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Good Scientific Practice (and its Pitfalls in Everyday Research Work)

Helga Nolte

Ombudsstelle der Universität Hamburg



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Rules of Good Scientific Practice –

Why?



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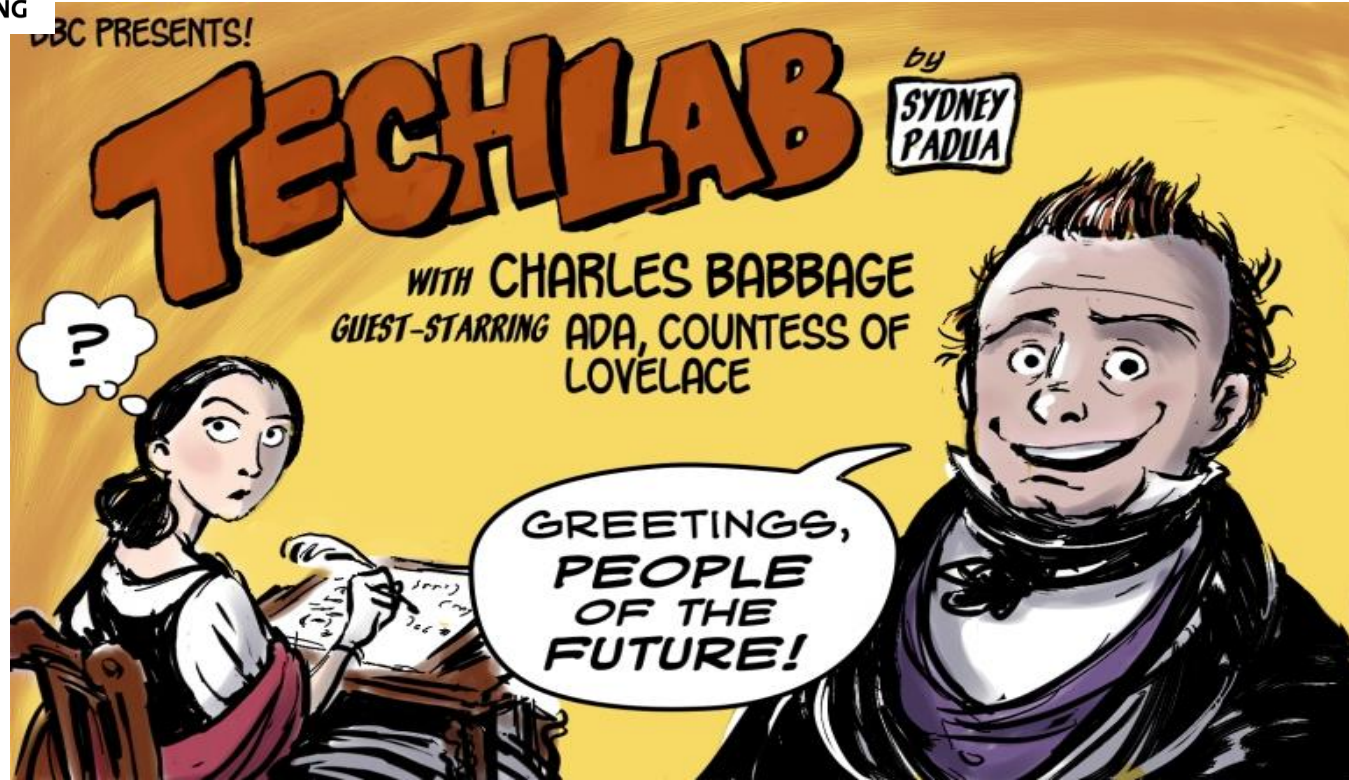
Rules



tice –



Charles Babbage, 1791-1871
Quelle: wikipedia.org



2dgoggles.com

- Charles Babbage** „*Reflections on the Decline of Science in England*“, 1830:
- Forging** = Invention of suitable data, results, observations, findings...
 - Trimming** = „Massage of data“, levelling of irregularities
 - Cooking** = Polishing of data, omission of unwanted results

Rules of Good Scientific Practice : Why?

1997 – The „Hermann-Brach-Case“



Net-praxis.de



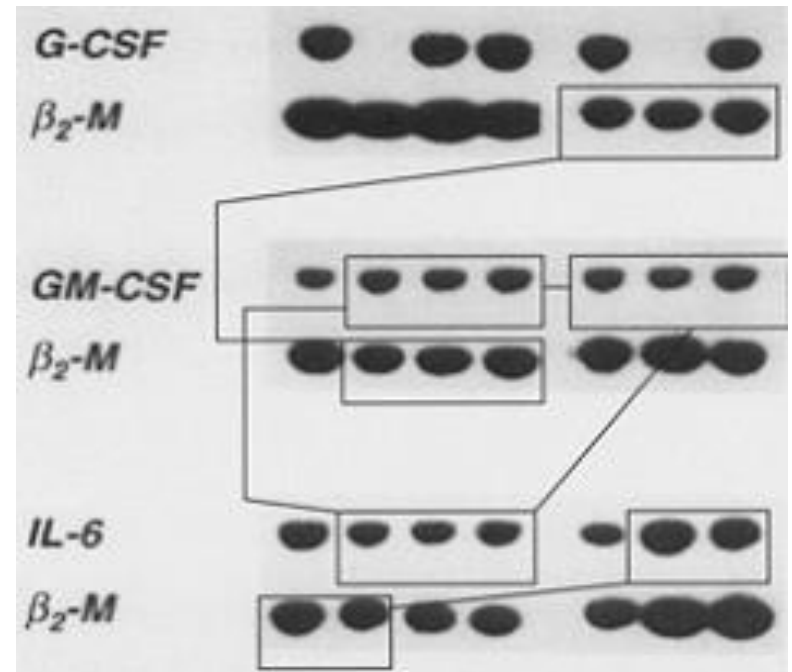
neue-medizin.net

Rules of Good Scientific Practice : Why?

1997 – The „Herrmann-Brach-Case“

**THEMEN DER ZEIT: Aufsätze
Forschungsbetrug – Fall Herrmann/
Brach: Gutachter bestätigen den
dringenden Verdacht der Manipulation**
Dtsch Arztebl 1997; 94(42): A-2716 / B-
2311 / C-2175

Abbildung 1: Ausschnitt aus Abb. 5 der Publikation **TF 421**, ergänzt um einige Rahmen und Pfeile, die die verschiedenen Duplikationen innerhalb dieser eindeutig gefälschten Abbildung verdeutlichen. Man sieht, dass einige der "Banden" genannten Flecken untereinander eine so hohe Ähnlichkeit aufweisen, dass auszuschließen ist, dass sie, wie vorgegeben, aus unterschiedlichen experimentellen Bedingungen hervorgegangen sind.





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DFG

**Denkschrift Sicherung Guter
Wissenschaftlicher Praxis**

Memorandum: Proposals for Safeguarding Good Scientific Practice

Revised version July 2013

**Valid for all German universities and
research institutions**

www.dfg.de

<http://www.dfg.de/sites/flipbook/gwp/index>



WILEY-VCH

DFG



Recommendation 2

- **Universities and independent research institutes shall formulate rules of good scientific practice**
- **Rules shall be made known to, and shall be binding for, all members of each institution**
- **Rules shall be a constituent part of teaching curricula and the education of young scientists and scholars**

**Do you know the Bylaws for Safeguarding Good Scientific Practice of Universität Hamburg?
Or the Rules to Ensure Good Scientific Practice at DESY?**



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**Satzung zur Sicherung guter wissenschaftlicher Praxis und zur
Vermeidung wissenschaftlichen Fehlverhaltens
an der Universität Hamburg**

vom 15.05.2014 (in Kraft getreten am 06.08.2014)

**Bylaws for Safeguarding GoodScientific Practice and Avoiding
Scientific Misconduct at Universität Hamburg**

dated May 15 2014



Universität Hamburg

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Bylaws for Safeguarding Good Scientific Practice and Avoiding Scientific Misconduct at Universität Hamburg

dated May 15 2014

New (amongst others):

- **Preamble**
- **Definition of Scope**
- **Criteria pro and contra Authorship**
- **Strengthening of the Ombuds' system**
- **Implementation of a Permanent Committee of Experts for Investigating Scientific Misconduct**



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What is Good Scientific Practice

?

Good Scientific Practice:

1. Observance and adherence of professional standards („lege artis“)
2. Honesty in performing research
3. Responsibility for publication of results

Singapore Statement on Research Integrity

Preamble. The value and benefits of research are vitally dependent on the integrity of research. While there can be and are national and disciplinary differences in the way research is organized and conducted, there are also principles and professional responsibilities that are fundamental to the integrity of research wherever it is undertaken.

PRINCIPLES

Honesty in all aspects of research

Accountability in the conduct of research

Professional courtesy and fairness in working with others

Good stewardship of research on behalf of others

Good Scientific Practice:

1. Observance and adherence of professional standards („lege artis“)
2. Honesty in performing research
3. Responsibility for publication of results

Mistakes / Misconduct

1. **True errors/mistakes**
2. **Non-compliance/disregarding of rules/regulations; illegal behaviour**
3. **Questionable, unethical practice, obliqueness**
4. **Intentional fraud, misconduct**

Questionable practice, obliqueness – for example:

- **Pretense or disregard of scientific authorship**
- **Claiming authorship by another person without prior consent**
- **Missing references / citation**
- **Selection of results / arbitrary omission or addition of results and/or information relevant to the topic**
- **Inadequate supervision**
- **etc. etc. etc.**

→ **Misconduct in terms of infringement of rules of Good Scientific Practice**

→ **could be correctable**

Intentional fraud, misconduct – for example

- **Falsification and/or fabrication of data**
- **Infringement of intellectual property rights; Plagiarism**
- **Deficient execution or loss of documentation**
- **Loss or removal of primary data**
- **Compromising research activities of others / Sabotage**
- **Providing incorrect information in a job or funding application**
- **Co-responsibility for scientific misconduct; possessing knowledge**
- **etc. etc. etc.**

→ **Fraud, severe scientific misconduct**

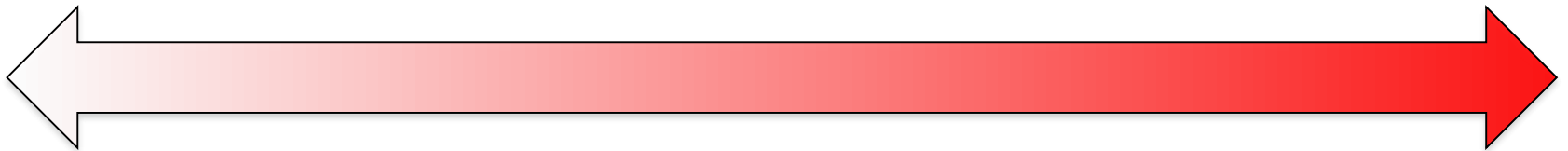
→ **Sanction**

Grey zones of scientific misconduct

**Sloppy
work**

**Questionable
practice**

**Severe
misconduct**



**Contradictions / discrepancies between
GSP-Rules and the research reality**

Recommendation 4

- **Need of special attention for the education and development of young scientists**
- **Binding standards for mentorship**
- **Supervision concepts are strongly recommended**

Bylaws/Satzung UniHH:

- **Supporting young researchers is one of the central responsibilities of professors**
- **Responsible supervision of young researchers must be ensured**
- **Emphasis of special responsibility of supervisors**

Recommendation 6

- Precedence of originality and quality before quantity in criteria for performance evaluation (academic degrees, career advancement, appointments and allocation of resources)

This applies to

- duration of graduation period
- number of publications
- applications and review process

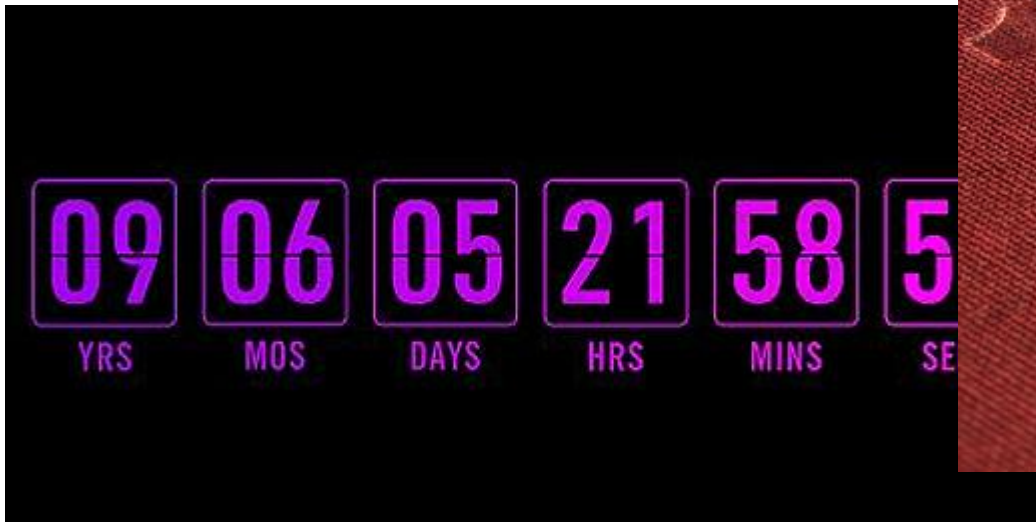
Bylaws/Satzung UniHH:

„§4(3): Criteria relating to performance evaluation must be based upon qualitative parameters and rendered transparent. Reviewers involved in the review process shall be impartial and independent.“

§ 4 Avoiding scientific misconduct

Bylaws/Satzung UniHH:

“Primary data forming the basis of publications must be stored on durable and secure storage devices for ten years in the institution of origin, unless special regulations specify a longer period of storage.”



§ 4 Avoiding scientific misconduct

Bylaws/Satzung UniHH:

“Primary data forming the basis of publications must be stored on durable and secure storage devices for ten years in the institution of origin, unless special regulations specify a longer period of storage.”

Bylaws/Satzung UniHH:

- From the date of publication.
- For doctoral dissertations, from the date of submission in the office for graduate studies.



§ 4 Avoiding scientific misconduct

Bylaws/Satzung UniHH:

“Primary data forming the basis of publications must be stored on durable and secure storage devices for ten years in the institution of origin, unless special regulations specify a longer period of storage.”

Further questions:

What are primary or original data / sources / documents ?



Primary / original data, sources, documents such as

**Lab-book – samples – literature – observations
– mappings – photograph – drawings – source
codes – thoughts – ideas – notes – videotaping
- animal/herbal preparations – (antique) work
of art – measured/ programming data –
metadata – emails – correspondence –
collections – corpora - drafts – transcriptions -
...**

§ 4 Avoiding scientific misconduct

Bylaws/Satzung UniHH:

“Primary data forming the basis of publications must be stored on durable and secure storage devices for ten years in the institution of origin, unless special regulations specify a longer period of storage.”

Further questions:

What are primary or original data / sources / documents ?

How are they stored?

Are there clear and binding terms or regulations in your working-group?

Do you know them??



**Don't store original data and
copies at the same place**



Recommendation 7

Commentary:

... “The published reports on scientific misconduct are full of accounts of vanished original data and of the circumstances under which they had reputedly been lost. This, if nothing else, shows the importance of the following statement:

The disappearance of primary data ... is an infraction of basic principles of careful scientific practice and justifies a prima facie assumption of dishonesty or gross negligence (9).”

Retraction

‘Ubiquitination of the GTPase Rap1B by the ubiquitin ligase Smurf2 is required for the establishment of neuronal polarity’

Jens C Schwamborn, Myriam Müller, Annemarie HM Becker & Andreas W Püschel

Retraction of: The EMBO Journal (2007) 26: 1410–1422. DOI: 10.1038/sj.emboj.7601580 | Published online 22 February 2007

The above article from The EMBO Journal, published online on 22 February 2007, has been retracted by agreement between the authors, the journal Chief Editor and Head of Scientific Publications, EMBO, Bernd Pulverer, and John Wiley & Sons Ltd. The authors’ statement follows.

We have been made aware of a number of issues with figures included in our research article published in 2007 (The EMBO Journal 26: 1410–1422). Briefly, image aberrations and/or duplications were apparent in Figures 2A (splicing of right most lane in the Myc blot); 2B and 2C (duplication of lysate Myc blot and lysate Flag blot, respectively); 2D (splicing on right and left of Flag blot); 2C and 5A (duplication and rotation of GST/Rap1B section of GST blot and tubulin blot, respectively) and aberrant image processing in the top left corner of two panels in Figure 6A labelled Smurf2 RNAi + HECT.

We have been unable to locate the original data associated with these figures, and it has therefore not been possible to resolve these issues.

At the request of the first author, JCS, all of the authors therefore agreed to retract the paper.

We apologize for any adverse consequences that may have arisen from these errors.

3012 The EMBO Journal Vol 33 | No 24 | 2014 ^a 2014 The Authors

Published online: December 17, 2014



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**Documentation of the
research process**

**is an indispensable
element of
Good scientific practice!!!**



Documentation of the research process

Why is it so important?

- **Retraceability / Reproducibility**
- **Memory hook**
- **Learning from and avoiding of mistakes**
- **Protection of the scientific work (loss, unjustified allegations etc.)**

Documentation of the research process

Criteria for an appropriate manner of documentation:

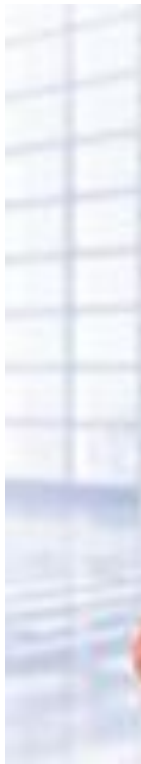
- ✓ promptly and directly
 - ✓ truly
 - ✓ completely, consistently
 - ✓ readable
 - ✓ unforgeable
 - ✓ in accordance with standards of the specific discipline
- Teaching these criteria is task of supervisors



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Keywords and questions about authorship





Keywords and questions about authorship

- **Responsibility of an author**
- **Authorship criteria – and exclusion**
- **Decision about authorship and position**
- **Role of journals/editors**

Keywords and questions about authorship

➤ Responsibility of an author

To safeguard

- **Validity of data**
- **Originality**
- **Correct citation**
- **Reproducibility (Data storage)**

DFG

„Authors of scientific publications are always jointly responsible for their content.“

Keywords and questions about authorship

- Responsibility of an author
- Authorship criteria – and exclusion

DFG

„Only someone who has made a significant contribution to a scientific publication is deemed to be its author.“

Significant contribution to

- conception of studies or experiments,
 - to the generation, analysis and interpretation of the data,
and
 - to preparing the manuscript.
-
- Consent to its publication,
 - thereby assuming responsibility for it



Keywords and questions about authorship

Authorship is justified when somebody took part in either

Planning

or

Performing

AND

Writing

or

Revising

AND

Approval

AND

Accountability

Keywords and questions about authorship

- Responsibility of an author
- Authorship criteria – and exclusion

Bylaws/Satzung UniHH:

The following forms of contribution, each in its own right, do not suffice as grounds for establishing authorship or co-authorship:

- responsibility for obtaining research funding
- occupying the position of head of either department or working group in which research underpinning the publication was conducted
- merely technical production of graphics or tables derived from existing data
- merely technical support, for example, provision of equipment and/or experimental materials
- reading a manuscript without substantial contribution to its content

Keywords and questions about authorship

- **Responsibility of an author**
- **Authorship criteria – and exclusion**

- **Decision about authorship and position**

- **Mutual decision of all authors, considering the individual contributions**
- **Taking into account the particular conventions of the discipline in question**
 - **Equivalent standards necessary!**
 - **Timely and clear agreements recommended!**



Keywords and questions about authorship

- **Responsibility of an author**
- **Authorship criteria – and exclusion**
- **Decision about authorship and position**

- **Role of journals/editors**

Promoting integrity in research publication

COPE is a forum for editors and publishers of peer reviewed journals to discuss all aspects of publication ethics. It also advises editors on how to handle cases of research and publication misconduct. [Read more about COPE...](#)

<http://www.publicationethics.org>

The Committee on Publication Ethics (COPE) was established in 1997 by a small group of medical journal editors in the UK but now has over 9000 members worldwide from all academic fields. Membership is open to editors of academic journals and others interested in publication ethics.

Tim Albert, Elizabeth Wagner:

How to handle authorship disputes: a guide for new researchers



Questionable publication practice

- **Salami publication**
- **Duplicate and multiple publication**
- **Speed publishing**
- **Honorary authorship**
- ...

Originally published in Science Express on 19 May 2005

Science 17 June 2005:

Vol. 308. no. 5729, pp. 1777 – 1783

DOI: 10.1126/science.1112286 [Prev](#) | [Table of Contents](#) | [Next Reports](#)

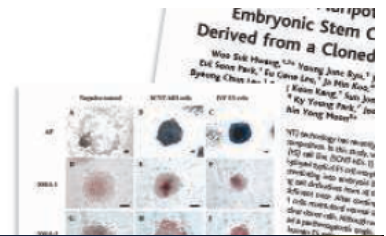
This article has been retracted:

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 **Gerald Schatten7***

Editorial Retraction

THE FINAL REPORT FROM THE INVESTIGATION COMMITTEE of Seoul National University (SNU) (1) has concluded that the authors of two papers published in *Science* (2, 3) have engaged in research misconduct and that the papers contain fabricated data. With regard to Hwang et al., 2004 (2), the



Science regrets the time that the peer reviewers and others spent evaluating these papers as well as the time and resources that the scientific community may have spent trying to replicate these results.

Consequences of misconduct

For individuals – animals – environment – society – science...

Waste of resources, such as material, money,
Lifetime...!

Damaging of career, reputation...

Overflow of control mechanisms („we need a new law...“)

**Damage / Loss of
Confidence in Science**



Dealing with conflicts – Ombuds' system

Recommendation 5 DFG

Independent mediators (ombudspersons) at all universities and research institutes

- Questions of good scientific practice
- Cases of suspected scientific misconduct

Ombuds Committee of Universität Hamburg incl. UKE

The members of the Ombuds Committee act as confidential contact persons for all questions relating to good scientific practice or the possession of evidence of scientific misconduct. All queries and evidence are treated confidentially.



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Ombudskollegium der Universität Hamburg einschließlich UKE:

Frau Prof. Miriam Beblo (WiSo)

Frau Prof. Monika Bullinger (Medizin)

Prof. Ulrich Gebhard (EW)

Prof. Heribert Hirte (Jura)

Prof. Reiner Lauterbach (MIN) - Sprecher

Geschäftsstelle:

Helga Nolte Tel. 42838 3564

ombudsstelle@uni-hamburg.de

<http://www.uni-hamburg.de/forschung/service/ombudsgremium.html>

Dealing with conflicts

Recommendation 5

Independent mediators (ombudspersons) at all universities and research institutes

- **Questions of good scientific practice**
- **Cases of suspected scientific misconduct**

Rec.16:

Independent authority „Ombudsman für die Wissenschaft“



Homepage: www.ombuds-wissenschaft.de

Selection of possible reasons for scientific misconduct (quite often a netting of several)

**Pressure, pressure, pressure --- Rewarding system --- Lack of „mistake culture“--- Lack of knowledge --- Personal vanity --
- Inadequate research structures --- Bad role models ---
Insider deals (rope teams) --- Insufficient knowledge of GSP-
rules (or even no knowledge at all) --- Missing self-criticism ---
Inadequate guidance / supervision --- Excessive demand ---
Deficient appreciation --- Injustice --- Information overload --
- Specializing --- Envy/Jealousy --- Low risk of detection ---
Speed of/in science („Acceleration instead of deceleration“) ---
...**

Lack of communication

Recommendation 8 DFG

Proceedings and consequences of misconduct

- **Procedures for dealing with allegations of scientific misconduct have to be established**
- **Approval by the responsible corporate body**
- **Consideration of relevant legal regulations including the law on disciplinary actions**

Consequences of scientific misconduct

- **Retraction of scientific publication**
- **Academic consequences (retraction of doctoral degree)**
- **Employment law**
- **Civil / criminal law**
- **...**

Prevention of scientific misconduct

Individual level

- Professional documentation
- Good mentoring
- Team meetings, professional communication, agreements and contracts
- Possibilities of counselling
- Responsibility of guidance
- „No blame“-culture
-

Institutional/structural and/or systemic level

- Fair reward system
- Support and adequate supervision
- Appropriate infrastructures, variation and improvement
- Good working atmosphere
- Speed - down

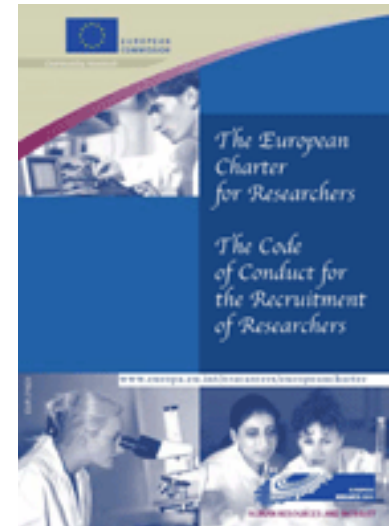




Keep on talking to each other

International Guidelines and Regulations

- „The European Charter for Researchers“
European Commission, 2005



- “The European Code of Conduct for Research Integrity”, Juni 2011



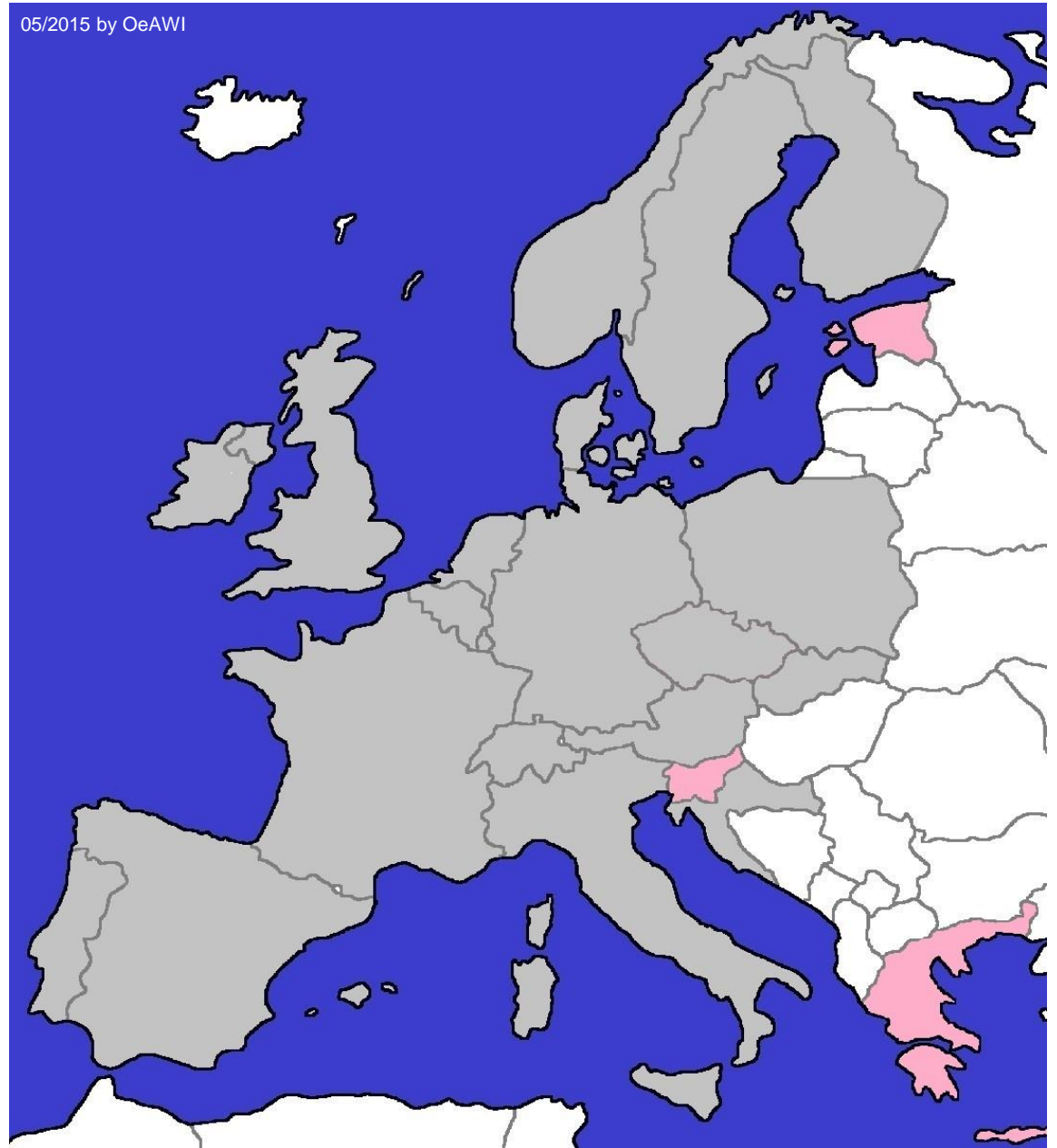
- European Network of Research Integrity Offices
(ENRIO)



05/2015 by OeAWI



<http://www.enrio.eu/>



International Development and Networking

Singapore Statement on Research Integrity

Preamble. The value and benefits of research are vitally dependent on the integrity of research. While there can be and are national and disciplinary differences in the way research is organized and conducted, there are also principles and professional responsibilities that are fundamental to the integrity of research wherever it is undertaken.

PRINCIPLES

Honesty in all aspects of research

Accountability in the conduct of research

Professional courtesy and fairness in working with others

Good stewardship of research on behalf of others

World Conferences on Research Integrity

2007 Lisbon

2010 Singapore

2013 Montreal

2015 Rio de Janeiro

2017 Amsterdam



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3rd
World
Conference
on Research
Integrity

“Montreal Statement on Research Integrity in Cross-Boundary Research Collaborations”, 2013



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**Thank you
for your attention**