RESEARCH ETHICS

MNSES9100

deborah.oughton@nmbu.no

A human embryo: Yorgos Nikas. Wellcome Images/Flickr (CC BY-NC-ND 2.0)

Why is research ethics important?

- History
- New knowledge/technology creates new ethical problems
- Science (and scientific reasoning) plays a significant role in public policy and has a powerful impact on society
- Worries about scientific misconduct

NATURE | NEWS

Chinese scientists genetically modify human embryos

Rumours of germline modification prove true — and look set to reignite an ethical debate.

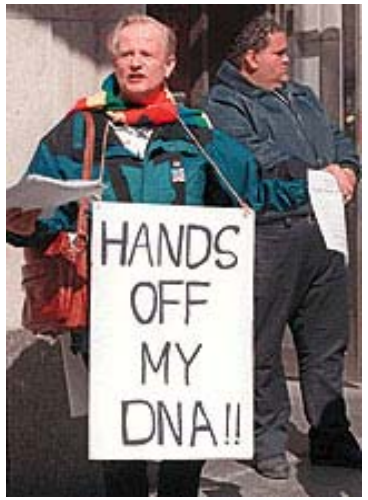
David Cyranoski & **Sara Reardon**

22 April 2015

www.wired.com/2017/05/jennifer-doudna-what-crispr-can-do/

Research Ethics: Three areas of responsibility

- Scientific community: research norms, misconduct, publication
- Research subjects: humans, animals
- Society: the public, environment, patents, technological risk



A brief history of Research Ethics - I

- **Hippocratic Oath**

- **Charles Babbage (1830) ”*Reflections on the decline of science in England*”**
  - **–Cooking, Trimming, Forging of data**

Ada Lovelace

The Thrilling Adventures of Lovelace and Babbage, Sydney Padua

A brief history of Research Ethics - I

Nüremberg Trials (1945- 1946)

Helsinki-deklarasjon

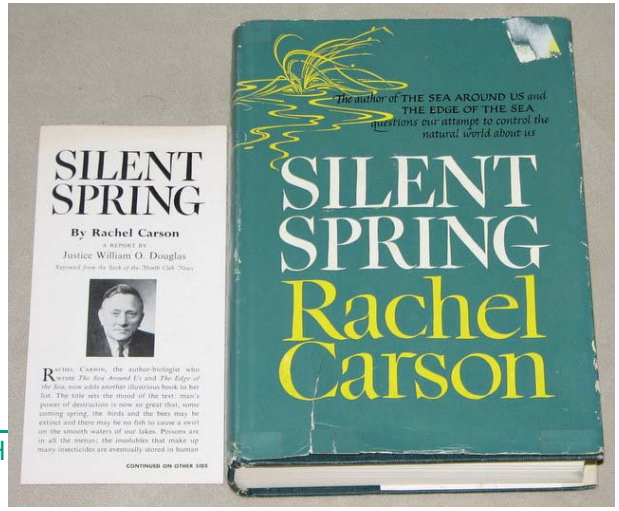
WMA Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects, 1964

A Brief History of Research Ethics - II

1945 First Atomic bomb test

1960-1970s **Reports of ethical mistreatment of research subjects and research fraud**

1962 **Rachel Carson *Silent Spring***

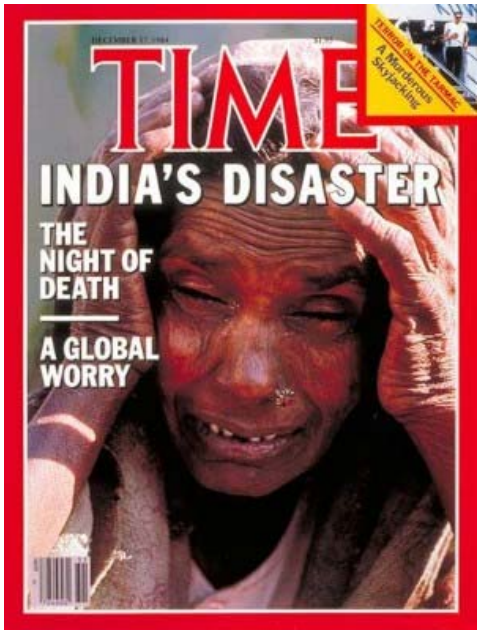


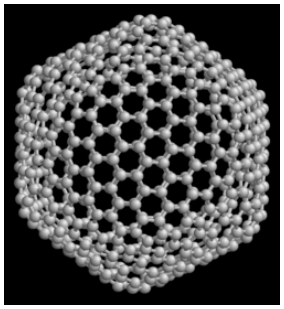
A Brief History of Research Ethics - III

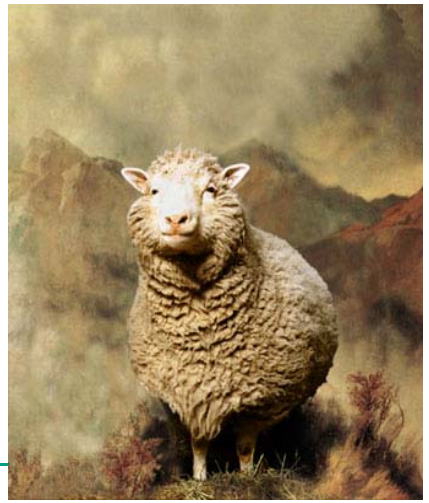
1970-1990 **Environmentalism, Animal rights, Bhopal, Chernobyl,**

1990s- **Biotechnology, genetic engineering, nanotechnology,**

2000s- **Synthetic Life, information technology**







Dolly, library.thinkquest.org

Research Ethics: Three areas of responsibility

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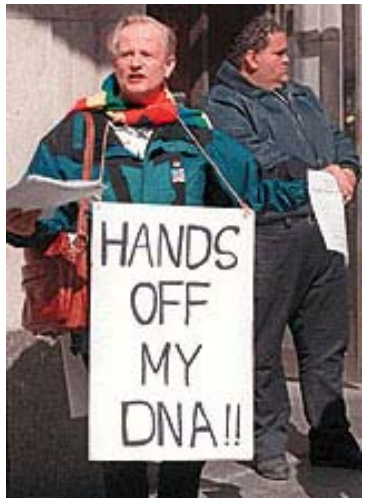
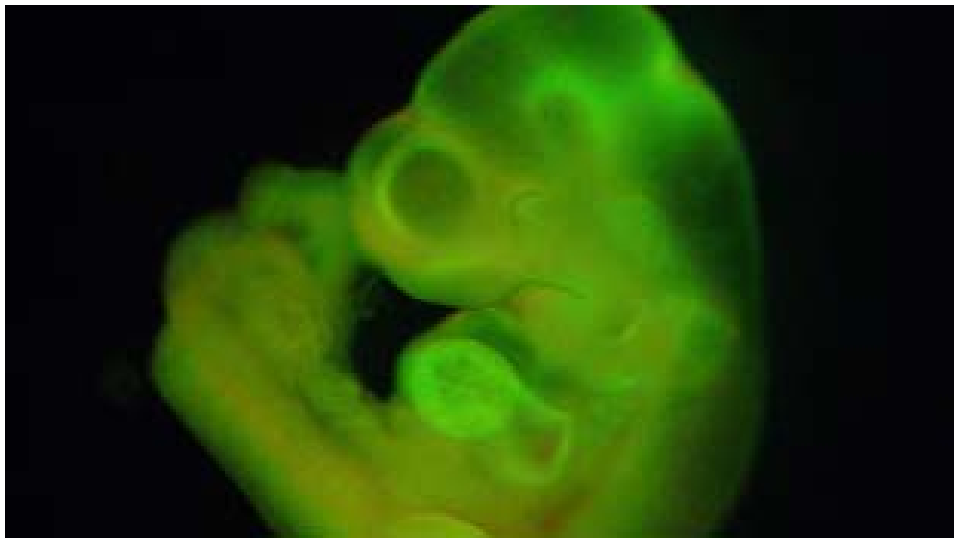


Misconduct concerns

STAP (Stimulus-triggered acquisition of pluripotency) – Nature, Japan



Photo, Haruko Obokata

NEWS FEATURE

COLLATERAL DAMAGE

How a case of misconduct brought a leading Japanese biology institute to its knees.

600 | NATURE | VOL 520 | 30 APRIL 2015

Misconduct and Fraud in Norway

- Jon Sudbø
  - Paper published in the Lancet October 2005 - Sudbø admitted fabrication of data January 2006
  - Independent commission appointed January 2006 to investigate all papers, including PhD and co-authors (60)
  - Report in June 2006 found that 13 articles needed to be withdrawn
  - UiO withrew PhD in December 2006
  - Authorisation as a doctor and dentist withdrew in November 2006
  - Now working as assistant dentist in Seljord

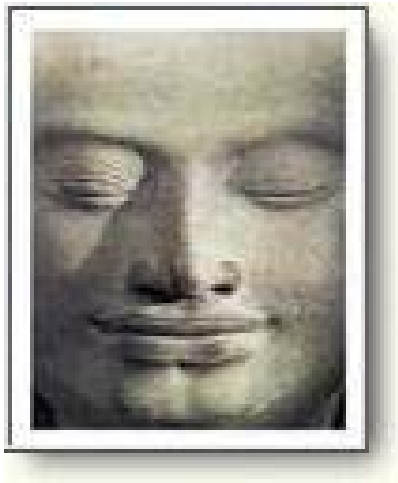
UNIVERSITAS

11 mistenkt for juks

SKUFFET: Dekan Finn Georg B. Wisløff tar mistanken om eksamensfusk blant doktorgradsstipendiatene alvorlig.
OTO: Brian Olguin

Ethics of Scientific Research

- Ethics
  - The philosophical study of right and wrong conduct and the rules and principles that ought to guide it ("the oughts and the shoulds").
- Scientific Research
  - The conduct of scientists



Research Fraud and Misconduct

- What is research fraud?
- Why does it happen?
- How often does it happen?
- How is it controlled?

Dutch psychologist Diederik Stapel
www.guardian.co.uk/science/2012/sep/13/scientific-research-fraud-bad-practice

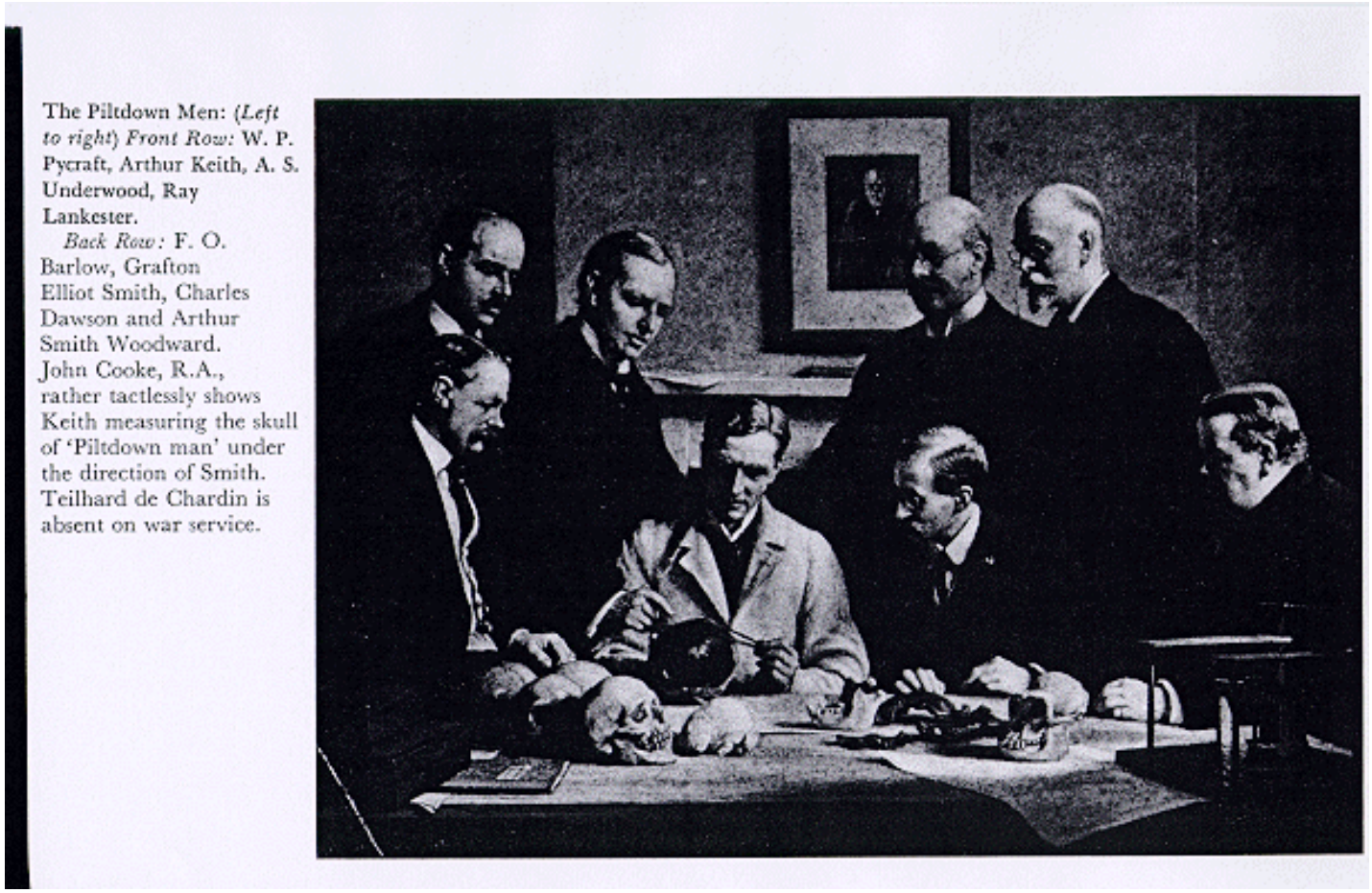
The Patchwork Mouse (1974)

- William T. Summerlin
- Chief of transplantation immunology at Sloan-Kettering
- Claimed he could transplant onto animals corneas, glands, and skin that would normally be rejected — sometimes even across species.
- The fraud discovered after three years when a lab assistant noticed that the black “skin graphs” were drawn on with a marker.

“my error was not in knowingly promulgating false data, but rather in succumbing to extreme pressure placed on me by the institute director to publish information".

Famous Frauds in Science

- The Piltdown Man (1908-12)



The Piltdown Men: (*Left to right*) *Front Row:* W. P. Pycraft, Arthur Keith, A. S. Underwood, Ray Lankester.
Back Row: F. O. Barlow, Grafton Elliot Smith, Charles Dawson and Arthur Smith Woodward. John Cooke, R.A., rather tactlessly shows Keith measuring the skull of 'Piltdown man' under the direction of Smith. Teilhard de Chardin is absent on war service.

The Hoax

Hoax papers

PUBLISHING

Mystery over obesity 'fraud'

Researcher baffled after his results appear in bogus paper.

BY DECLAN BUTLER

Communications (*BBRC*), is not the kind of prank that journals have encountered before,

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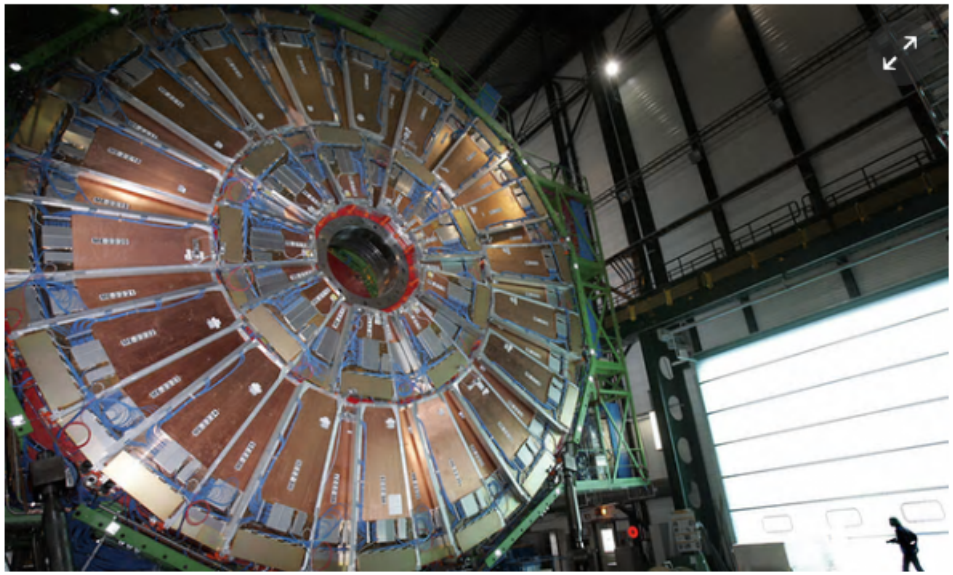
Other Publication «Hoaxes»

Nonsense paper written by iOS autocomplete accepted for conference

New Zealand professor asked to present his work at US event on nuclear physics despite it containing gibberish all through the copy



The Cern laboratory in Geneva. Christoph Bartneck reduced the complex world of nuclear physics to phrases such as 'power is not a great place for a good time'. Photograph: Fabrice Coffrini/AFP/Getty Images

Guardian, 21 October 2016

Journal accepts bogus paper requesting removal from mailing list

Australian computer scientist Dr Peter Vamplew submitted emphatically titled paper to 'predatory' journal and 'nearly fell off chair' when it was accepted

Get me off Your Fucking Mailing List

David Mazières and Eddie Kohler
New York University
University of California, Los Angeles
http://www.mailavenger.org/

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your fucking mailing list. Get me off
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Guardian, 25 November 2014

Famous Frauds in Science

- Cyril Burt (twin study 1943)
- IQ studies on identical twins
- Posthumously accused of fraud and fabrication

I know I am right

Cyril Burt 1881-1971

Famous Frauds in Science

- Hwang Woo-Suk (embryonic stem cells and cloning)

I want fame and fortune

This article has been retracted

Published Online May 19 2005
Science 17 June 2005:
Vol. 308 no. 5729 pp. 1777–1783
DOI: 10.1126/science.1112286

REPORT

Patient-Specific Embryonic Stem Cells Derived from Human SCNT Blastocysts

Woo Suk Hwang[1,2,*], Sung Il Roh[3], Byeong Chun Lee[1], Sung Keun Kang[1], Dae Kee Kwon[1], Sue Kim[1], Sun Jong Kim[3], Sun Woo Park[1], Hee Sun Kwon[1], Chang Kyu Lee[2], Jung Bok Lee[3], Jin Mee Kim[3], Curie Ahn[4], Sun Ha Paek[4], Sang Sik Chang[5], Jung Jin Koo[5], Hyun Soo Yoon[6], Jung Hye Hwang[6], Youn Young Hwang[6], Ye Soo Park[6], Sun Kyung Oh[4], Hee Sun Kim[4], Jong Hyuk Park[7], Shin Yong Moon[4] and Gerald Schatten[7,*]

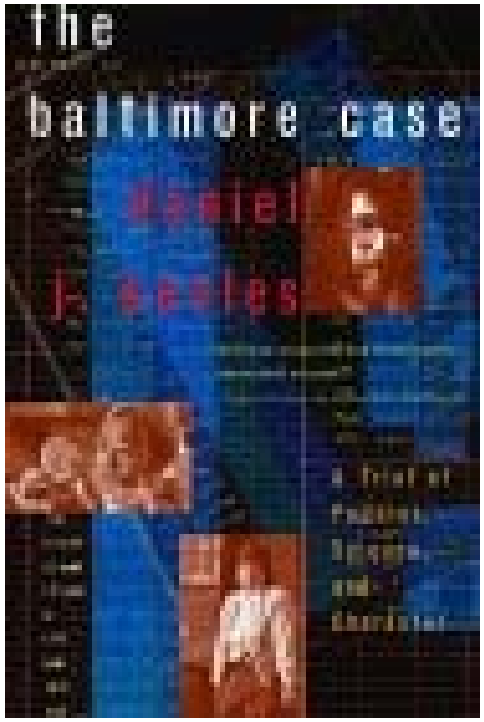
± Author Affiliations

* To whom correspondence should be addressed. E-mail: hwangws@snu.ac.kr (W.S.H.); gschatten@pdc.magee.edu (G.S.)

Case study: “The Baltimore Affair”

A case of data manipulation and fraud accusations between scientists that shocked America; damaged the reputation of a Nobel prize-winner and the prestigious Massachusetts Institute of Technology (MIT); and sparked a governmental level investigation.

Daniel Kevles. 1998. The Baltimore Case: A Trial of Politics, Science and Character



Aftermath

- Baltimore and Imanshi-Kari cleared in 1996 (not fraud but sloppy science and bad practice)
- Both still working as scientists
- Repercussions in ”interference” of government in research
- Disquiet about the role of industry funding and whether it promotes fraud and bias
- What is fraud; what is personal conflict; what is scientific disagreement?

«It’s hard to tell the jerks from the cheats»

Scientific Fraud and Misconduct

1. Fabrication and construction of data (forgery)
2. Data manipulation /falsification (selection, substitution, misleading statistical methods)
3. Deliberate distortion of results or conclusions
4. Plagiarism of results, publications or ideas
5. Proposal applications containing incorrect information
6. Inappropriate author credit (omission or honorary author credit)
7. Negligent filing and storage of data

NENT: Den nasjonale forskningsetiske komité for naturvitenskap og teknologi www.etikkom.no

#overlyhonestmethods

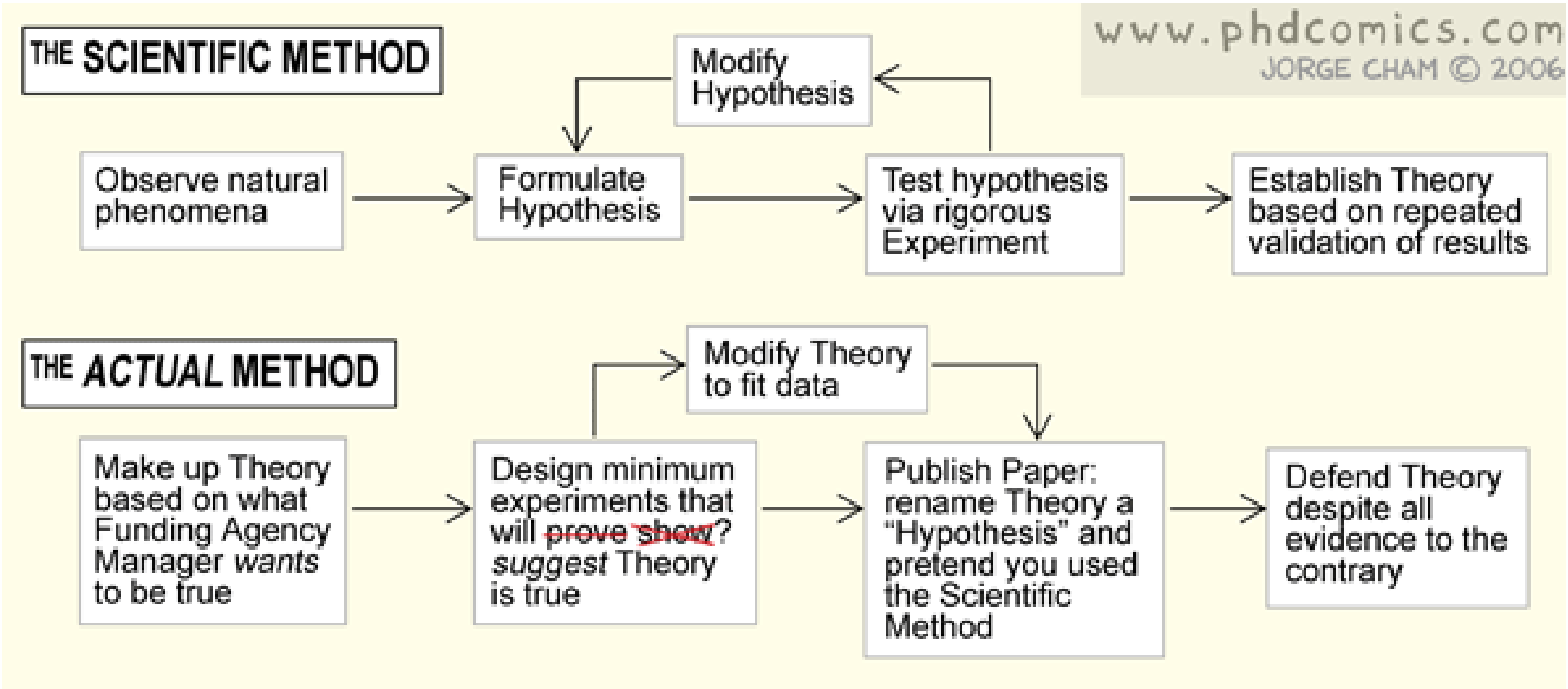
I can't send you the original data because I don't remember what my excel file names mean anymore #overlyhonestmethods

There should have been more experiments but our funding ran out so we published it anyway. #overlyhonestmethods

What the... We didn't do any of this! Has my supervisor edited it without telling me? Oh, great. Now I'll look stupid #overlyhonestmethods

A Northern blot was run instead of realtime QPCR because the PI is old and does not trust results unless he sees a band #overlyhonestmethods

"Experiment was repeated until we had three statistically significant similar results and could discard the outliers"
#overlyhonestmethods



Group Discussion 1 – The «Scientific Method» - Is honesty the best policy

1. Go round the table and give a brief introduction to yourself and your PhD research Area
2. Select a reporter

3. Discussion

- Who's research methods fit the Popperian approach to hypothesis testing?
- What other types of method are used in research projects?
- Can you identify with any of the #overlyhonestmethods?
- When might #overlyhonestmethods represent deviations from good practice or ethically questionable actions, or undermine the integrity of science?

Group Discussion 1

- Group 1: HE Seminarrom U29
- Group 2: FYS Ø358
- Group 3: HE 595/596
- Group 4: HE Aud 3 Front
- Group 5: HE Aud 3 Back
- Group 6: HE Canteen

Group Discussions…

- Discussions to ca. 1500
- Feedback session/Lecture 1515-1600

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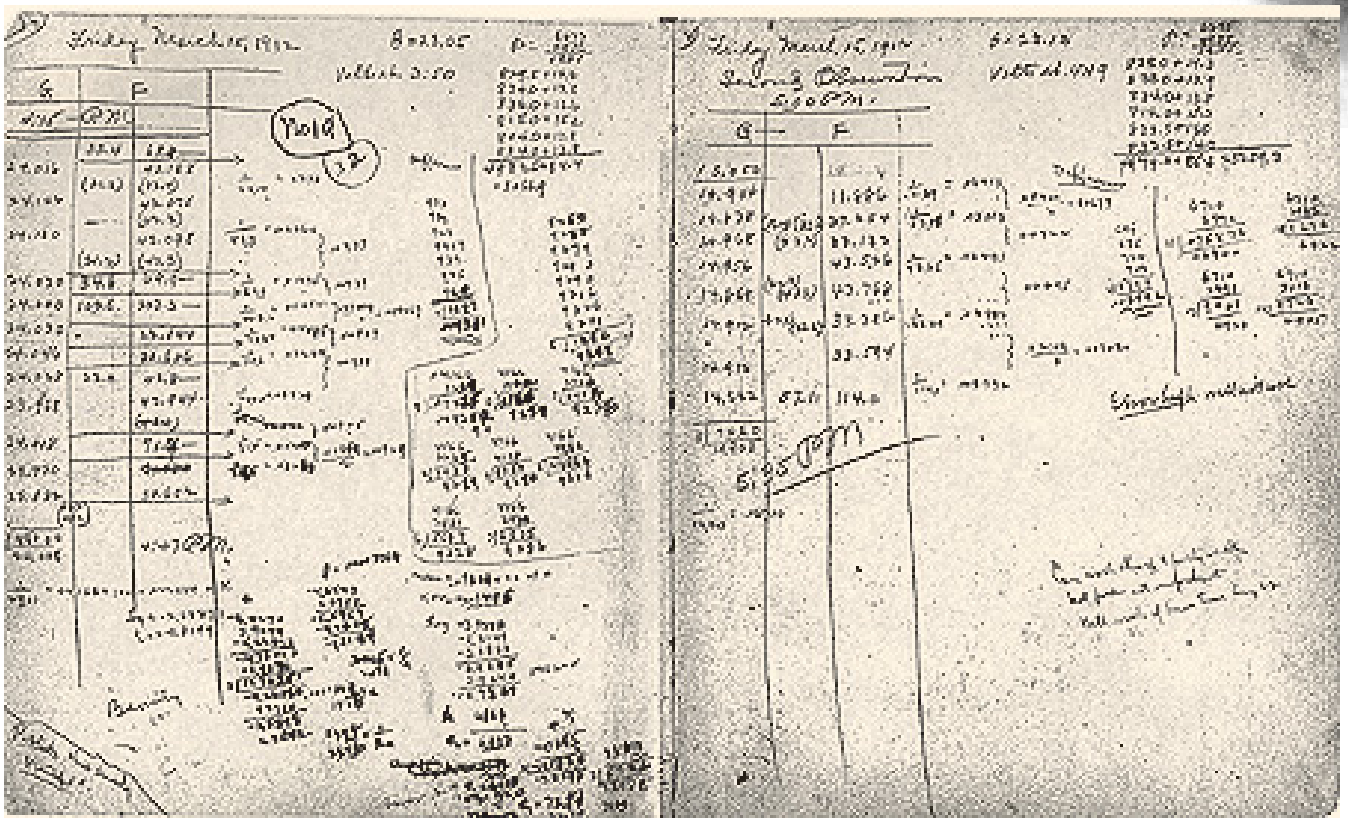
Trimming the data ?

- Gregor Mendel (1866)
- Milikan's Oil Drop Experiment (1916)



Famous Plagiarists

- Vijay Soman, an assistant professor at Yale, was asked by his boss Philip Felig to peer review a paper by Helena Wachslicht-Rodbard. Felig and Soman sent back a negative review, delaying publication, then Soman turned around and submitted virtually the same paper to another journal.

- Guess who got the paper to review?

Research Ethics: Three areas of responsibility

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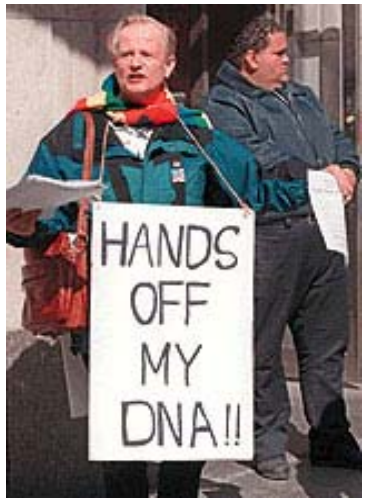
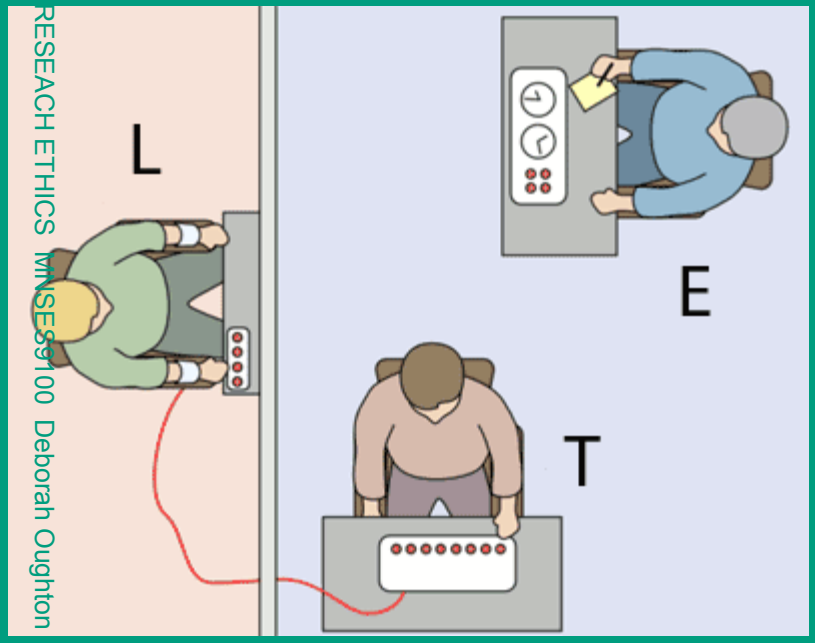


Harming Research Subjects: Milgram's Obedience Studies

Stanley Milgram**: Psychologist at Yale University**
Experiment: **"Obedience to Authority" 1974**

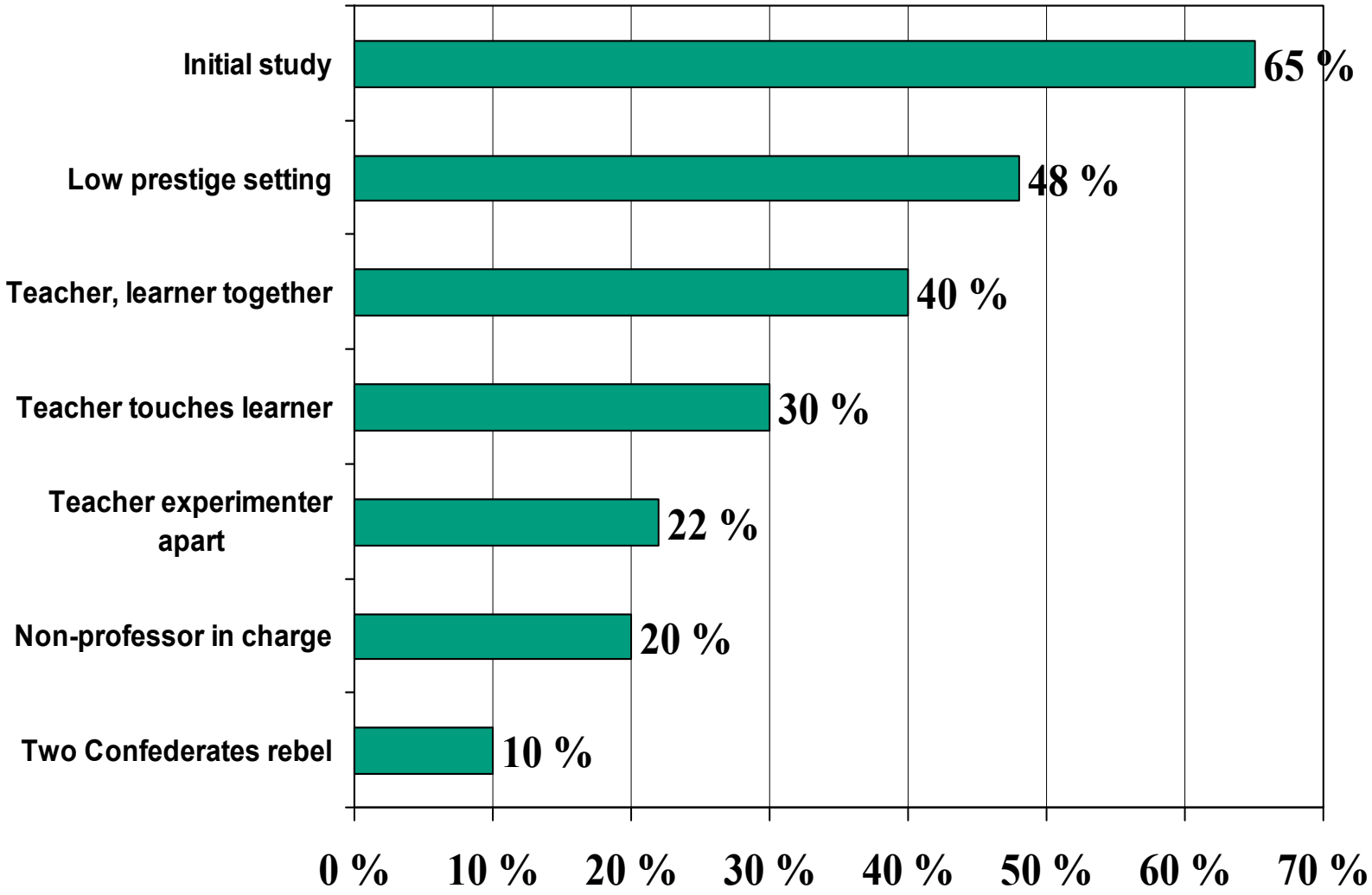
Research volunteers, "teachers", were told to give electric shocks to what they thought were research subjects, "learners", as part of a study on the effect of punishment on learning. Even though many showed unease and asked questions, 65% followed the orders "all the way", to 450 Volt



Obedience to Authority, 1974

"I observed a mature and initially poised businessman enter the laboratory smiling and confident. Within 20 minutes he was reduced to a twitching, stuttering wreck, who was rapidly approaching nervous collapse. He constantly pulled on his ear lobe, and twisted his hands. At one point he pushed his fist into his forehead and muttered 'Oh God, lets stop it'. And yet he continued to respond to every word of the experimenter, and obeyed to the end."

Milgram's Results



Tuskegee ”Experiments”

- Time and place: **Alabama 1932-1972**
- Aim: **To investigate the long-term effect of untreated syphilis**
- Studies: **400 poor, black American men (200 controls) were led to believe that they were receiving free medical treatment for syphilis from doctors**
- **The studies lasted until 1972 when Jean Heller broke the story. By then,100 of the research subjects were already dead, even though penicillin was a long established treatment**

Presidential apology in 1997

Research involving humans: Take home messages

- Research Subjects. Need to be aware of potential conflicts and adress the issues of:
  - Free informed consent
  - Transparency vs. privacy and confidentiality
  - Objectivity vs. Involvement of the research subject
- Data Protection Official for Research/ Personvernombud for forsking/NSD www.nsd.uib.no/personvern/
- Ethical and Societal Consequences of Research
  - Harm means more than ”ouch”
  - Need to consider not only risks to research subjects, but also how they might benefit from research

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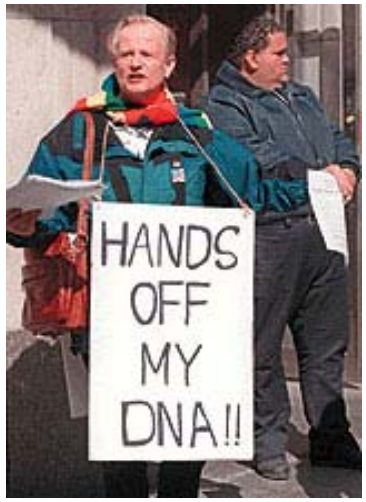
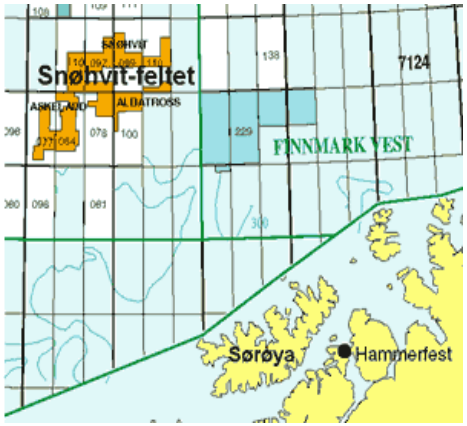
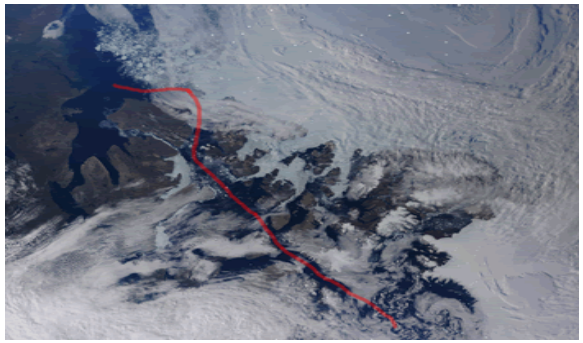


Ethics, Science and Society

- What responsibility do scientists have for the possible negative consequences of their research?
- How should we best evaluate and balance the potential harms and benefits of research and technology?
- How to deal with risk and uncertainty?



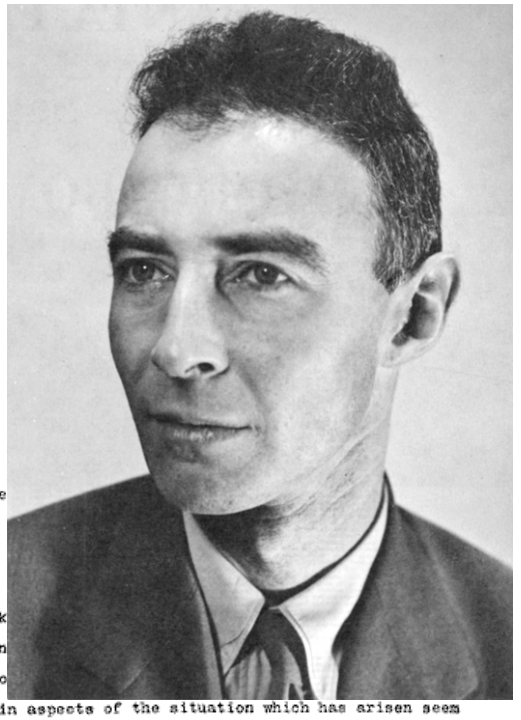


Case 1: Manhattan project

Richard Rhodes: The Making of the Atomic Bomb

Chain of events

- 1933 Leo Szilard realises the possibility of a nuclear chain reaction
- Aug 1939 Einstein (and Szilard) write to Roosevelt recommending research into nuclear weapons
- Sept 1939 WWII begins
- 1941 Roosevelt authorises Manhattan Project
- 1942 Fermi achieves controlled fission at Chicago
- May 1945 War ends in Europe
- August 6th 1945 Hiroshima (Truman's orders)
- August 9th 1945 Nagasaki
- August 11th Japan surrendered



F.D. Roosevelt,
President of the Unite
White House
Washington, D.C.

Sir:

Some recent work
municated to me in man
ium may be turned into
mediate future. Certain aspects of the situation which has arisen seem
to call for watch
of the Administration.

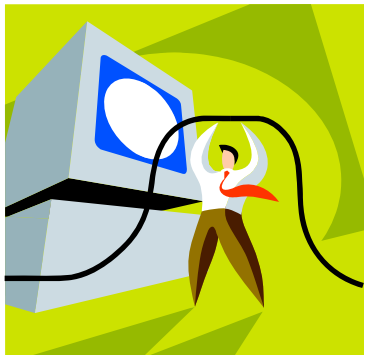
Robert Oppenheimer

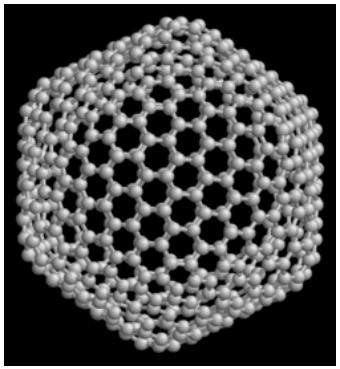
Trinity, July 16 1945 (Berlyn Brixner)

All knowledge has the potential to be absued or misused; all knowledge has the potential to be beneficial to society; all technologies carry risks

↓

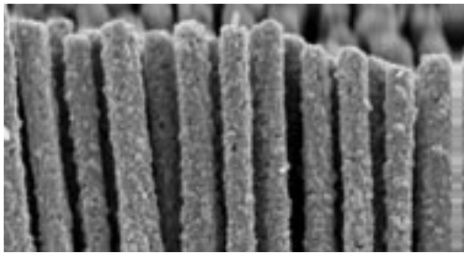
Is this part of Research Ethics??





Strand and Oughton 2009 ***Risk and Uncertainty as a Research Ethics Challenge. NENT (www.etikkom.no)***

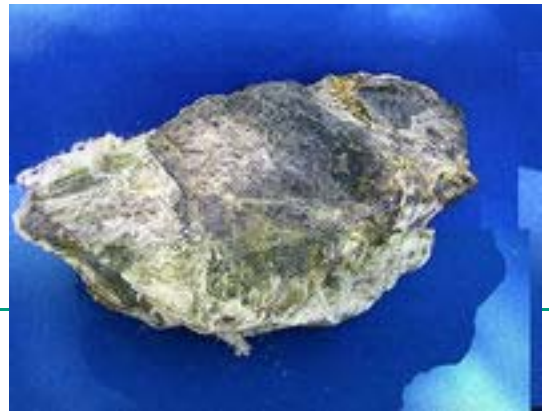
Case 2: Nanotechnology/ Nanomaterials



- Development and exploitation of materials and products at the nanometer scale (1-100 nm)
- Nanoparticles – organic (carbon rods, polymers, fullerenes), inorganic (metals, metal oxides, ceramics) or compsite
- Three types: natural (colloids), anthropogenic (smoke, soot), or manufactured/engineered
- Many already on the market (sun-creams, self-cleaning surfaces, refrigerators, washing machines)

Environmental and Health Risks

- Environmental and Health risks
  - High reactivity due to high surface area
  - Potential to cross the blood-brain membrane
  - Ecotoxicological responses found in organisms and cell cultures (e.g., fullerenes, metals, metal oxides)
  - Asbestos analogy: asbestos made from chrysotile, an naturally occuring non-toxic substance.
  - ”Grey Goo” and «killer nano-robots»



The Large Hadron Collider, CERN

Photo: Fabrice Coiffrini, AFP

- Lawsuit bought against CERN, claiming the scientists were risking creating a black hole www.lhcdefense

Tuesday 24th

- Svein Sjöberg (Kristian Nygaards Hus)
- Andreas Karlsson

Wednesday 25th

- Demarcation of science from pseudoscience

  - Recommended Literature : Feyerabend paper