science and Public Policy*, 3 (2) pp 117-126.

Active patients and research subjects

Rabeharisoa, V and Callon, M, 2004. 'Patients and scientists in French muscular dystrophy research'. In Jasanoff, S (ed) *States of Knowledge: the co-production of science and social order*, London, Routledge.

Weinstein, M. (2001). 'A public culture for guinea pigs: US human research subjects after the Tuskegee study'. *Science as Culture* 10(2), 195-223. [fascinating insight into 'professional guinea pigs']

Epstein, S (2008), 'Patient Groups and Health Movements' in Hackett, EJ *et al* (eds) *The Handbook of Science and Technology Studies*, Third Edition (Cambridge: MIT Press).

Epstein, S. (1996). *Impure science: AIDS, activism and the politics of knowledge*. Berkeley: University of California Press.

Volunteers' understandings

Corrigan, O. (2003). Empty ethics: the problem with informed consent. *Sociology of Health and Illness* 25(3), 768-792.

Featherstone, K., & Donovan, J. (2002). "Why don't they just tell me straight, why allocate it?" The struggle to make sense of participating in a randomised controlled

trial'. *Social Science and Medicine* 55 709-719.

Morris, N. and Balmer, B. (2006). Volunteer human subjects' understandings of their participation in a biomedical research experiment. *Social Science & Medicine*, 62(4), 998-1008

Researcher-subject relationships

Corrigan, O and Tutton, R (2006). 'What's in a name? Subjects, volunteers, participants and activists in clinical research'. *Clinical Ethics*, 1, 101-104.

Morris, N. and Balmer, B. (2006). Are you sitting comfortably? Perspectives of the researchers and the researched on 'being comfortable' *Accountability in Research*, 13, 111-133.

Motivation / Social perspectives

Ross, S., Grant, A., Counsell, C., Gillespie, W., Russell, I., & Prescott, R. (1999). Barriers to participation in randomised controlled trials: a systematic review. *Clinical Epidemiology* 52(12), 1143-1156.

Titmuss, R.M. (1971). *The gift relationship: from human blood to social policy*. London: LSE Books.

ALSO RELEVANT: papers by Rabeharisoa and Callon, and by Weinstein, listed earlier.

Topic 10. Animal Experimentation

Most of the literature on animal experimentation focuses on ethics – is it right or wrong. While not wholly ignoring this debate, a more policy-orientated social science literature tries to understand the social dynamics of the debate. From this perspective analysis tries to understand how the debate gets fought; what sort of rhetoric, strategies or tactics are employed on both sides; why people become involved in the issue etc.

The Wellcome Information Service (see front of reading list) has a large collection of material on issues in animal experimentation and you are encouraged to explore their resources.

The social dynamics of the debate:

These are not arguments for or against, but analyses of the history of the issue and of the types and styles of arguments used:

Essential Reading

Sanders, S and Jasper, JM (1994), 'Civil Politics in the Animal Rights Conflict: God Terms versus Casuistry in Cambridge, Massachusetts', *Science, Technology and Human Values* Vol.19 No.2 pp169-188

Additional Reading:

Michael M and Birke L (1994), 'Accounting for Animal Experiments: Identity and Disreputable "Others"', *Science, Technology and Human Values* Vol.19 No.2 pp189-204

- Nelkin D and Jasper JM (1992), 'The Animal Rights Controversy', in Nelkin D (1992), *Controversy: The Politics of Technical Decisions* (3rd Edition) (Newbury Park: Sage) pp26-44. [[Available on-line from library: click Online <http://lss-llss.ucl.ac.uk/> and search for this course, tick the 'previous year' box to make sure]
- Pivetti, M (2007), 'Natural and unnatural: activists' representations of animal biotechnology', *New Genetics and Society* Vol.26(2): 137-157.
- Holmberg, T and Ideland, M (2010), 'Secrets and lies: "selective openness" in the apparatus of animal experimentation', *Public Understanding of Science* (forthcoming) available at: <http://pus.sagepub.com/content/early/recent>
- Jasper, JM and Poulsen, J (1995), 'Recruiting Strangers and Friends: Moral Shocks and Social Networks in Animal Rights and Anti-nuclear Protest', *Social Problems* 42(4):493-512 (Looks at recruitment to protest movements via 'moral shocks' of visual and verbal rhetoric).
- Jasper, JM and Poulsen, J (1993), 'Fighting Back: Vulnerabilities, Blunders, and Countermobilization by the Targets in Three Animal Rights Campaigns', *Sociological Forum* Vol.8 (4): 639-57.
- McAllister Groves, J (1997), *Hearts and Minds: The Controversy Over Laboratory Animals* (Temple: Philadelphia) (Esp. Intro, Chs 5-6 and conclusion). [Wellcome]
- Munro, L (2005), 'Strategies, Action Repertoires and DIY Activism in the Animal Rights Movement', *Social Movement Studies* Vol 4 (1): 75 – 94. (Argues, based on empirical study, that the majority of animal activists employ non-violent means).

Web-Sites:

The Research Defence Society: <http://www.rds-online.org.uk/>

People for the Ethical Treatment of Animals: <http://www.peta-online.org>

Royal Society for Prevention of Cruelty to Animals: <http://www.rspca.org.uk/>