



Good Scientific Practices

- **ProLehre | Medien und Didaktik** is the Department for Teaching and Learning in **Higher Education** @TUM, supporting teaching staff via

- individual **counselling** and **faculty-specific** services
- **course program** to acquire "**Certificate** for Teaching in Higher Education of the Bavarian Universities"



- Faculty **contact person**

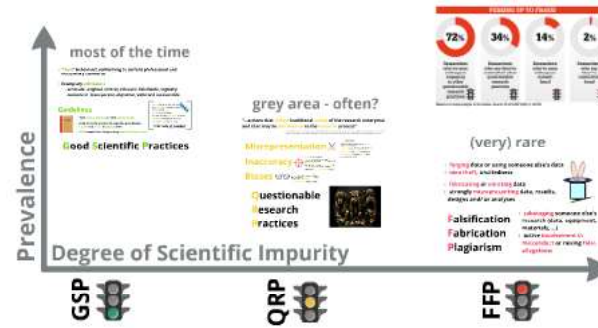
Dr. Emil Ratko-Dehnert



- Visit us

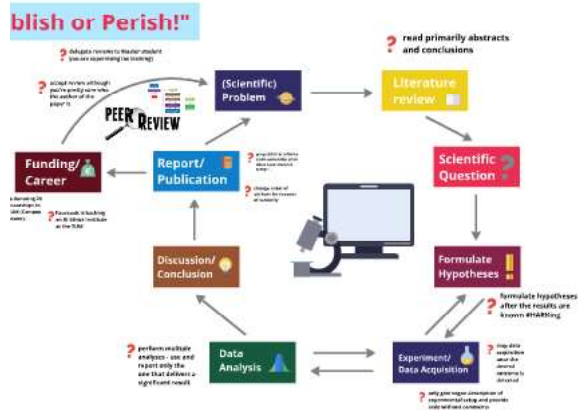
- at <http://www.prolehre.tum.de/>
- or at our office in **MW.0005** (by appointment)

ProLehre



(Stenek et al., 2006; Simmons et al., 2011)

Continuum of Scientific Conduct



TUM Kickoff Event for PhD candidates
Dr. Emil Ratko-Dehnert – Garching - 13.02.2019



Good Scientific Practices



Scientific Enterprise

How can I **avoid** misconduct/ complications?



- assume responsibility - inform yourself and be a role model
- if in **doubt** - ask someone (see -> contact points) and **discuss** with colleagues
- **explicitate agreements in advance** and record them in **writing** (lab journal, email communication, "contracts", ...)
- use **TUM Infrastructures** (e.g. TUM research data management center)

Recommendations

Prevention

What should I **do** if I **suspect** or **detect** a case of scientific misconduct?

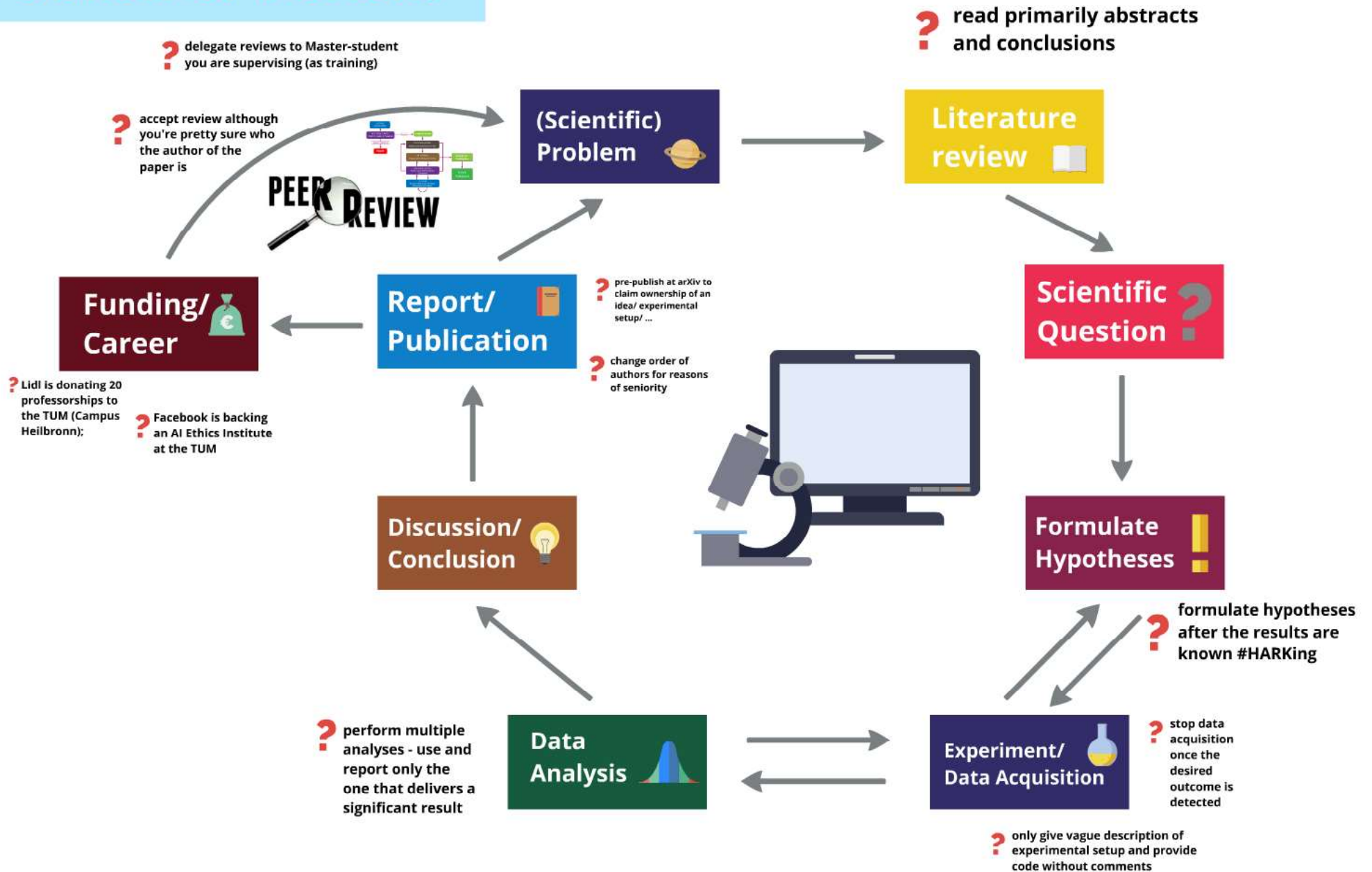
- **supervisor** or experienced **faculty staff**
- **TUM Ombudsperson**
- **(DFG Ombudsperson)**

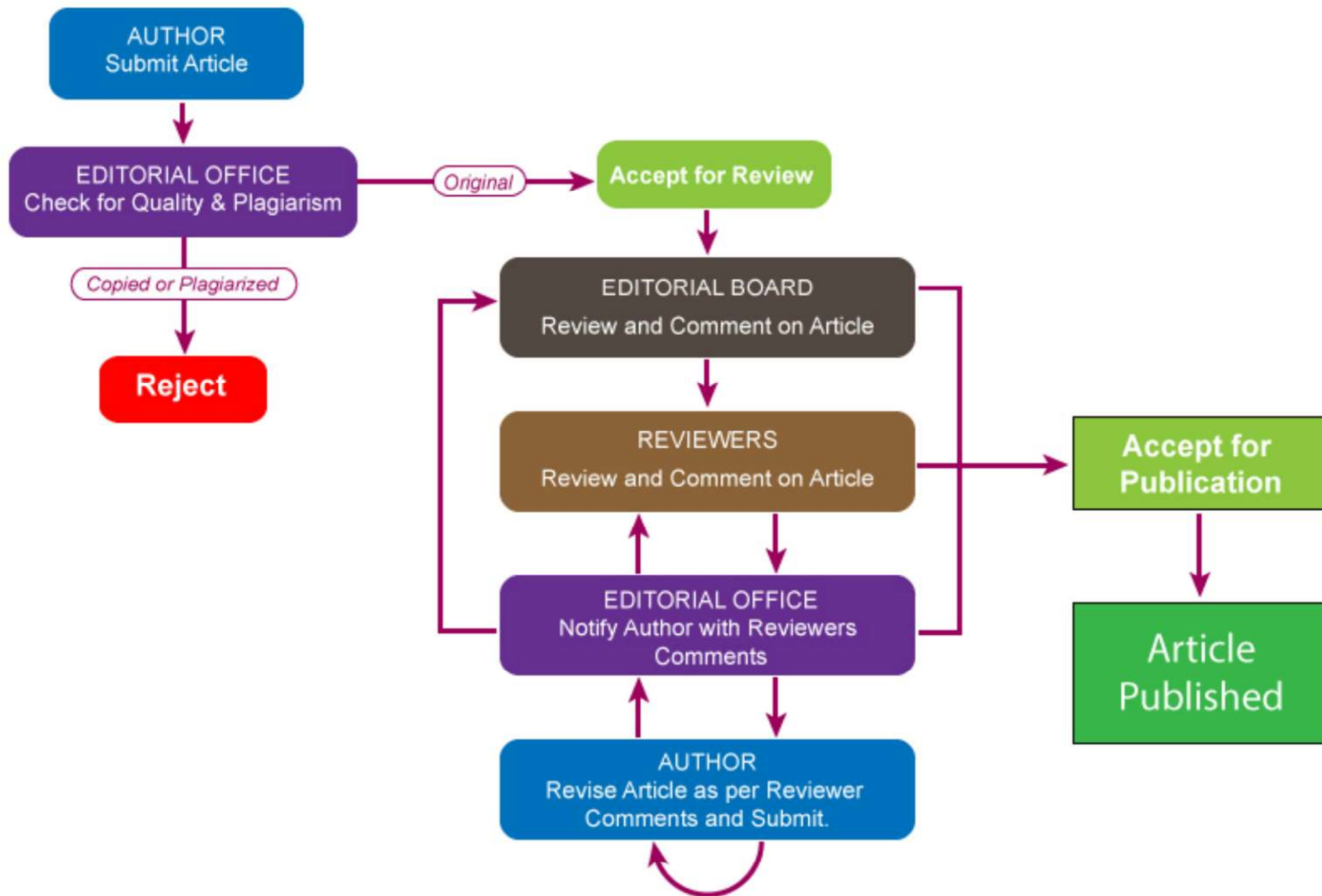
Contact Points

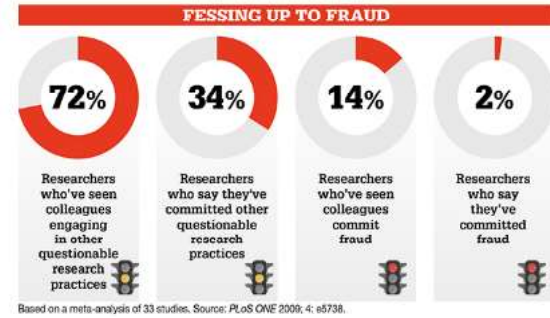
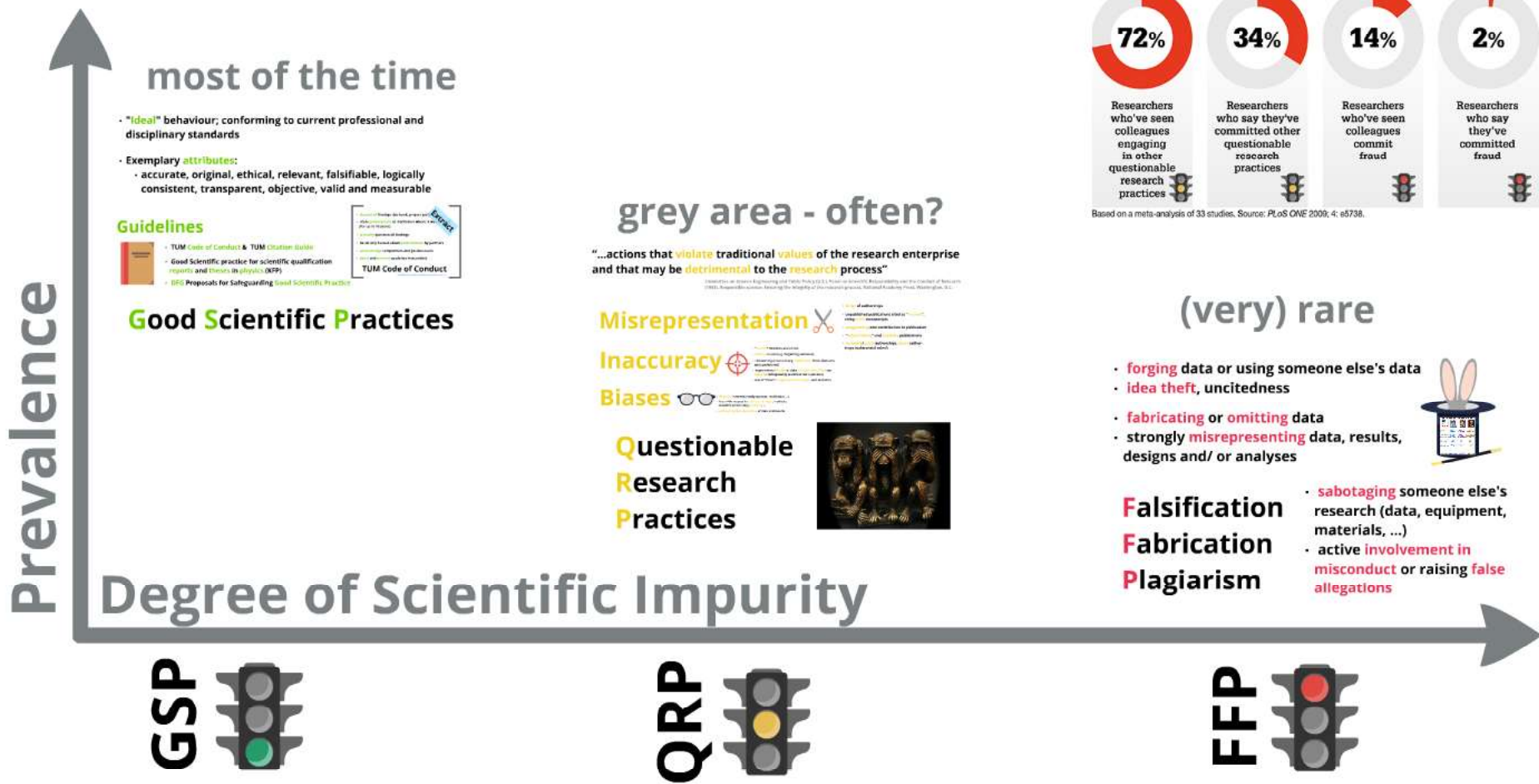


Escalation

"Publish or Perish!"







(Stenek et al., 2006; Simmons et al. 2011)

Continuum of Scientific Conduct

- "Ideal" behaviour; conforming to current professional and disciplinary standards
- Exemplary attributes:
 - accurate, original, ethical, relevant, falsifiable, logically consistent, transparent, objective, valid and measurable

Guidelines



- TUM Code of Conduct & TUM Citation Guide
- Good Scientific practice for scientific qualification reports and theses in physics (KFP)
- DFG Proposals for Safeguarding Good Scientific Practice


Extract

- document findings (lab book, project journal)
- store primary data at institution where it was created (for up to 10 years)
- critically question all findings
- be strictly honest about contributions by partners
- acknowledge competitors and predecessors
- avoid and prevent academic misconduct

TUM Code of Conduct

<http://www.gu.com.de/en/factorial/candidates/good-scientific-practice/>

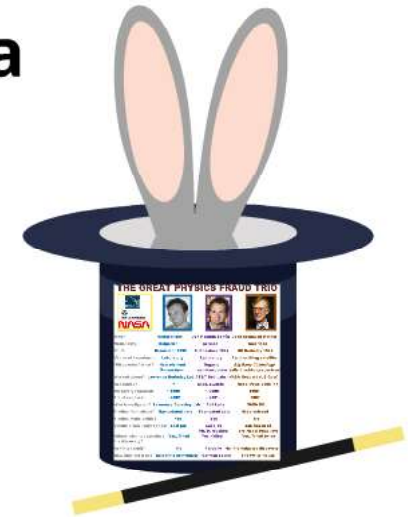
Good Scientific Practices

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- **document** findings (lab book, project journal)
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 - be strictly honest about **contributions** by partners
 - **acknowledge** competitors and predecessors
 - **avoid** and **prevent** academic misconduct

TUM Code of Conduct

<http://www.gs.tum.de/en/doctoral-candidates/good-scientific-practice/faq/>

- **forging** data or using someone else's data
- **idea theft**, uncitedness
- **fabricating** or **omitting** data
- **strongly misrepresenting** data, results, designs and/ or analyses



Falsification
Fabrication
Plagiarism

- **sabotaging** someone else's research (data, equipment, materials, ...)
- active **involvement in misconduct** or raising **false allegations**



THE GREAT PHYSICS FRAUD TRIO



Who?	Victor Ninov	Jan Hendrik Schön	John Cromwell Mather
Nationality	Bulgarian	German	American
Ph. D.	Dramstadt 1992	U Konstanz 1997	UC Berkeley 1974
Venue of experiment	Laboratory	Laboratory	Earth-orbiting satellite
“Discovered” what?	New element <i>Ununocium</i>	Organic semiconductor	<i>Big Bang Cosmology</i> relic blackbody spectrum
Worked where?	Lawrence Berkeley Lab	AT&T Bell Labs	NASA Goddard (US Govt)
Accolades?	?	Misc. awards	Nobel Prize 2006 ++
Discovery reported:	~ 1999	~ 2000	1990
Fraud exposed:	~2002	~ 2001	2007
Who investigated?	Lawrence Berkeley Lab	Bell Labs	NASA HQ
Finding from above?	Manipulated data	Fabricated data	Not disclosed
Finding made public?	Yes	Yes	No
Visible disciplinary action:	Lost job	Lost job Ph. D. revoked	Job frozen at pre-Nobel Prize level
Others tried to reproduce his discovery?	Yes, failed	Yes, failed	Yes, failed twice
Admitted fault?	No	Partially	No. Promulgates discovery.
How high did it go?	Scientific community	German courts	The White House

“...actions that **violate** traditional **values** of the research enterprise and that may be **detrimental** to the **research** process”

Committee on Science Engineering and Public Policy (U.S.). Panel on Scientific Responsibility and the Conduct of Research (1992). Responsible science: Ensuring the integrity of the research process, National Academy Press, Washington, D.C.

Misrepresentation

- **Order** of authorships
- unpublished publications cited as “**in press**”, citing **arXiv** manuscripts
- **exaggerating** own contribution to publication
- “**Salami Slicing**” und **duplicate** publications
- **honorary**/ **guest** authorships, **ghost** authorships (substantial roles!)

Inaccuracy

- “**honest**” mistakes and errors
- **citation** errors (e.g. forgetting someone)
- referencing errors (wrong **implications** from abstracts and conclusions)
- experimental **design** or data **analyses described** too **vaguely**/ ambiguously (and thus not replicable)
- use of “**false**”/ **inappropriate analyses** and statistics

Biases

- **financial** interests (study sponsor, institution, ...)
- bias with respect to **country of origin**, institute, scientific community, **authors**, ...
- **self-serving interpretation** of data and results

Questionable Research Practices



Policy (U.S.). Panel on Scientific Responsibility and the Conduct of the research process, National Academy Press, Washir



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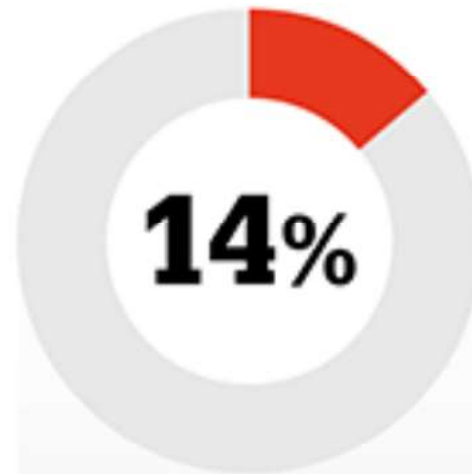
FESSING UP TO FRAUD



Researchers who've seen colleagues engaging in other questionable research practices



Researchers who say they've committed other questionable research practices



Researchers who've seen colleagues commit fraud



Researchers who say they've committed fraud



Based on a meta-analysis of 33 studies. Source: *PLoS ONE* 2009; 4: e5738.

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misconduct/
complications?



• assume responsibility - **inform** yourself and be a **role model**



• if in **doubt** - ask someone (see --> **contact points**) and **discuss** with colleagues



• explicate **agreements in advance** and record them **in writing** (lab journal, email communication, "contracts", ...)



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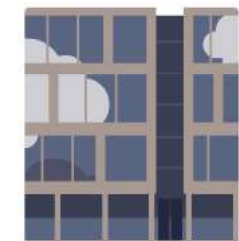
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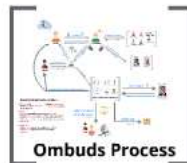
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Recommendations

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- **supervisor** or experienced **faculty** staff
- TUM **Ombudsperson**
- (DFG Ombudsperson)



Contact Points



Escalation

- **supervisor** or **experienced faculty staff**

Project Leader
Erika Schropp

Ombuds person
Prof. em. Joachim Heinzl

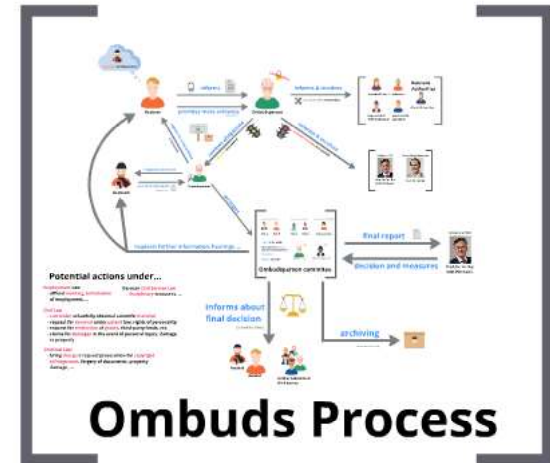
Deputy Ombuds person
Prof. em. Angelika Görg

ombudsperson@tum.de

Research Integrity Office TUM

- **TUM Ombudsperson**

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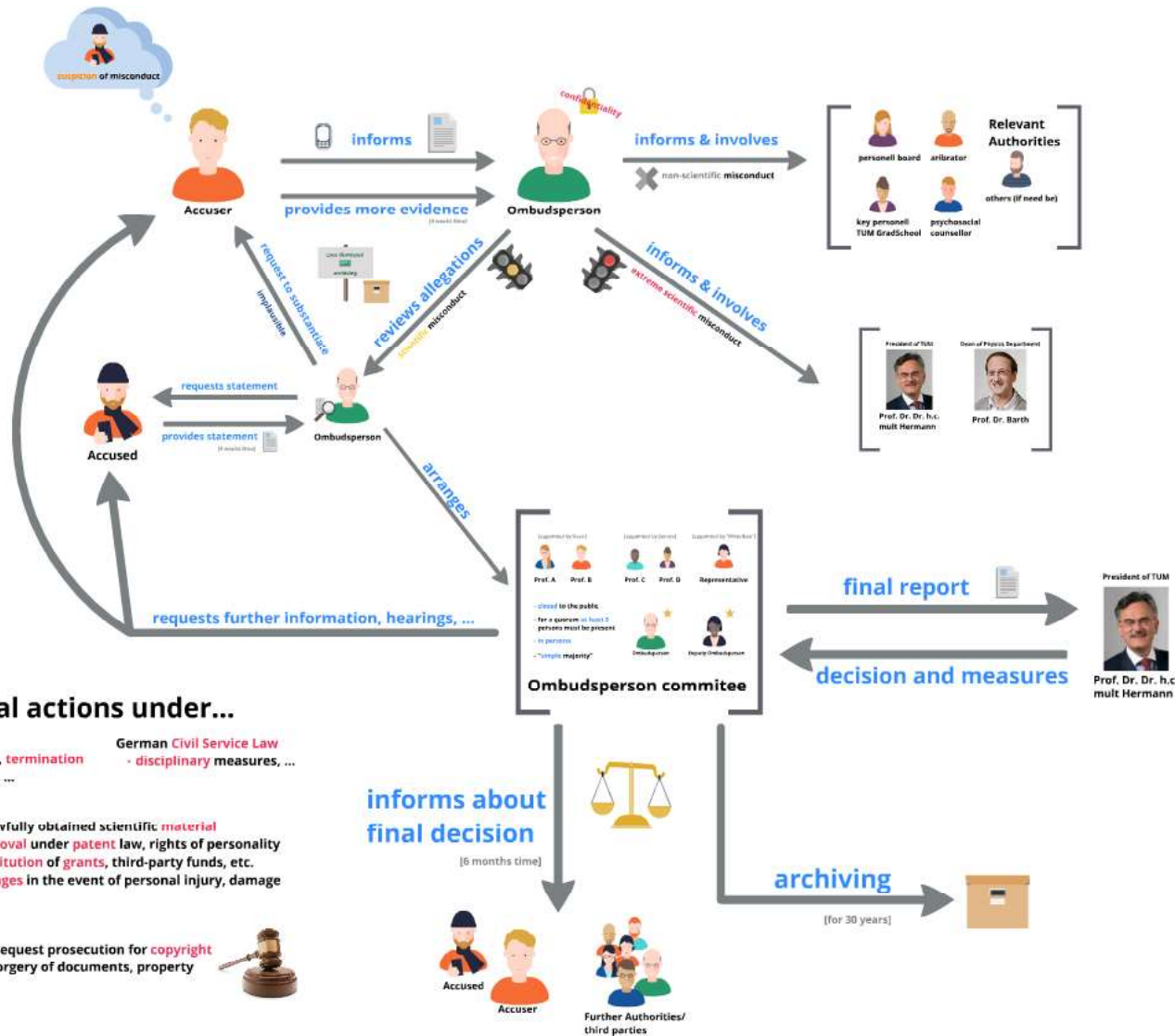
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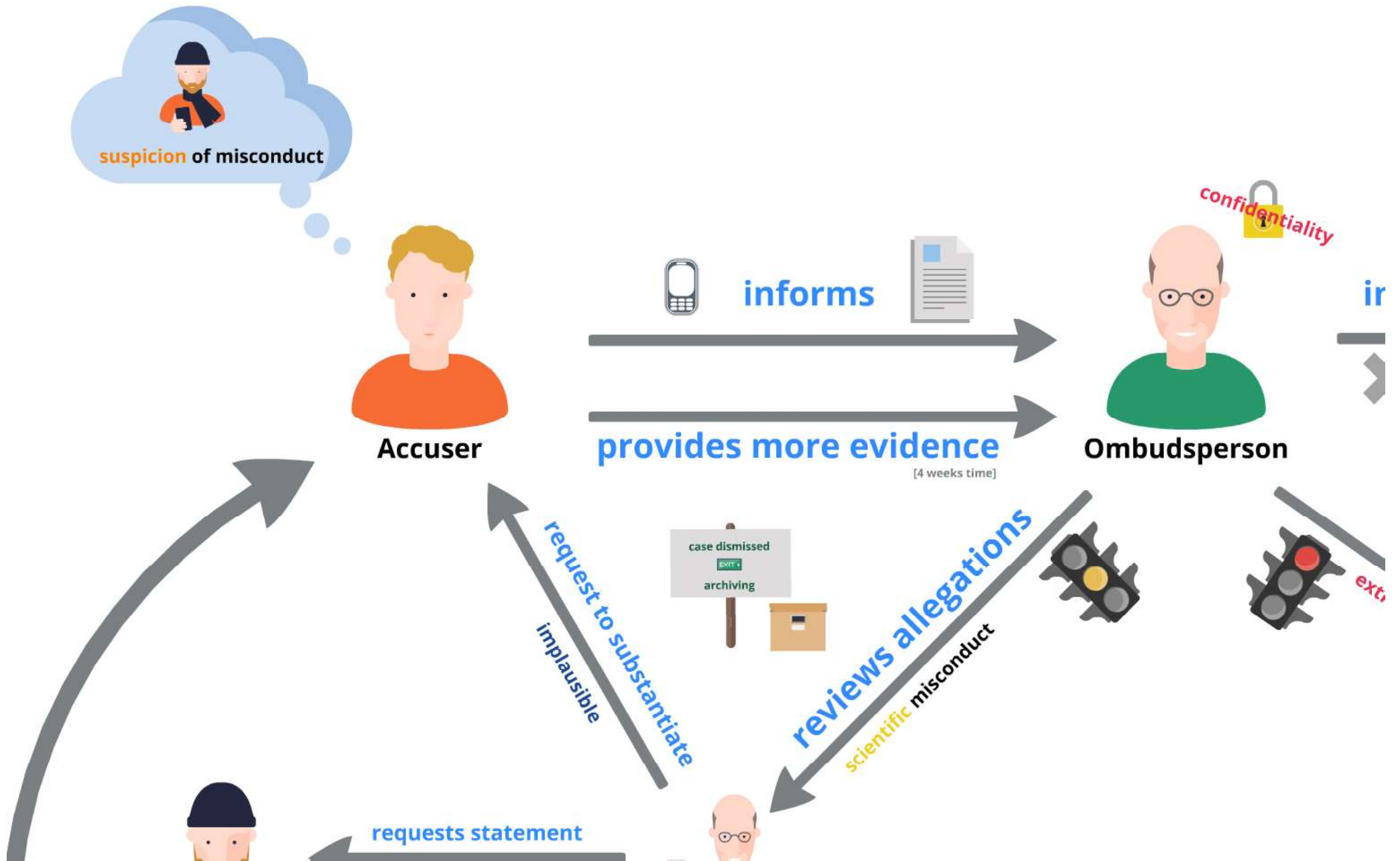
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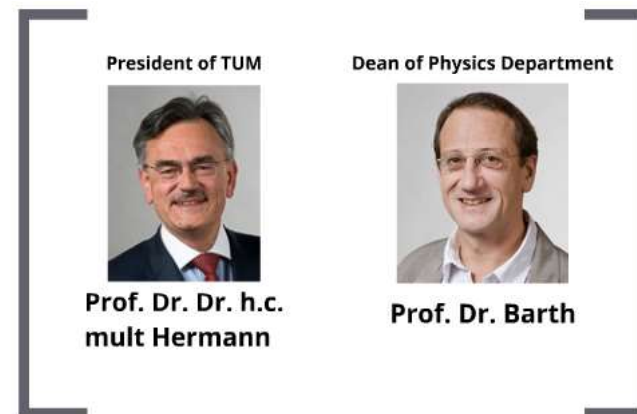
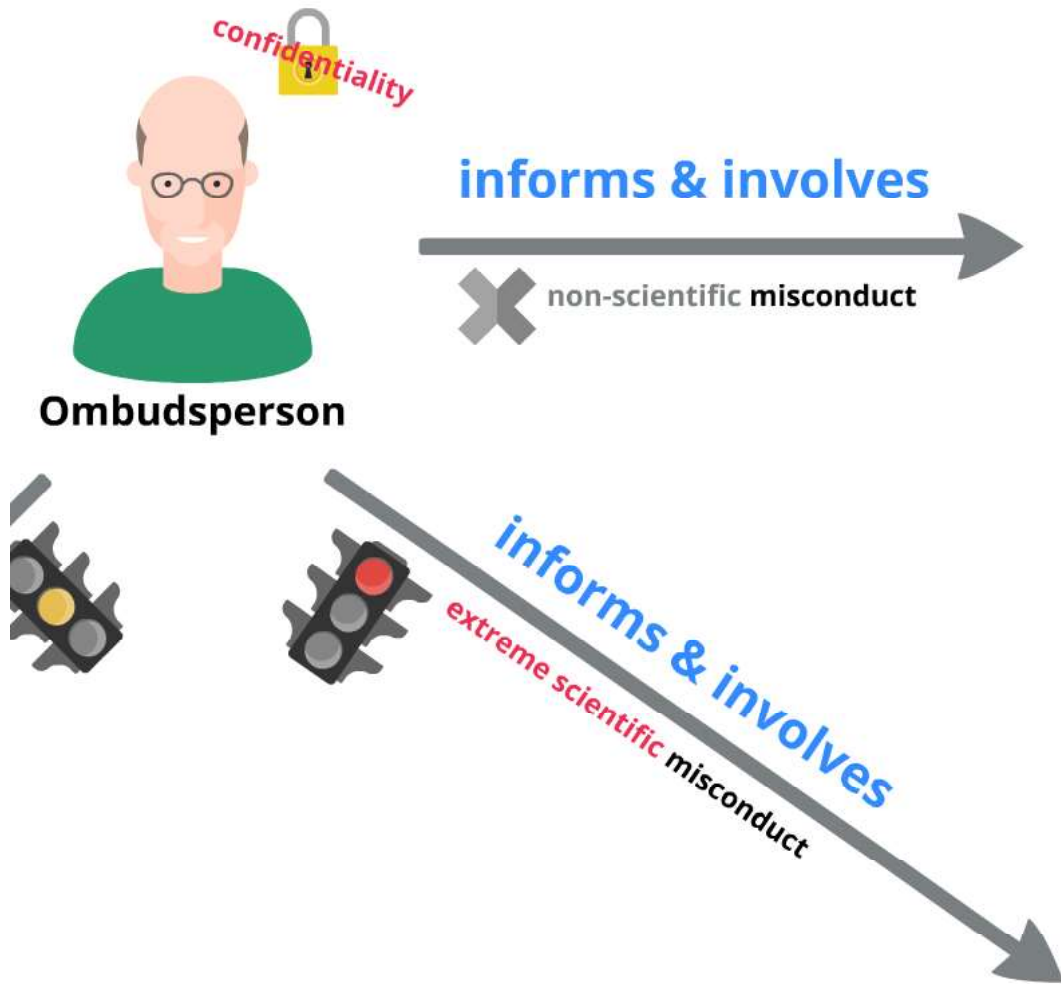
ombudsperson@tum.de

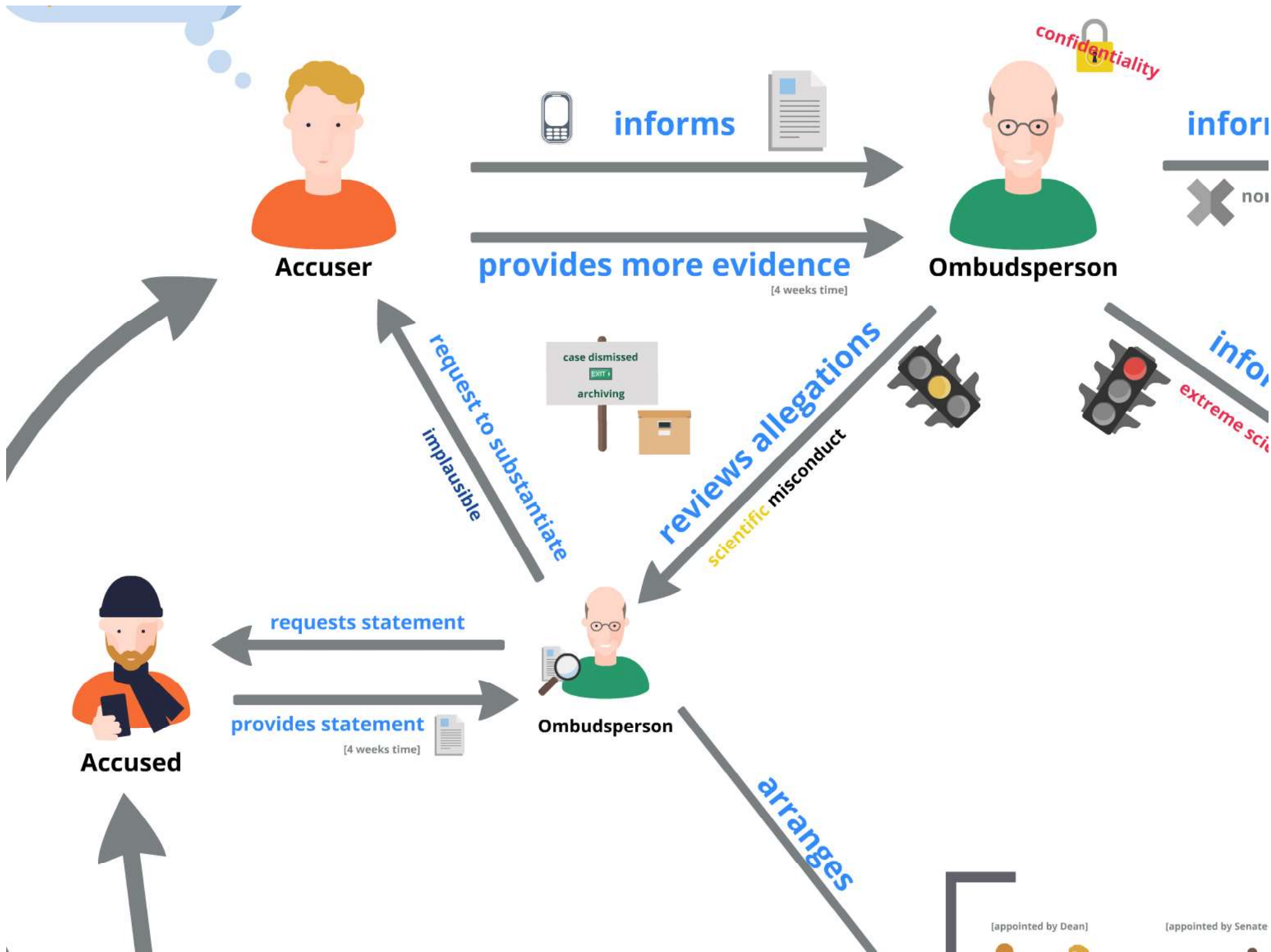
Research Integrity Office TUM



Ombuds Process







[appointed by Dean]



Prof. A



Prof. B

[appointed by Senate]



Prof. C



Prof. D

[appointed by "Mittelbau"]



Representative

- **closed** to the public
- for a quorum **at least 5** persons must be present
- **in persona**
- "**simple** majority"



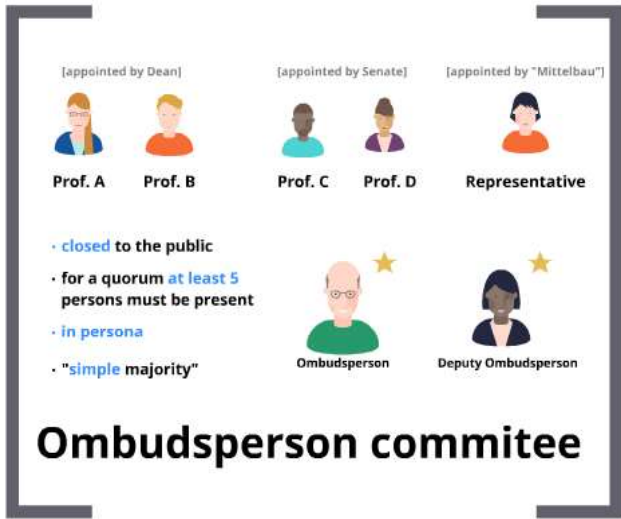
Ombudsperson



Deputy Ombudsperson

Ombudsperson committee

arranges
on, hearings, ...



informs about final decision

[6 months time]



Potential actions under...

Employment Law

- official **warning, termination** of employment, ...

German Civil Service Law

- **disciplinary** measures, ...

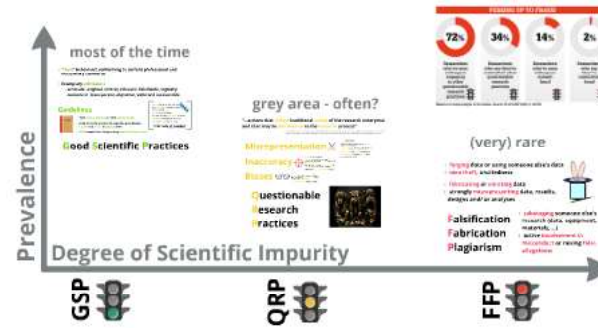
Civil Law

- **surrender** unlawfully obtained scientific **material**
- request for **removal** under **patent** law, rights of personality
- request for **restitution** of **grants**, third-party funds, etc.
- claims for **damages** in the event of personal injury, damage to property

Criminal Law

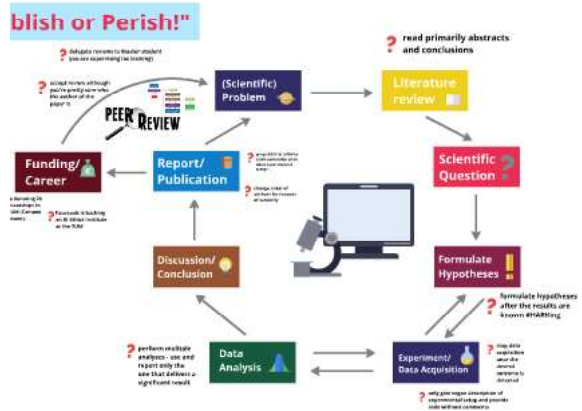
- bring **charges**/ request prosecution for **copyright infringement**, forgery of documents, property damage, ...





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Escalation

**Thank you for your
attention and active
participation!**



**Good luck with
your PhD project!**