

New Program for NANO 310, adapted from Kjetil's 2018 course

Andrea Saltelli, August 2019

Day 1, August 19, 10:15-14:00: (Andrea, Kjetil, four lessons)

Kjetil: Introduction (two lessons). Nanoethics and Responsible Research and Innovation: what is it? Changing societal roles for science and for researchers. Kjetil own selection from his syllabus.

Andrea 1st Lesson: Ethics in pills and introduction to nano-risks and nano-imaginaries

- Ethics in crumbs; golden rule, Nichomachean ethics, utilitarianism and little more;
- Nano and risk: EEA;
- Nano and Risk: RIVM;
- Collingridge and its dilemma;
- Nanoethics at the Markkula center;
- Nano and weapons;
- Nano and transhumanism in GRIN. US NBIC report;
- Visions, from Feynman, Drexler, Harari;
- Feynman versus Drexler
- Fiction corner: Neal Stephenson's Age of Diamond and Black Mirror's Hated in the Nation.

Andrea 2nd Lesson: History and Philosophy of Science

- How are we taught our science?
- Why Science and Ethics? The Vienna Circle, Popper, Kuhn, Lakatos, Feyerabend (based on Ravetz's "Ideological commitments in the philosophy of science");
- Michal Polanyi;
- Lyotard, Shapin and Schaffer, Latour, Toulmin;
- Roots of the Cartesian dream: From Bacon to Science the Endless Frontier;
- Critique of the dream;
- Merton, norms and counter-norms (Mitroff);
- Feynman Cargo Cult lecture.

Day 2, Wednesday August 21, 10:15-12:00: (Andrea and Matthias, two lessons)

Matthias: (one lesson): Matthias own selection (from his 'Numbers for Policy' lessons?) – could be on Friday 23rd instead.

Andrea, 3rd Lessons Crises and Ethics;

- From P-test to a crisis of statistics;
- Statistics is difficult;
- A ritual use?
- The debate about significance; Rudner;
- Reproducibility, P-hacking, HARKing;
- From a crisis in statistics to one in science;
- Who predicted the crisis: De Solla Price and Ravetz;
- Ravetz: Science from 'Gemeinschaft' to 'Gesellschaft';
- Bad science is fit; it is sticky; fixes backfire; a lost ethos;
- Not all disciplines are the same.

Day 3, Thursday 22, 10:15-14:00: (Andrea and Roger, four lessons)

Roger: (two lessons): Research ethics (national ethics committees); nano-code of conduct, soft law; governance; Roger own selection (based on reading material 1,2,7,10?)

Andrea, 4th Lessons Crises and Ethics, Continued

- From science's crisis to science wars;
- Instrumental readings of the crisis;
- Structural contradictions in science;
- Who is a scientist?
- Repercussions on policy and society?
- Science and technology between utopia and dystopia;
- Is our relation to technology addictive? Mumford, Harari;
- Dewey, Postman;
- Lyotard Shapin Schaffer (repetition);
- What is new in our relationship to the new social media;
- Orwell or Huxley? Lanier versus Zuboff;
- Possible scenarios, from collapse to techno-split;
- What the optimists say.

Day 4, Friday 23 10:15-16:00: (Andrea and Jeroen, five or six lessons?)

Jeroen: (two lessons) Nano as a physical / chemical object. Science, uncertainty, non-knowledge and ignorance. Jeroen own selection based on his lecture Jeroen_Slides_NANO310_Nanorisk23Aug2017.pdf

Andrea 5th Lesson: Evidence based policy

- Experts and expertise; from Rittel to the present;
- How to appraise the evidence from experts? The lesson from Giandomenico Majone;
- Evidence based policy; Shakespeare's taming of the Shrew

- Majone again;
- Andrew Stirling;
- What is wrong with evidence-based policy?
- Power asymmetries;
- Merchant of doubts;
- Science and lobbies; the regulation game;
- Regulatory capture in the name of enlightenment?
- Ethic washing; EU guidelines on Ethics of AI (Thomas Metzinger)
- The case of the innovation principle;
- Numbers and trust, the lesson of Theodor Porter;
- Trust for Luhmann, Ravetz;
- Law of Goodhart, Campbell or Ravetz?
- Jerry Z. Muller and the Tyranny of Metrics;
- Frames; George Lakoff, Steve Rayner;
- When practical problems are dressed as technical ones. The case of GMO and the PABE study.

Andrea 6th Lesson: Ethics of quantification

- The Procedural Utopia of Logical Positivism (E. Millgram); Majone's; decisionism; Condorcet's *Mathématique sociale*; recall the critique of Stirling;
- Prevailing view: Cass Sunstein and Nicholas Stern;
- Cathy O'Neil Weapons of Math Destruction
- Popp Berman and the sociology of quantification;
- More from Porter (Funny Numbers);
- The French Stat-activisme;
- A decalogue of diligent quantifier;
- Rosen, Oreskes on modelling;
- Models; *caeteris are never paribus*;
- Sensitivity analysis;
- Sensitivity auditing

Day 5, Friday 30 August, 10:15-14:00 (Mali and Andrea, four hours)

Presentations of the Essays by the students

Monday 30 September: Submission essays

Reading Material

1. Roger Strand, 2011, Chapter 16, Nano Ethics, In: *Nanotechnology in the Agri - Food Sector: Implications for the Future*, Editors:Lynn J. Frewer, Willem Norde, Arnout Fischer, Frans Kampers, Wiley.

- http://www.andreasaltelli.eu/file/repository/Roger_nanoethics_chapter_1.pdf
2. Research Council of Norway: A Framework for Responsible Innovation, in Norwegian:
<https://www.forskningsradet.no/contentassets/1975cf4657c24ffea33d274adfff0319/rri-rammeverk.pdf>. Available in English at:
https://www.dropbox.com/s/17gpxyfkpzt242s/NFR_Framework_RRI.pdf?dl=0
 3. Andrew Chen, 2002, The Ethics of Nanotechnology, Markkula Center for Applied Ethics, May 3, 2002, <https://www.scu.edu/ethics/focus-areas/technology-ethics/resources/the-ethics-of-nanotechnology/>
 4. EEA 2013 Late lessons II Chapter 22 - Nanotechnology - early lessons from early warnings <https://www.eea.europa.eu/publications/late-lessons-2/late-lessons-chapters/late-lessons-ii-chapter-22/view>; see also
 5. Steffen Foss Hansen, Andrew Maynard, Anders Baun and Joel A. Tickner, 2008, Late lessons from early warnings for nanotechnology, Nature Nanotechnology, Vol. 3, 444-447.
http://www.andreasaltelli.eu/file/repository/Hansen_et_al_Late_lessons_from_early_warnings_for_nanotechnology.pdf
 6. Jaco Westra (editor), 2014, Assessing health and environmental risks of nanoparticles. An overview, RIVM Rapport 2014-0157,
https://www.rivm.nl/sites/default/files/2018-11/007767_nanoparticles_eng-tg.pdf
 7. Excerpts from Rene von Schomberg (2011) "Introduction: Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields",
<https://publications.europa.eu/en/publication-detail/-/publication/60153e8a-0fe9-4911-a7f4-1b530967ef10>
 8. Jerry Ravetz and Roy Edgley, 1984, Ideological Commitments in the Philosophy of Science, With a Comment on Ravetz by Edgley, Radical Philosophy 037 (Summer 1984) / Article,
http://www.andreasaltelli.eu/file/repository/Ideological_commitment.pdf
 9. R. Feynman, Cargo Cult Science, Commencement Speech at Caltech 1974,
<http://calteches.library.caltech.edu/3043/1/CargoCult.pdf>, (also available in the book Surely You're Joking, Mr. Feynman!)
 10. European Commission, 2009, Commission recommendation on A code of conduct for responsible nanosciences and nanotechnologies research & Council conclusions on Responsible nanosciences and nanotechnologies research, ISBN 978-92-79-11605-6, Luxembourg.
http://ec.europa.eu/research/science-society/document_library/pdf_06/nanocode-apr09_en.pdf
 11. Excerpts from Ravetz, J., 1971, Scientific Knowledge and its Social Problems, Oxford University Press.
<http://www.andreasaltelli.eu/file/repository/Bits.pdf>
 12. Marc A. Edwards and Siddhartha Roy, Academic Research in the 21st Century: Maintaining Scientific Integrity in a Climate of Perverse Incentives and Hyper-competition, ENVIRONMENTAL ENGINEERING

SCIENCE, 34(1), 2017,

<https://www.liebertpub.com/doi/10.1089/ees.2016.0223>

13. C. Marris, "Final Report of the PABE research project funded by the Commission of European Communities," 2001.

http://www.andreasaltelli.eu/file/repository/PABE_FAIR_CT98_3844_DG12_SSMI_eu_studie_akzeptanz_biotech_011201.pdf