
# ...and good scientific practice

– A brief overview –

Manfred Schüssler
MPS, Katlenburg-Lindau

IMPRS Retreat
Travemünde
April 27/28, 2009

# 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

# 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.

→ rules about providing research material upon which papers are based

→ conventions about authorship, author sequence, ...

# 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

# Why this talk?

Create some **awareness**:

- sometimes unclear ideas: what does good scientific practice mean and include?
  It is more than avoiding FFP (fabrication, falsification, plagiarism)
- violations of the rules apparently become more frequent(ly known)
- standards must be maintained actively: „osmosis" in research groups is not sufficient
- rules and procedures of the MPG
- the role of the ombuds system

# 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, ...

# Violations of the rules

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 interpretation |
| 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 |

# Violations of the rules

*Nature* **444**, 524 (Nov. 2006)

Automatic analysis of 280,000 entries in the arXiv preprint server for duplication and plagiarism (D. Sorokina, Cornell)

0.2 % Blatant plagiarism

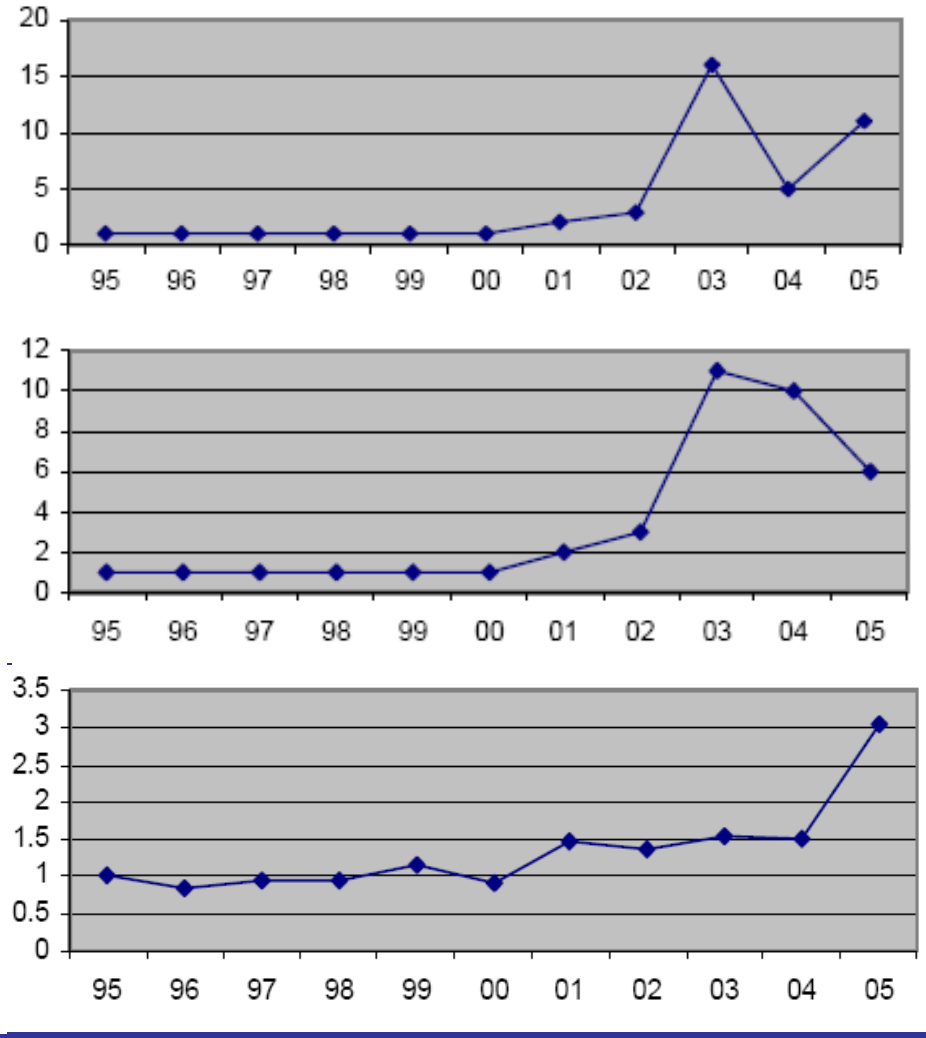
11 % Duplicate publication (without proper reference)

Many cases of students copying verbatim from other sources

„Clever plagiarism" not as easily found by simple text comparison

# Experiences of the NSF (USA)
# C. Boesz (Inspector General, 2006)

Scientific misconduct: trends (relative change since 1995 → 1)




Fabrication of research results

Falsification of data

Plagiarism, intellectual theft

# What are the reasons?

- Growing competition?
  - → postdoc hopping, cutback of permanent positions
  - → more scientists share same amount of resources, globalization
  - → dependence on superiors and on continued funding
  - → high stress levels & low rewards
- Permanent evaluation, quantitative criteria?
  - → publication/citation counting, impact factors,
    „prime" journal publications expected, press releases...
  - → overload of the peer review system
- Erosion of standards?
  - → „economisation" of science, marketing of results, short-term success
  - → pressure to produce new, positive results in a short time
    (as opposed to test, replication, ... )
  - → lack of education and awareness

# Not really a new problem...

*"There are several species of impositions that have been practised in science... . These may be classed under the heads of hoaxing, forging, trimming, and cooking."*

Charles Babbage: Reflections on the decline of science in England, and on some of its causes (1839)

# 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
- inappropriate statistical tests or other statistical procedures
- 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?

- Same topic: Hertzsprung´s algebraic flaws ?

- Polywater (1960s)

  → poor experimental practice

- Schön case

  → fabrication, i.e. misconduct

- Another example

  of honest error →

# 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 (+ „Matthew effect")

- Instrument PIs on all data analysis papers?

  → scientific reputation for managerial achievement?

  → but: the instrument data are the basis for all science analyses; the PI had no chance to do much science during the development

  → contributions of the other team members?

  → differentiate between „own" analysis team and outsiders

# Conducting and reporting research

- 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”: work becomes associated with the best-known author
  - → inform yourself, discuss authorship rules in your group!
  - → don´t accept hierarchy, 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)

# 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 Pittsburgh panel, but found guilty of „research misbehavior" . Consequences?
- Coauthorship in the (authentic) dog cloning paper *(Nature, August 2005)* based solely on suggesting a professional photographer to take pictures of the dog...

- 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

# 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

# Being a responsible referee…

*E.N. Parker, „The martial art of scientific publishing˝*
*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 months 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” ;-)

- 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

# 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

- 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

# 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.

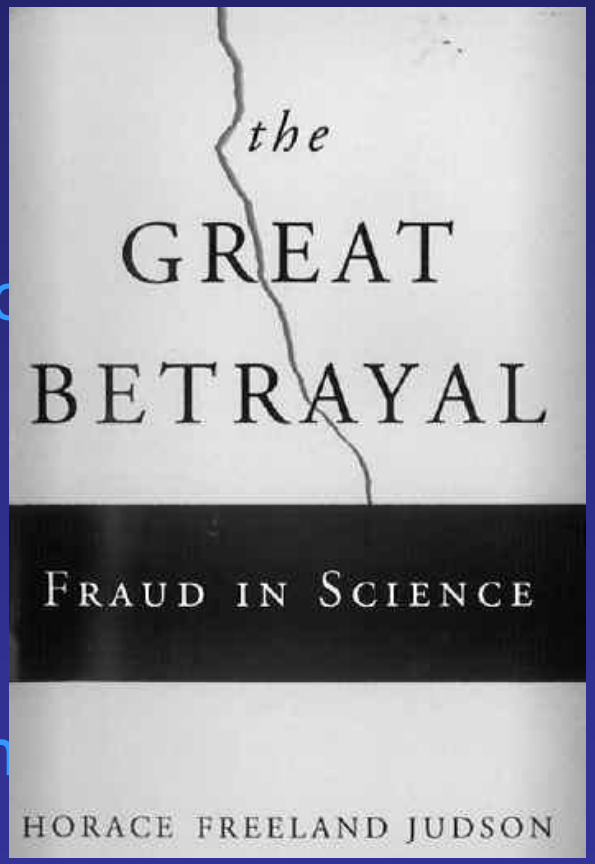
# Hazards to good scientific practice

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.

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



# 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 accessible 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

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

- Ethical obligation to act in cases of suspected misconduct
- The „whistleblower˝ does not do the damage, the persons involved in misconduct are!
- Seek advice from trusted peers, postdocs, senior scientits
- Seek advice from your thesis advisor/group/department head
- Seek advice from the Ombudsperson (institute, MPG section, or DFG)
  Ombudsperson for MPS: Manfred Schüssler
  Ombudsperson for CPT section: Peter Fulde

# Protection of whistleblowers?

## Blow the whistle?

→ evaluation: what is misconduct?

→ communication: whom to contact?

→ consequences: am I protected against „retaliation"?

- Risk of career disadvantages, mobbing, isolation, ...
- Contact with ombudsperson is confidential
- In case of a preliminary investigation by the ombudsperson, the identity of the whistleblower is not revealed
- In case of a formal investigation, the identity is only revealed if the accused person otherwise could not adequately defend itself.

# 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
- And...

# 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
- And...

- 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**

# The MPG rules of good scientific practice

*Scientific honesty and the observance of the principles of good scientific practice are essential in all scientific work which seeks to expand our knowledge and which is intended to earn respect from the public. The principles of good scientific practice can be violated in many ways - from a lack of care in the application of scientific methods or in documenting data, to serious scientific misconduct through deliberate falsification or deceit. All such violations are irreconcilable with the essence of science itself as a methodical, systematic process of research aimed at gaining knowledge based on verifiable results. Moreover they destroy public trust in the reliability of scientific results and they destroy the trust of scientists among themselves, which is an important requirement for scientific work today where cooperation and division of labor are the norm.*

from the preface of
„Rules of Good Scientific Practice"
of the MPG (November 2000)

# The MPG rules of good scientific practice

*The basic rules of good scientific practice set out here take up the relevant recommendations of the Deutsche Forschungsgemeinschaft of January 1998 and adapt them to the research conditions at the Max Planck Society. They are binding on all persons active in research work at the Max Planck Society.*

from the preface of
„Rules of Good Scientific Practice"
of the MPG (November 2000)

# The MPG rules of good scientific practice

- 1. General principles of scientific practice

  a) Regulations governing day-to-day scientific practice

  → precise observance of discipline-specific rules for acquiring and selecting data,

  → reliable securing and storing of primary data; clear and comprehensible documentation of all important results,

  → the rule of systematic scepticism: openness for doubt (...),

  → a realisation of tacit, axiomatic assumptions; watchfulness for any „wishful thinking" motivated by self-interest or even morals (...).

# The MPG rules of good scientific practice

## b) Regulations governing relations with colleagues and cooperation

→ no hindrance of the scientific work of competitors,
for example by delaying reviews or passing on scientific results
which have been acquired in confidence,

→ active promotion of junior scientists´ scientific qualifications,

→ openness to criticism and doubt expressed
by other scientists and team colleagues,

→ careful, non-self-interested and unprejudiced
assessment of colleagues; avoidance of bias

# The MPG rules of good scientific practice

## c) Regulations governing the publication of results

→ publication on principle of results obtained through public funding (principle of public availibility of the results of basic research)

→ publication of falsified hypotheses in an appropriate manner and admission of mistakes (principle of a science culture open to the possibility of error)

→ strict honesty in the recognition and appropriate consideration of the contributions of predecessors, competitors and colleagues (principle of recognition)

# The MPG rules of good scientific practice

- 2. Cooperation and leadership responsibility within working groups
  (paraphrased by M.S.)

→ Responsibility of the head of each institute or research establishment for a proper organisation which ensures clear allocation of the tasks of leadership, monitoring, conflict resolution and quality control.

→ Cooperation in working groups to be organised such that results achieved in specialised areas should be reciprocally aired, critisised and integrated, regardless of any considerations of hierarchy (training of junior scientists).

→ Regulated form (regular colloquia) recommended for larger groups.

→ Important results to be double-checked within the research group.

→ Leadership requires expertise, presence, and a broad perspective.

# The MPG rules of good scientific practice

- 3. Guidance for junior scientists

  (paraphrased by M.S.)

  → attention to training and furtherance, including good scientific practice
  → appropriate care for junior scientists
  → contact persons for master & PhD students, younger postdocs
  → establishment of thesis committees

- 4. Securing and storing primary data

  (paraphrased by M.S.)

  → 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

# The MPG rules of good scientific practice

- 5. Scientific publications
  (paraphrased by M.S.)

  → full and comprehensive descriptions of results and methods,

  → full and correct credit for previous work,

  → no multiple publication,

  → findings that support or call into question the results presented to be made known equally,

  → authorship requires considerable contribution to the design of the study, to working out, analysing or interpreting the data and to writing the paper,

  → all authors bear joint responsibilty for the content,

  → „honorary authorship" is not permitted.

# The MPG rules of good scientific practice

- 6. Appointment of an ombudsperson
  (paraphrased by M.S.)

→ one elected scientist per institute (term: 3 years)
→ point of contact in all 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 superiors and institute management
→ in addition, one ombudsperson for each section of the MPG

The ombudsperson acts as a confidant in order to resolve the potential conflict of loyalities to the superior or to the team on the one side and the obligation to proper scientific conduct on the other side. Such conflicts frequently occur in the case of junior researchers.

Alternatively, advice can be sought from the ombudsperson of the CPT section (Peter Fulde, MPI für Physik komplexer Systeme, Dresden, fulde@mpipks-dresden.mpg.de)
or from the ombudsman committee of the DFG.

# 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)

# Rules and procedures of the Max Planck Society

- 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 2 weeks
  - → MD and VP decide on whether to continue the investigation
  - → if misconduct is proven: recommendation on sanctions to MPG President
  - → 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 are heard

→ 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
  - → ordinary or extraordinary dismissal
  - → mutual rescission
- 2. Academic consequences (by university)
  - → withdrawal of the doctoral degree
  - → withdrawal of the license to teach
- 3. Civil law consequences
  - → restitutory claims, surrender of grants, damage claims
- 4. Penal consequences

# Violations of the rules

Ombudsman of the Deutsche Forschungsgemeinschaft (since 1999)

At present: U. Beisiegel (Biomed. research, U Hamburg, chairperson)
S. Hunklinger (Physics, U Heidelberg)
W. Löwer (Science Law, U Bonn)

http://www1.uni-hamburg.de/dfg_ombud

Between 5/1999 and 10/2006:
198 cases, 40% in biomedical research, 23% other natural sciences

| | |
|---|---|
| 20 % | Authorship disputes |
| 20 % | improper use of data or instruments (incl. falsification, fabrication) |
| 15 % | Hindrance of scientists (mostly in subordinate positions) |
| 10 % | plagiarism |
| | problems with proposal evaluations |
| | defense against false allegations |

# Violations of the rules

## Experiences of the DFG Ombudsman (U. Beisiegel, 2006)

Cases are reported...

- ... rarely during running contracts
- ... often long after the actual events
- ... often after years of frustration and disappointment

➔ protection and support of „whistleblowers" crucial

# Violations of the rules

## Experiences of the DFG Ombudsman (U. Beisiegel, 2006)

- Insufficient knowledge about the rules
- Insufficient explanation of the rules
- Insufficient education in good scientific practice
- Insufficient knowledge about the Ombuds system
  - unsufficient information of young scientists
  - institute directors not well informed
  - unknown by the administration
  - „Schmuddelecke...” (e.g., absent on MPG web site)

# 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
-

# 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

# Richard Feynman: „Cargo cult science" (1974)

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

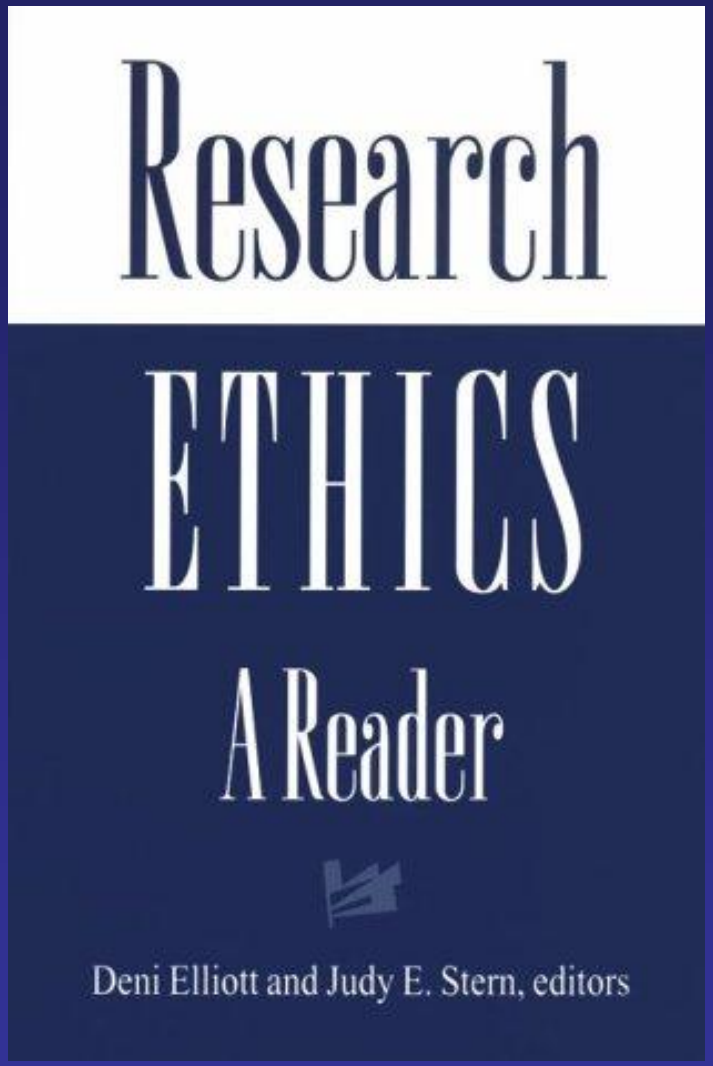
I'm talking about a specific, extra type of integrity that is not lying, but bending over backwards to show how you're maybe wrong, that you ought to have when acting as a scientist. And this is our responsibility as scientists, certainly to other scientists, and I think to laymen.

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.

# Richard Feynman: „Cargo cult science" (1974)

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

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.




University Press of New England
Hanover & London (1997)


National Academy Press (3rd ed., 2009)
http://www.nap.edu/openbook