...and good scientific practice

– A brief overview –

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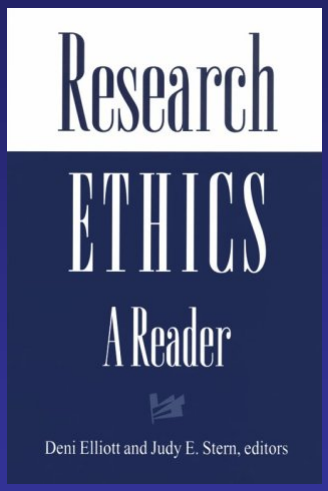
Outline

- What is Research Ethics?
- Why lecture on Research Ethics?
- Conducting and reporting of science
- Conflicts of interest and conflicts of commitment
- Relationship in research groups
- Hazards to good scientific practice
- What is scientific misconduct?
- Rules and procedures of the Max Planck Society



University Press of New England
Hanover & London (1997)

On Being a Scientist
Responsible Conduct in Research

Commitee on Science, Engineering, and Public Policy

Nat. Acad. of Sciences
Nat. Acad. of Engineering
Institute of Medicine

National Academy Press (1995)

http://www.nap.edu/openbook

Cargo Cult Science

Richard Feynman

From a Caltech commencement address given in 1974
(to be found in many places on the internet)

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Richard Feynman: „Cargo cult science" (1974)

It's a kind of scientific integrity, a principle of scientific thought that corresponds to a kind of utter honesty – a kind of leaning over backwards. For example, if you're doing an experiment, you should report everything that you think might make it invalid – not only what you think is right about it: other causes that could possibly explain your results; and things you thought of that you've eliminated by some other experiment, and how they worked – to make sure the other fellow can tell they have been eliminated.

What is Research Ethics?

- **„Morale"** ← Latin „mores" : custom, habit
  ... indicates the distinction between what is good and what is evil in the everyday life

- **„Ethics"** ← Greek „ethos" : tradition, habit
  ... the philosophical study of the principles at the basis of morale

Etymology of the two words speaks one's mind:
both ethics and morale are the result of the society's evolution towards "standard" behaviours.

Operational definition of morale:
„... those standards everyone wants everyone to follow, even if everyone else´s following them means having to follow them oneself." (M. Davis)

What is Research Ethics?

- **„Ethics of topics and findings"**

  „morality" : effects on society and humanity

  where are the limits?

- **„Ethics of methods and process"**

„integrity" : credibility of results, trust among scientists and between society and scientists

Basic values:
- honesty
- scepticism
- fairness
- collegiality
- openness

What is Research Ethics?

- Morality can be based upon the rationale to avoid harm.

- Scientists generally agree on the basic moral standards.
  Moral disagreements often result from
  - → disagreement about the facts of a case, e.g., has the researcher really used information from reviewing a proposal for his own proposal?
  - → dissens on what standards to apply, e.g., should a competent scientist have known that the experiment posed significant risk of harm?
  - → disagreement on what counts as breaking a rule, e.g., does not reporting failed experiments count as deception?

  Moral judgements in a particular field requires knowledge of the conventions and practices of the field.

- Moral systems are not simple ones (like grammatics).
  An explicit account of morality may reveal that judgements in one area are inconsistent with the vast majority of one´s other judgements, e.g., what is morally allowable regarding who should be listed as an author.

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Why lecture on Research Ethics?

Martinson, Anderson & de Vries, *Nature* **435**, 737 (9 June 2005)

Anonymous poll of 3247 scientist funded by NIH
Percentage of scientists who admit having engaged in the behavior listed within the previous 3 years (selection):

0.3	Falsifying or „cooking" research data
1.4	Using another´s ideas without permission or giving credit
1.7	Unauthorized use of confidential material for own research
6.0	Failing to present data that contradict one´s previous research
12.5	Overlooking other´s use of flawed data or questionable interpretion
4.7	Multiple publication of the same data or results
10.0	Inappropriately assigning authorship credit
10.8	Withholding details of methodology in papers or proposals
13.5	Using inadequate or inappropriate research designs
15.3	Dropping observations or data points on a „gut feeling"
27.5	Inadequate record keeping related to research projects

Why lecture on Research Ethics?

Why should I follow ethical rules?

„Moral rules are those rules that reasonable people, in ignorance of their own circumstances or future, would agree are the best standards for their own behavior and the behavior of others."

(Werhane & Doering, 1997)

a) the rules are consistent with common-sense morality

b) the rules are in my own interest

b) I want to avoid being punished

Why lecture on Research Ethics?

Modern science is...

- ... centered on methods
  - → special skills required, division of labor
- ... carried out in large units
  - → control, supervision of teams and individuals
- ... professionalized
  - → competition, dependence on superiors
- ... dependent on resources
  - → competition, peer review
- ... reputation building
  - → non-personal procedures (publications & impact)
- „Useful" or „relevant" results are required
  - → interaction with funding bodies & with the public

Why lecture on Research Ethics?

- Science is a social enterprise based upon trust
  - → in the results by others that you use
  - → in your collaborators
  - → of the public in the scientists
- Science deals with ethical affairs internally (self-regulation)
  - → we are responsible to define and keep the standards
  - → necessary service to the scientific community
  - → minimize external interference and control
- Rules and standards must be known to all
  - → „ethical preparedness": recognize and deal with ethical issues that may be encountered
  - → day-to-day problems: authorship, intellectual property, hierarchy and relationships in groups, ...

Why lecture on Research Ethics?

„If there is any human endeavour in which crime does not pay, it is in science." (E. Racker)

- Pressure on the individual scientist and on research groups has grown in the last decades
  - → increasing competition: less funds per scientist
  - → more evaluation, paper & proposal counting
  - → individuals, groups, institutes often depend on short-term results and success
- Blow the whistle?
  - → evaluation: what is misconduct?
  - → communication: whom to contact?
  - → consequences: am I protected?

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Conducting and reporting research

- Research design
  - → proper hypothesis building
  - → no exaggeration of relevance (e.g., to funding agencies)
  - → limit the effect of unconscious bias (double-blind studies...)
- Intellectual property
  - → science is a social enterprise
  - → reward for a scientist is the reputation resulting from the recognition of her/his work
  - → thus: give credit!
  - → previous work that you build on, ideas/hypotheses that you follow, methods developed by others

Conducting and reporting research

- The casual speaker...

On a scientific conference, a well-known scientist gives a review talk. He basically presents his own work. During the discussion, a participant mentions that similar results had been found by two other groups and that a key concept used in his work has been formulated by another researcher. The speaker smiles broadly and answers:

„Well, you know, I am not good at giving credit..."

Conducting and reporting research

- Research plan execution
  - → accuracy and scrutiny in data collection
  - → selection of data for analysis („outliers"??)
  - → retention of data and notes after analysis

Examples of questionable data analysis practices:

- ignoring nonrandom errors (bias)
- post hoc hypotheses
- multiple comparisons and data dredging
- inappropriate statistical tests or other statistical procedures
- „negative" conclusions at low statistical power
- suppressing, trimming, „adjusting" data

Conducting and reporting research

- Honest error vs. negligent error vs. misconduct
  → sometimes difficult to differentiate, „gray zones"
- A. van Maanen and the nebular controversy (~1920)
  → honest error, but unaware of bias by strong conviction?
- Polywater (1960s)
  → poor experimental practice
- Schön case
  → fabrication, i.e. misconduct

Conducting and reporting research

- Oral communication
  → discussions, seminars, conferences, posters
  → give credit: collaborators, sources of ideas, hypotheses, ...
  → main message, details often not given (time constraint)
  → serve to announce results before publication, or make people aware of already published work
- Written presentation (in peer-reviewed journals)
  → crucial medium of scientific communication
  → review concerns scientific accuracy & relevance of the work
  → possible conflicts of interest on the side of the reviewer
  → after publication: provide underlying data on request?
  → what if published results prove wrong for technical reasons? retraction? erratum?
  → presentation to the general public

Conducting and reporting research

- Authorship
  - → crucial: allocates credit for contributions, measures achievement
  - → results in responsibility for the complete content of the paper
  - → self-plagiarism? LPU: „least publishable units"
- Who should be an author?
  - → intellectual contribution to the core of the paper is both required and qualifies for authorship
  - → *„Each author must be able to take public responsibility for the contents of the paper, must be able to explain why and how the observations (the mathematical analysis, the simulation...) were made, and how the conclusions follow from the data (results)."*
    [Style manual of the Council of Biology Editors, 1983. (...) by MS]
  - → other, more limited, contributions in „Acknowledgements"
  - → „honorary authorship" is NOT good scientific practice

Conducting and reporting research

- Honorary authorship, why not?
- reader can be misled about the quality/solidity of a paper having a non-contributing coauthor with a big reputation
  - → first author´s reputation increased at the expense of others who don´t have big names on their list
  - → honorary author receives undeserved credit
- Instrument PIs on data analysis papers without contribution?
  - → scientific reputation for managerial achievement?
  - → contributions of the other team members?
  - → differentiate between „own" analysis team and outsiders

A case to consider...

- The busy professor...

  ... tells her group over coffee one afternoon:

  „Well, you know that I will be terribly busy writing this book over the next two years. So, considering all my other obligations, I will have no time to do regular research. But you know that our funding depends strongly on my research record and publication list. So I suggest that you will put my name on every paper that you write in the coming two years."

Conducting and reporting research

- Order of authorship
  - → matters a lot („... et al."), but no unique practice
  - → sequence should not hide a true „first author"
  - → possibilities: alphabetic, unless contributions are unequal, groups may permutate order, info about contributions in footnotes
  - → the „Matthew effect"
  - → inform yourself, discuss authorship rules in your group!
  - → don´t accept hirarchy, exertion of power... (easier said than done)
- Responsibilities of authors
  - → review the manuscript, revised version etc.
  - → assure that proper procedures have been followed
  - → confirm that proper credit is given, relevant work is cited (includes also unpublished work, e.g. oral presentations, posters, or discussion remarks at meetings)

A case to consider...

- (Im)proper credit...

You write a paper jointly with a colleague. She has written the Introduction and you notice that a reference to previous work on the same topic done by another group is missing.
Your colleague explains to you:
„Oh yes, this is certainly relevant in principle. But we both know that their approach is sloppy and deficient in many ways. If we cite their paper we would have to take pains to point out all the weaknesses and inadequacies of their work. This is tedious and also might create bad feelings on their side. I thought it better to just make no reference."

Authorship and responsibility...

Science **311**, 928 (17 Feb 2005)

G. Schatten (U Pittsburgh) and the Hwang case

- Senior (corresponding) author of a (now retracted) paper *(Science, June 2005)* on stem cells derived from cloned human embryos
- No involvement in the experiments
- No action after having been informed by Hwang that cell lines had been „lost by contamination" in January 2005 (before submittance)
- No approval of the manuscript by all 25 coauthors
- Distanced himself from Hwang in November 2005
- Cleared of misconduct by U Pttsburgh panel, but found guilty of „research misbehavior" (Pttsburgh speciality?) Consequences?
- Coauthorship in the (authentic) dog cloning paper *(Nature, August 2005)* based solely on suggesting a professional photographer to take pictures of the dog...

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Conflicts of interest and conflicts of commitment

- Conflicts of interest
  - → professional requirements ↔ personal or financial interest
  - → temptation to compromise professional judgement
  - → e.g. investment in a company connected to the research work
  - → receiving grants from institutions with a political/economic inclination
  - → reviewing papers or proposals directly touching upon own research
  - → loyality to collaborators, personal friends, spouses,...
  - → strongly held intellectual, religious or social convictions
- How to deal with them?
  - → realize them and their ethical implications
  - → avoid or remove yourself from the conflict situation
  - → do not act in your personal or financial interests
  - → disclose conflicts of interest

Conflicts of interest and conflicts of commitment

- Conflicts of commitment
  - → conflicts between two sets of professional obligations
  - → possibly compromising professional judgement
  - → „role": – frequent-traveling professor is not available to students
    – glowing recommendation letter for a mediocre student
    – proper evaluation vs. loyality to institute or group
  - → „structural": – university rewards research more then teaching
    – being „first" vs. giving proper credit
  - → „intellectual": passion for discovery vs. sufficient verification (e.g., Mars microbes)

- How to deal with conflicts of commitment?
  - → realize them and their ethical implications
  - → usually you cannot remove yourself from the conflict situation
  - → do not act in a way that compromises professional judgement
  - → disclose conflicts of commitment

A case to consider...

- The inconvenient result...

You are a solar physicist and a person who is very much concerned about protection of the natural environment and the future of our children. You recently carried out a study that revealed an astoundingly high correlation between a solar activity index and various records of climate change on Earth. When you report these results to your friends in your environmentalist group, they unanimously suggest that you do not publish them. They say: „This would immediately and eagerly be taken up by all these political and economic pressure groups, which fight against the Kyoto protocol by denying the anthropogenic greenhouse effect. This could severely damage all attempts to curb the climate change by introducing carbondioxide regulations."

A case to consider…

- Reviewing a grant proposal...

You notice that in a proposal you are reviewing for some science foundation, a method is suggested that could be very useful for a problem that you have in your own work. Your work is not directly related to the project in the proposal.

Variation of the theme:

The proposal suggests to use a method described in some obscure journal that has escaped your attention. Your work is directly related to the project in the proposal.

Being a responsible referee…

E.N. Parker, EOS **78**, 437 (1997)

The all too clever referee... (1959)

- Parker submits a paper to a „well-known journal"
- inquiring the editorial office after two months, the answer is that the referee („an important and busy man") would answer soon
- same brush-off on further occasions
- Parker realizes that his paper contains a serious error and drops it
- After 8 months, the referee report arrives saying that the paper could be published in a „suitably brief form". Parker declines.
- 2 month later, a paper by a well-known plasma physicist appears in the same journal with the sole purpose of pointing out the error in Parker´s unpublished paper (cited as an in-house report).
- Parker: „I was flattered that even my unpublished work merited attention in a national journal" ;-)

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Relationship in research groups

- Features of the research environment
  - → research is highly decentralized, local practices matter
  - → collaboration, cooperation and independence of members
  - → competition among (and often within) research groups particularly competition for recognition
  - → climate in a research group is relevant for responsibe conduct
  - → make standards/rules explicit, inform new group members
  - → disparity of power: group leader controls the resources
- Setting standards
  - → ground rules for proposing, conducting and reporting research
  - → „rules that everyone wants everyone else to follow, even if..."
  - → need to be consistent and clear
  - → range from informal policies to highly codified
  - → cover range of situations? reflect proclaimed values of science?

Relationship in research groups

- Cooperation and competition
  - → internal competition (deliberate: „winner takes it all") ?
  - → possible ethical conflict between competition and collaboration
  - → criteria for credit?
  - → expectations for reciprocity, loyality, collegiality?
  - → possible ethical conflicts regarding loyality
- Power disparity
  - → relationships: group head, senior/junior researchers, postdocs, students, technicians, ...)
  - → exploitation and abuse of power, difficult to resist (e.g., heavy teaching load on a postdoc, extensive routine data gathering tasks for a PhD student, ...)

Relationship in research groups

- Mentors
  - → more than thesis supervision, multiple mentors advantageous
  - → interactive process: actively seek guidance
  - → provide good mentoring in a group is major ethical concern
  - → toxic mentors: „avoiders", „dumpers", „blockers", „destroyers", ...
- What can go wrong?
  - → unclear lines of supervision
  - → research problems unsufficiently demarcated
  - → lack of well-defined lines and regular occasions of communication
  - → vague role responsibilities
  - → unfair/unsatisfactory attribution of credit, authorship
  - → unclear policies concerning ownership of data and ideas
  - → fueling of internal competition
- Written ground rules ? The lab of last resorts... (p.79)

A case to consider...

- The frustrated postdoc...

  As a PhD student, Medea had been exploited by her thesis advisor. Even as a postdoc at another institute, he tried to keep her under his thumb and work mainly with and for him. Eventually, she refused to cooperate. After she was a coauthor of a paper heavily critisizing a paper by her ex-advisor, there is tense and heated quarrel with exchange of „Comments" and „Response".

  As a result, Medea decides to make no reference to papers of her ex-advisor in her own papers, even if the work is directly relevant. She even completely ignores their joint papers.

A case to consider...

- The discovery of pulsars

  In 1967, Jocelyne Bell, then a 24-year old graduate student, had contributed for two years, together with other graduate students, to build a 4.5-acre radio telescope under the supervision of her thesis advisor, Anthony Hewish. Bell was in charge of operating it and analyze the data under Hewish´s direction. After detecting an oscillating extraterrestrial signal, she and Hewish analyzed it together. With three other people involved, they published a joint paper announcing the discovery. Later, Hewish alone received the Nobel prize.

  Many argued that Bell should have shared the prize since her recognition of the signal was crucial for the discovery. Others, including Bell herself, said that she received adequate recognition in other ways and should not have been so lavishly rewarded for doing what a graduate student is expected to do in a project conceived and set up by others.

  „On Being a Scientist", p. 14

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Hazards to good scientific practice

Science is carried out in a social fabric, resulting in

- pressure
  - → evaluations, paper/citation counts
  - → short-term positions or research grants
  - → competition inside and between research groups
  - → expectations to deliver „useful" results
- seduction
  - → parallel involvement in commercialisation
  - → paid expert opinions
  - → media presence and awareness
  - → ambition (prizes, positions, publicity, recognition...)

Hazards to good scientific practice

Science is carried out by human beings, which are capable of...

- sloppiness
  - → careless experimenting
  - → insufficient checking of results, „cutting corners"
  - → inadequate testing of computer codes
  - → uncritical analysis of data, ignoring sources of error
  - → insufficient awareness of the relevant literature
- self-deception
  - → preconceived opinions, cherished hypotheses, the „school"
  - → non-realization of „unsuitable" data or results
  - → emotion-based judgement of other´s work
  - → ambition, arrogance, wishful thinking, political bias

Emotions are an integral part of the human character. We can´t suppress them when doing science, but we must be aware of them.

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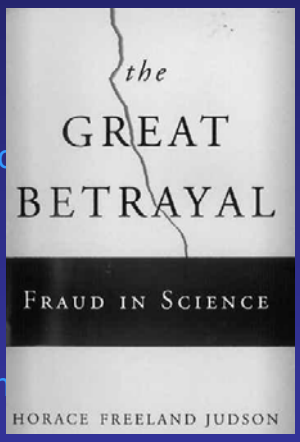

What is scientific misconduct?

Three categories, requiring different types of responses
(following a report from the Nat. Acad. of Sciences, USA)

- „Misconduct in science" („fraud" no longer used: legal term)
  - → damage to the integrity of the research process
  - → e.g., fabrication, falsification, plagiarism („FFP")
- „Questionable/unacceptable research practices"
  - → violate traditional values of the research enterprise
  - → may be detrimental to the research process
  - → e.g., inadequately supervising research subordinates or exploiting them, inappropriate authorship
- „Other misconduct"
  - → unacceptable behavior not specific to a research environment
  - → e.g., harassment, misuse of funds

What is scientific misconduct?

according to MPG „Rules of Good Scientific Practice" (2000)

- False statements made knowingly
  - → the fabrication of data
  - → the falsification of data, e.g.
    - a) through undisclosed selective reporting and rejection of unwanted results
    - b) through the manipulation of a representation or illustration
  - → incorrect statements in a letter of application or in an application for support (including false statements concerning the publication in which work is said to have appeared, and concerning work accepted for publication)

What is scientific misconduct?

according to MPG „Rules of Good Scientific Practice" (2000)

- Infringement of intellectual property
  - → with respect to a copyright work of another person or the significant scientific findings, hypotheses, theories or research methods of others
    - a) the unauthorized exploitation involving usurpation of authorship (plagiarism)
    - b) the misappropriation, particularly in an expert opinion, of research methods and ideas (theft of ideas)
    - c) the usurpation of scientific authorship or co-authorship, or unjustified acceptance thereof
    - d) the falsification of the contents or
    - e) the unauthorized publishing or making accesible to third persons of work, findings, hypothesis, theory or research work not yet published
  - → the assertion of (co-)authorship of another person without his or her consent

What is scientific misconduct?

according to MPG „Rules of Good Scientific Practice" (2000)

- Impairment of the research work of others
  - → the sabotage of research work (including damaging, destroying or manipulating experimental arrangements, equipment, documentation, hardware, software, chemicals or other items required by another person for carrying out an experiment)
- Joint accountability
  - → Joint accountability may, inter alia, be the result of
    - a) active participation in the misconduct of others
    - b) having knowledge of falsification committed by others (!)
    - c) co-authorship of falsified publications
    - d) gross dereliction of supervisory duties.

Final decisions must depend upon the circumstances of each case.

[Questions (M.S.): what about malicious allegations of misconduct?
what about abusing peer review to impair competitors?
what about preventing the reporting of misconduct?]

What is scientific misconduct?

Questionable/unacceptable research practices

- misuse of one´s position for personal gain
- exaggerating one´s claims („puffery")
- failing to give credit to the work of other scientists
- exploiting discretionary information (e.g., as a reviewer) for one´s own work
- failing to retain significant research data for a reasonable period
- maintaining inadequate research records for published work
- refusing to give peers reasonable access to unique research material or data that support published papers
- using inappropriate statistical or other methods of measurement to enhance the significance of research findings

Covering up...: The Baltimore case

The New Republic **25**, 28 (1992)

- April 1986: a paper by D. Weaver, M. Reis, C. Albanese, D. Baltimore, and T. Imanishi-Kari on mouse genes appears in *Cell*
- M. O´Toole, postdoc of TIK, finds that crucial experiments are wrong, she „blows the whistle". TIK produces additional evidence and is cleared by a committee at Tufts Univ. The evidence later turns out to be fabricated.
- June 1986: in a meeting of MOT with TIK, DB and the MIT dean, TIK admits that some of the work in the paper was never done. DB: such problems with „inaccuracy" are not unusual and need not be corrected; other will figure out that the results are wrong... MOT let the matter drop, but rumours continue → J. Dingell, chairman of House Subcommittee on Oversight and Investigations starts investigating.
- January 1988: NIH appoints an investigation panel. Two members are close associates of DB, the third has written a recommendation letter for TIK.
- April 1988/1989: two hearings on the case in House

Covering up…: The Baltimore case

- Summer 1988: DB starts national campaign designed to derail NIH and congressional investigations: „threat to science by outsiders invading the sanctuary of science". Letter campaign, including Nobel prize winners and other prominent scientists.
- Spring 1989: TIK notebooks investigated by forensic experts of the Secret Service, who report evidence for outright fabrication/falsification.
- In the Congress hearing, DB states that „there is nothing from the Secret Service investigation that causes me to doubt the validity of the *Cell* paper."
- Status in 1992:
  - TIK continues as assistent professor at Tufts University
  - M. O´Toole found a new job only after years of unemployment...

Lies, bad lies, statistics...

- Lies, bad lies, statistics...

A graduate student used a specific statistical procedure and software package to analyse data for her thesis. After graduation, her advisor submits a manuscript to a peer-reviewed conference proceedings with her as a co-author, but without giving her the possibility to review it. She sees the revised manuscript before resubmission and only then finds that the advisor had rerun her analysis, but with inappropriate parameter settings. As a result, the statistical significance of the result is enhanced. The advisor refuses to replace his analysis with that in her thesis, threatening to remove the student´s name from the list of authors.

Elliott & Stern, „Research Ethics", p.91

A case to consider...

- The instrument proposal (fictitious example...)

  Your group is preparing a detailed instrument proposal for a major space mission. The group hasn´t had much success recently, a new project is urgently needed to secure funding for some key personel.
  It turns out that the final run of a crucial thermal model calculation, for which you are responsible to give the input, cannot be finished until the deadline for delivery of the proposal. The PI suggests to use the results of a previous study for a preliminary version of the design: „I don´t think there will be a problem with the thermal properties. Otherwise, we can always change the design somewhat in order to stay within specifications. We have ample experience with this kind of instruments and they always worked well."

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Rules and procedures of the Max Planck Society

- „Rules of good scientific practice"
  (adopted by the Senate of the MPG on 24 November 2000)
  → „They are binding on all persons active in research work at the Max Planck Society"
- 1. General principles of scientific practice
  - → observance of discipline-specific rules for acquiring and selecting data
  - → securing and storing of primary data, clear and comprehensible documentation
  - → systematic scepticism
  - → realisation of tacit, axiomatic assumptions
  - → no hindrance of the scientific work of competitors
  - → active promotion of junior scientist´s scientific qualifications
  - → openness to criticism and doubt expressed by other scientists
  - → careful, non-self-interested and unprejudiced assesment of colleagues
  - → publication of results obtained through public funding
  - → publication of falsified hypotheses, admission of mistakes
  - → honesty in the recognition of the contributions of others

Rules and procedures of the Max Planck Society

- 2. Cooperation and leadership responsibility within working groups
  - → responsibility of the group head for monitoring, conflict resolution, quality control
  - → leadership requires expertise, presence, and a broad perspective
  - → delegation of leadership if necessary
  - → results achieved in specialised areas should be reciprocally aired, critisized and integrated, regardless of any considerations of hierarchy
  - → regulated form (regular colloquia) recommended for larger groups
  - → important results to be double-checked within the research group

Rules and procedures of the Max Planck Society

- 3. Guidance for junior scientists
  - → attention to training and furtherance, including good scientific practice
  - → good cooperation with universities
  - → contact persons for master & PhD students, younger postdocs
  - → establishment of thesis committees
- 4. Securing and storing primary data
  - → store for at least 10 years, access to persons with justifiable interest
  - → full and adequate reports on experiments and numerical calculations to ensure reproducibility, to be kept for at least 10 years
  - → institute management responsible for defining detailed guidelines

Rules and procedures of the Max Planck Society

- 5. Scientific publications
  - → comprehensive descriptions, full and correct credit
  - → no multiple publication
  - → contradicting evidence to be made known
  - → authorship requires considerable contribution to the design of the study, to working out, analysing or interpreting the data and to writing the paper
  - → „honorary authorship" is not permitted
- 4. Appointment of an ombudsperson
  - → one elected scientist per institute
  - → point of contact in matters of good scientific practice
  - → confidential advisor to all concerned in cases where there is suspicion of a violation of the rules of good scientific practice
  - → in this role, independent of institute directors
  - → in addition, one ombudsperson for each section of the MPG

Rules and procedures of the Max Planck Society

- „Rules of procedure in cases of suspected scientific misconduct"
  (adopted by the Senate of the MPG on 14 Nov 1997, amended on 24 Nov 2000)

- 1. Preliminary enquiry
  - → Notification of the Managing Director (MD), who informs Vice President (VP)
  - → Both (or VP alone) acquaint the suspect with incriminating evidence
  - → response due in 3 weeks
  - → MD and VP decide on whether to continue the investigation
  - → if misconduct is proven: recommendation on sanctions to MPG
  - → if misconduct is suspected, but not proven: formal investigation
  - → suspect to be heard at every stage
  - → strict confidentiality until culpable misconduct has been proven

Rules and procedures of the Max Planck Society

- 2. Formal investigation
  - → Committee: Chairperson, VP, 3 advisers from the sections, head of legal aff.
  - → Chairperson is not a member of MPG, may co-opt nonvoting experts
  - → oral proceedings; institute and suspects granted oral hearing
  - → name of informant can be disclosed at this stage
  - → decision by majority vote whether misconduct has been established
  - → if yes: recommendation to the President for decision
  - → no internal procedure for complaint concerning the committee´s decision

Rules and procedures of the Max Planck Society

- Catalogue of possible sanctions or consequences
- 1. Labor law consequences
  - → reprimand in writing and entered into the personnel file
  - → extraordinary dismissal
  - → mutual rescission
- 2. Academic consequences
  - → withdrawal of the doctoral degree
  - → withdrawal of the license to teach
- 3. Civil law consequences
  - → restitutory claims, surrender of grants, damage claims

How to react when suspecting misconduct or violation of good scientific practice?

- Ethical obligation to act in cases of suspected misconduct
- Seek advice from trusted peers, postdocs, senior scientits
- Seek advice from your thesis advisor/group/department head
- Seek advice from the Ombudsperson (institute, section, or DFG)
  Ombudsperson for MPS: Manfred Schüssler
- Inform the Managing Director of the Institute

Fictitious example: „A career in the balance" (On being a scientist, p. 19)

The situation in Germany: Report of the "Ombudsman of the DFG" (1999-2005)

http://www.rrz.uni-hamburg.de/dfg_ombud

- 128 relevant cases (51 medicine, 37 natural sciences)
- 35 data issues, 30 authorship, 27 research impairment, 18 plagiarism
  4 unjustified accusations
- PhD students, habilitands: unsufficient support and supervision, authorship
- deficiencies in research management, lack of communication
- resistance of local institutions to take effective action („whitewash")
  (issues of false loyality, reputation, exertion of power,...) [„joyful data deletion"]
- insufficient sanctions; harder on scientists in weaker positions
- unclear legal basis for sanctions
- lack of protection for whistleblowers
-

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-

2 Remarks (M.S.):

1) Only a few years since introduction of formal systems of self-control.
   It still takes some time to fully establish the procedures...

2) **Don´t let them be ridiculed: Such systems are for protecting the weaker parties, those in power do not need (want) them!**

- unclear legal basis for sanctions
- lack of protection for whistleblowers

How can good scientific practice be maintained and misconduct be avoided?

- Education and information
- Clear rules in research units and cooperations
- Open data policies
- Achieve a healthy balance between pressure & evaluation etc. and freedom & trust in the researcher
- Checks and balances in peer review
- Proper credit for peer reviewing, mentoring, and education

Richard Feynman: „Cargo cult science" (1974)

I'm talking about a specific, extra type of integrity that is not lying, but bending over backwards to show how you're maybe wrong, that you ought to have when acting as a scientist. And this is our responsibility as scientists, certainly to other scientists, and I think to laymen.

...

So I have just one wish for you – the good luck to be somewhere where you are free to maintain the kind of integrity I have described, and where you do not feel forced by a need to maintain your position in the organization, or financial support, or so on, to lose your integrity. May you have that freedom.