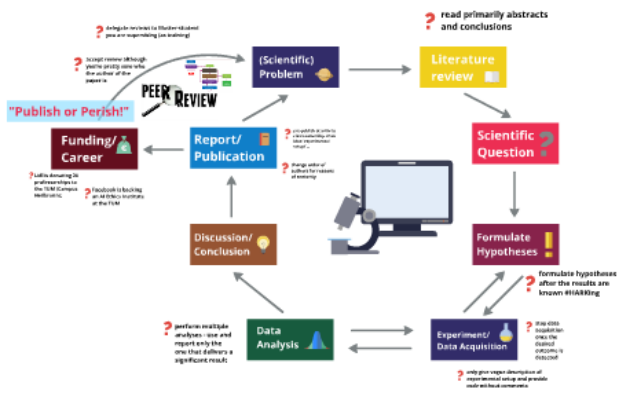


(Stenek et al., 2006; Simmons et al. 2011)

Continuum of Scientific Conduct



Scientific Enterprise

Kickoff Event for PhD candidates
Dr. Emil Ratko-Dehnert -- Garching - 16.07.2019

Did I Plagiarize?

"...it's kinda complicated..."

Good Scientific Practices

ProLehre

Thank you for your attention and active participation!

Good Luck with your PhD project!

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
- explicate agreements in advance and record them in writing (lab journal, email communication, "contracts", ...)
- use TUM infrastructure (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)



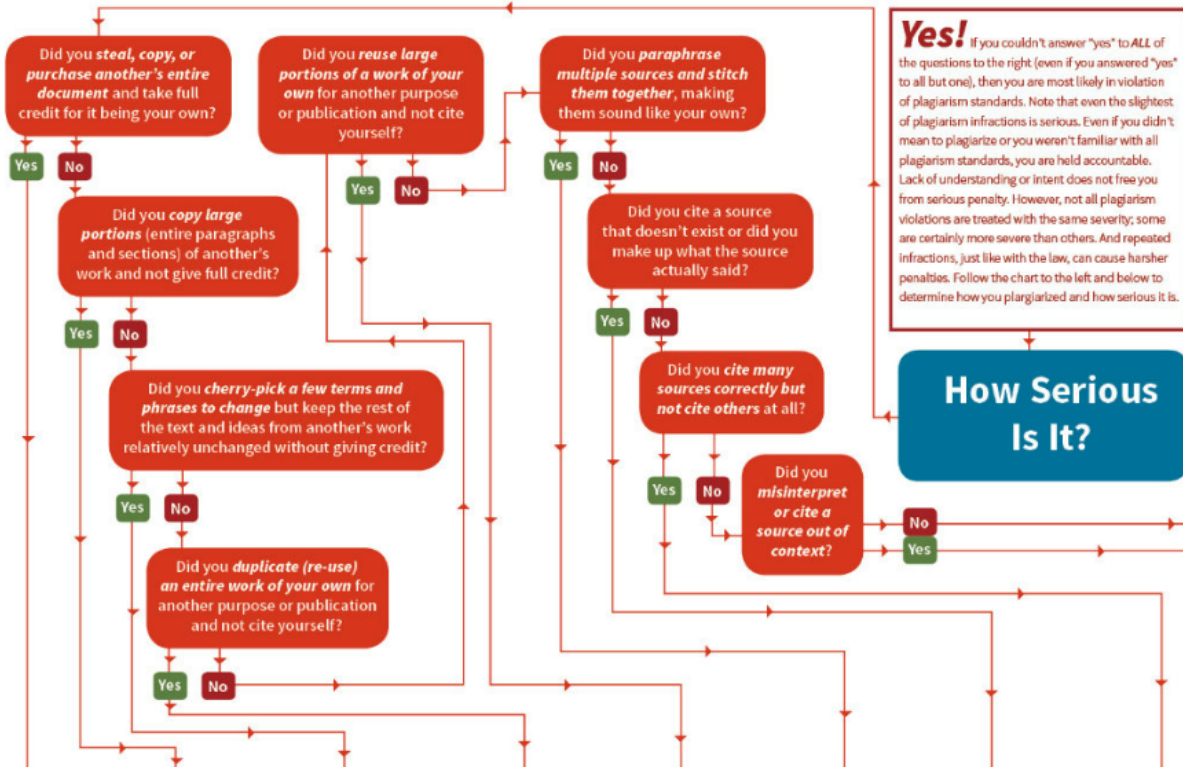
Contact Points



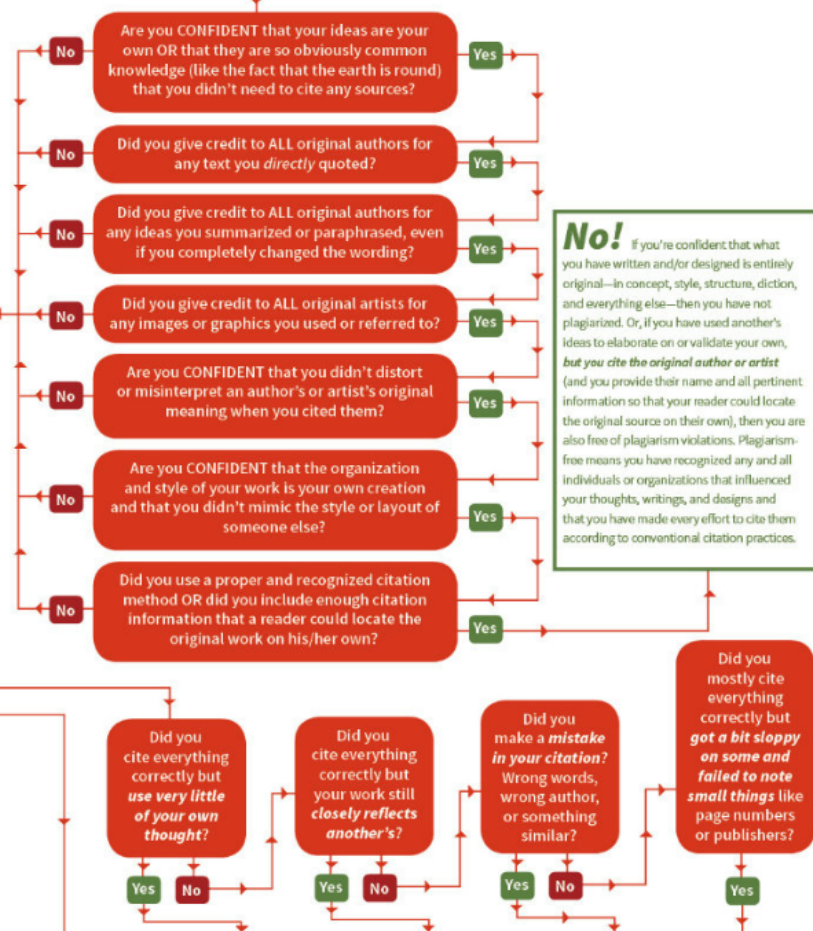
Escalation

Did I Plagiarize?

The Types and Severity of Plagiarism Violations



Did I Plagiarize?



Insanely	Extremely	Terribly	Immensely	Profoundly	Hugely	Very, Very	Very	Remarkably	Quite	Notably	Somewhat	Mildly

Plagiarism Severity Meter: How Serious Is the Violation?



"...it's kinda complicated..."

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

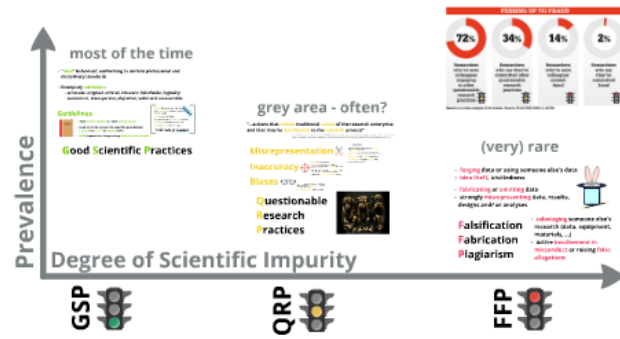
- at <http://www.prolehre.tum.de/>
- or at our office in **MW.0005** (by appointment)

ProLehre



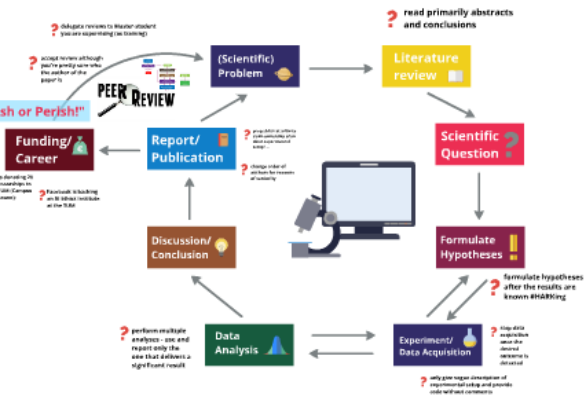
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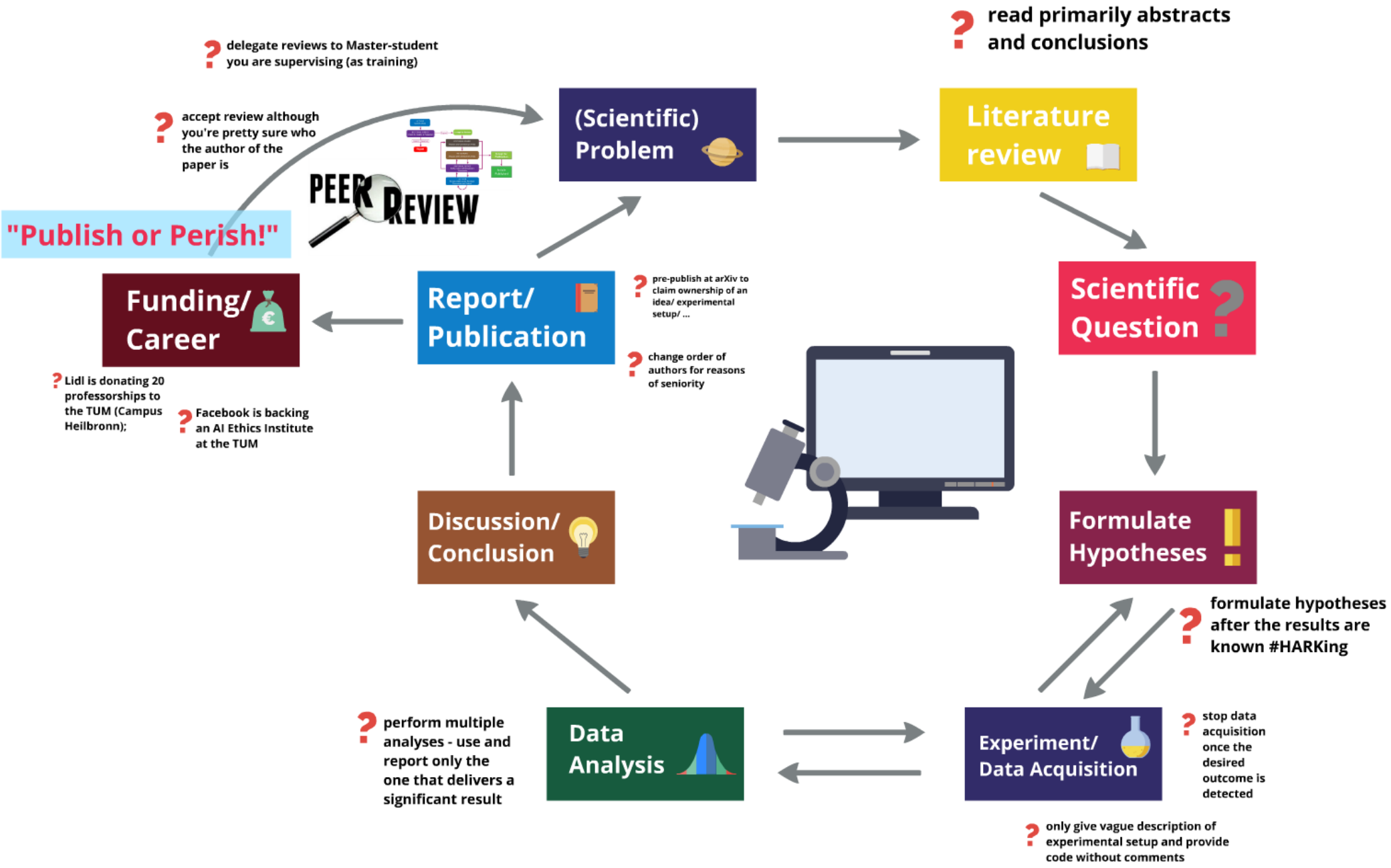
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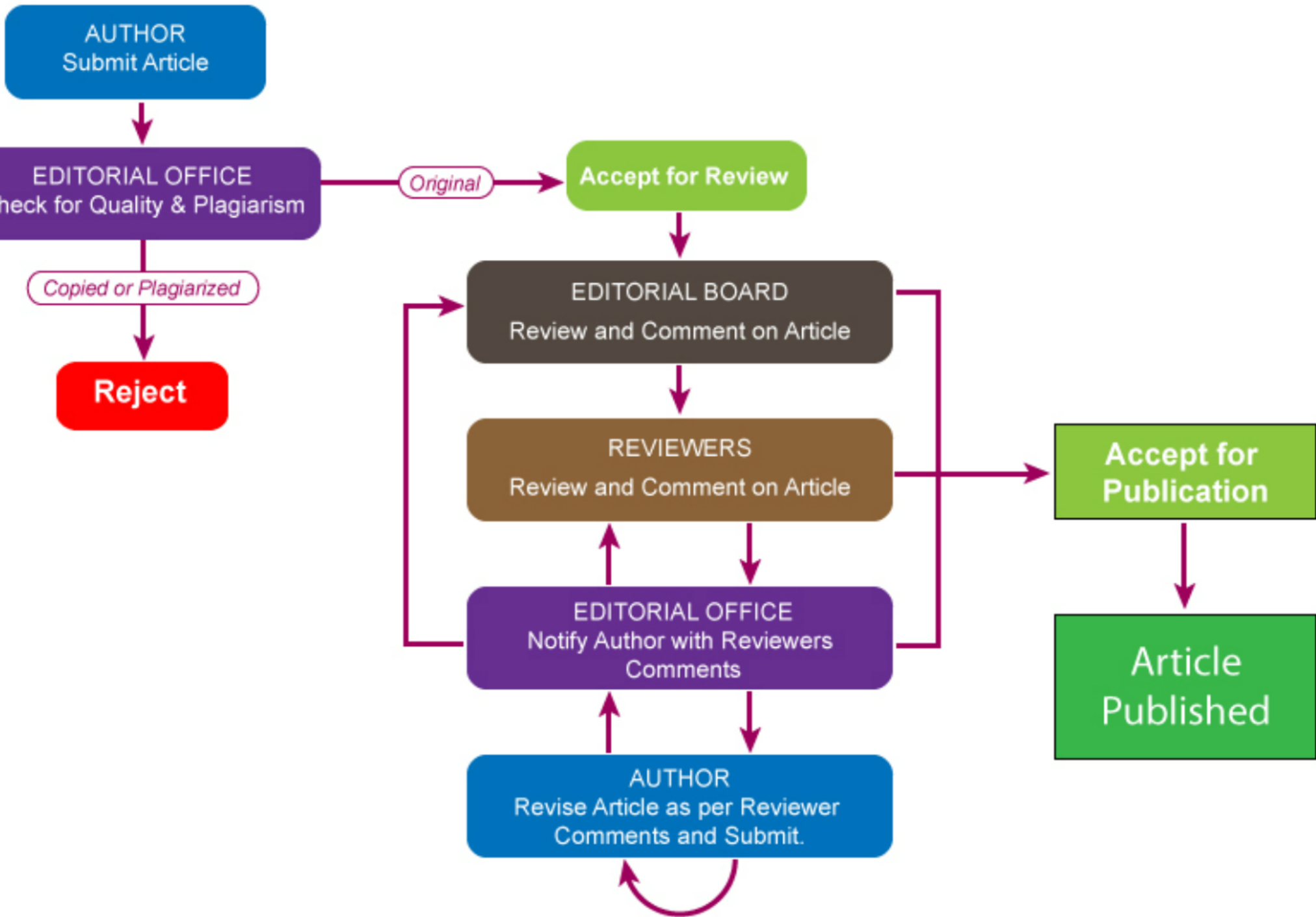
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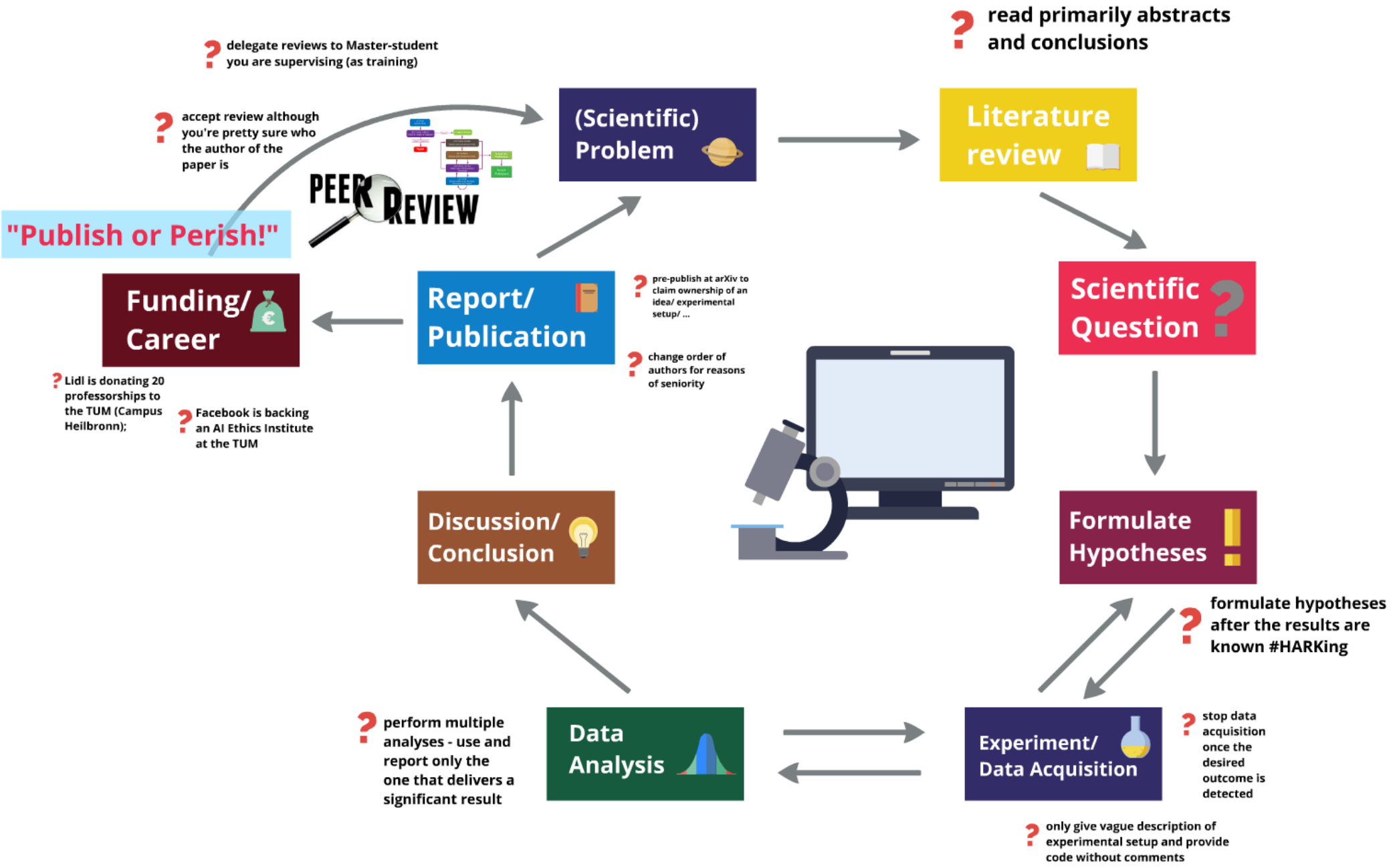
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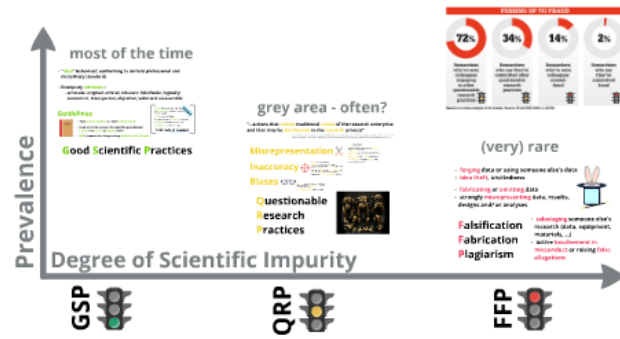


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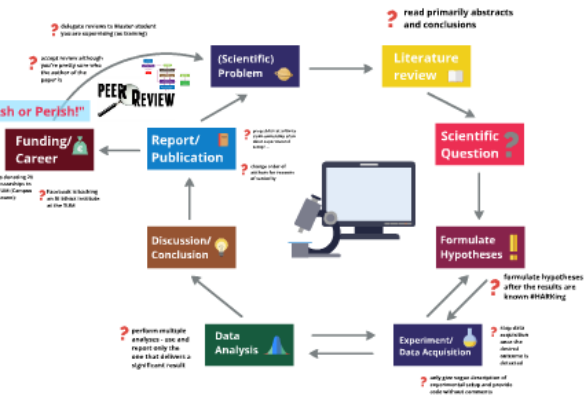






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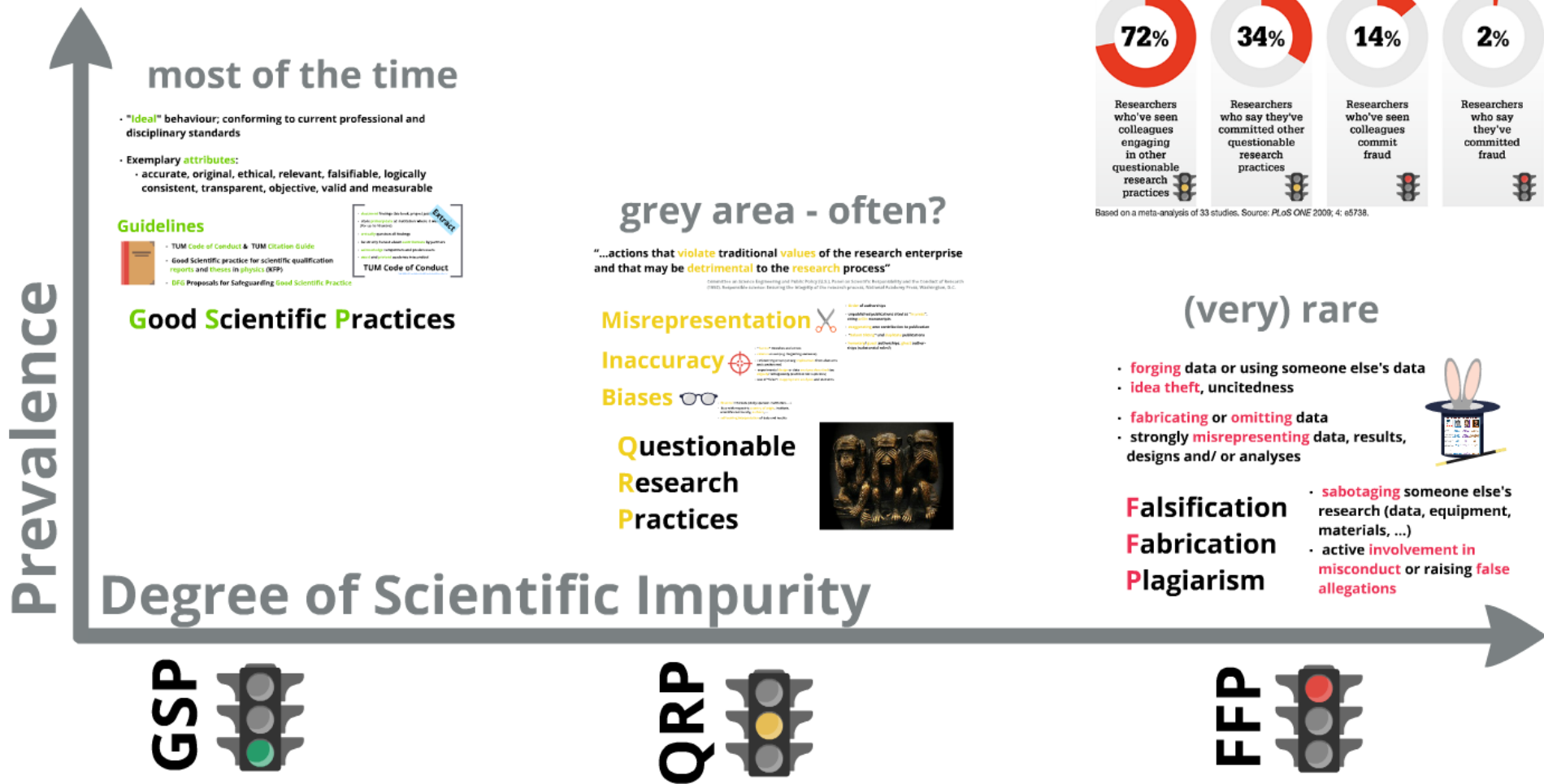
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Contact Points



Escalation



(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.gs.tum.de/en/doctoral-candidates/good-scientific-practice/>

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Good Scientific Practices

grey area - often?

"...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 (CSEP), National Academies of Sciences, Engineering, and Medicine (2016). Responsible science: Restoring the integrity of the research process. National Academies Press, Washington, D.C.

Misrepresentation 

- **selective** disclosure
- **unpublished** publications cited as "preprint" or "in preparation"
- **misquoting** data and statistics in publications
- **misleading** and **misleading** publications
- **misrepresentation** of **data** and **results**

Inaccuracy 

- **rounding** numbers and **units**
- **omitting** error bars, **confidence** intervals, **uncertainties**, **limitations**, **assumptions**, **methodological** details, **data** and **code**
- **misquoting** data and **statistics**
- **misrepresentation** of **data** and **results**

Biases 

- **confirmation** bias
- **cherry-picking** data
- **overfitting** models
- **overstating** the **significance** of **findings**
- **misquoting** data and **statistics**
- **misrepresentation** of **data** and **results**

Questionable Research Practices



FESSING UP TO FRAUD



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

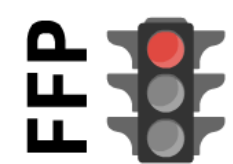
(very) rare

- **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**

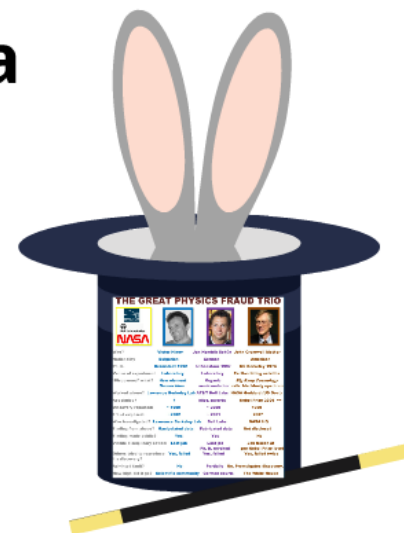
Degree of Scientific Impurity



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Fabrication

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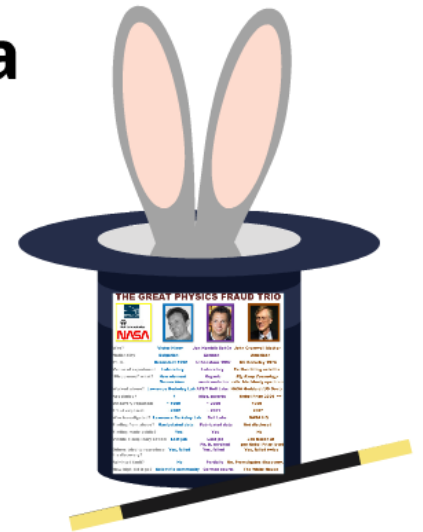
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THE GREAT PHYSICS FRAUD TRIO



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>Ununoctium</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

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most of the time

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Good Scientific Practices

grey area - often?

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

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Falsification
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Plagiarism


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



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

GSP 

QRP 

FFP 

Degree of Scientific Impurity

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

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- **Order** of authorships
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- “**Salami Slicing**” und **duplicate** publications
- **honorary**/ **guest** authorships, **ghost** authorships (substantial roles!)

Inaccuracy

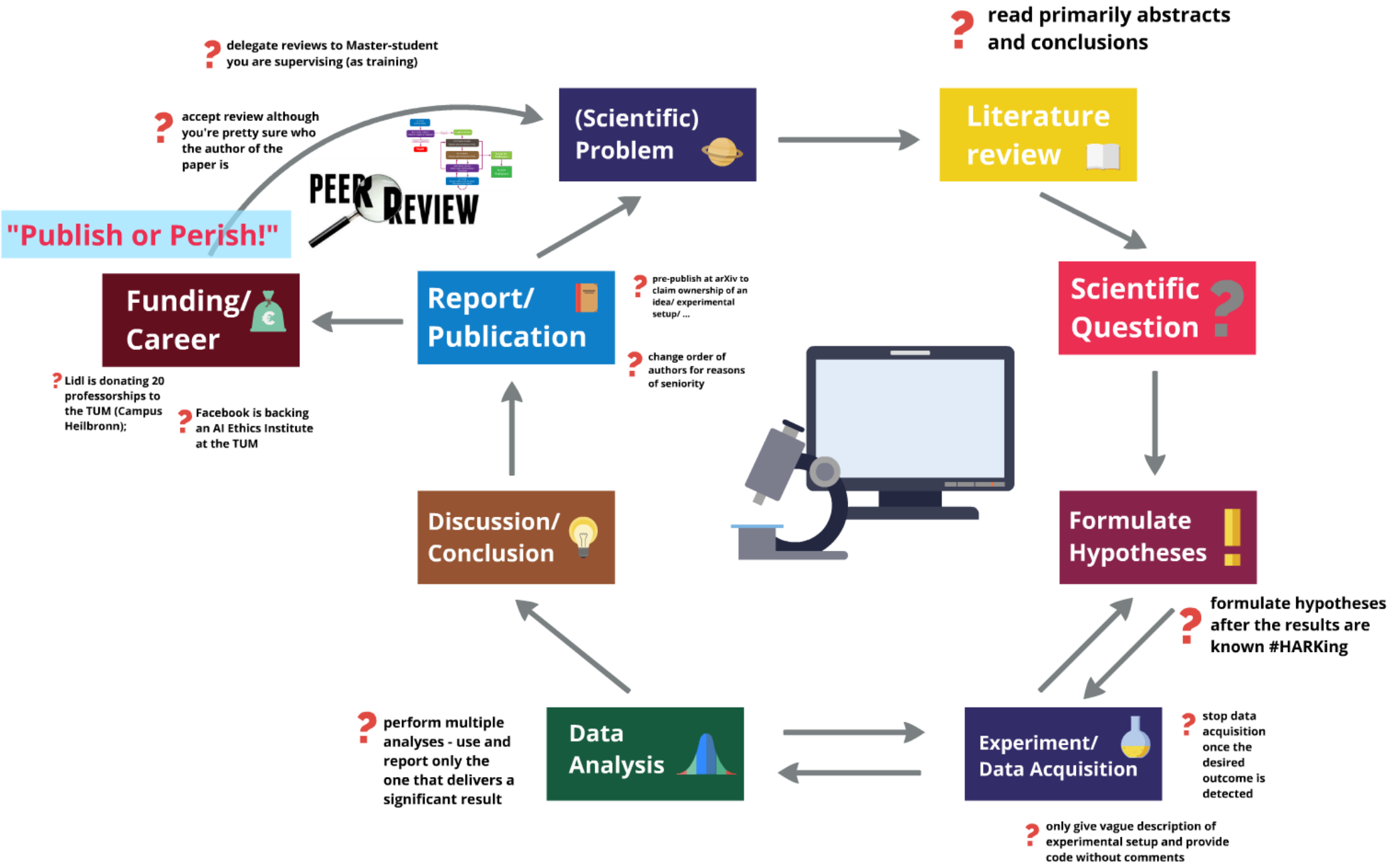
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Biases

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Questionable Research Practices







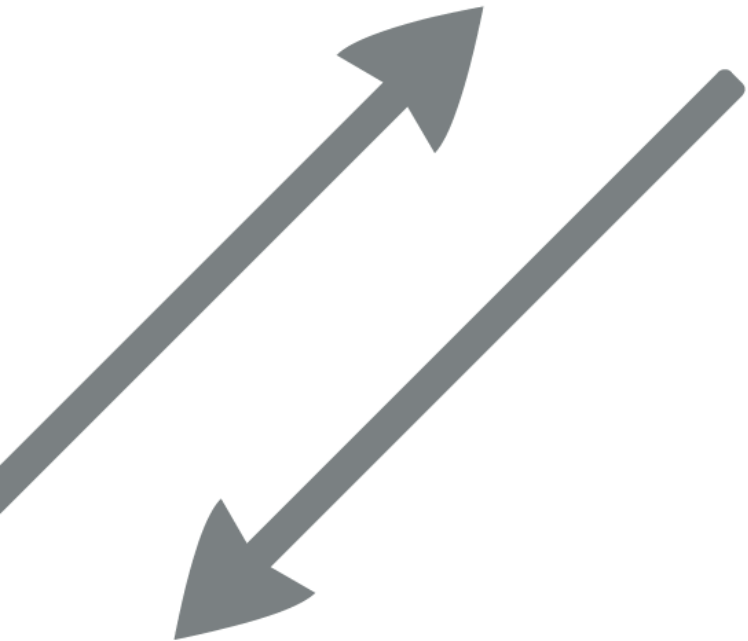
**read primarily abstracts
and conclusions**

**Literature
review**





Formulate Hypotheses



**formulate hypotheses
after the results are
known #HARKing**

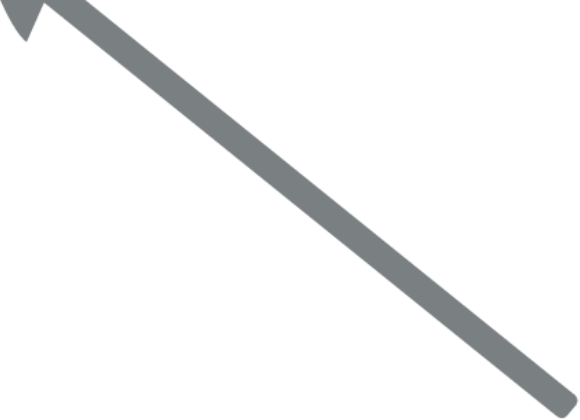


Experiment/ Data Acquisition



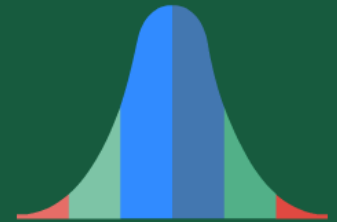
? stop data acquisition once the desired outcome is detected

? only give vague description of experimental setup and provide code without comments

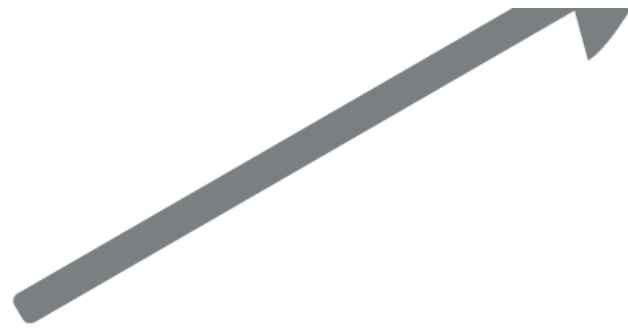


? perform multiple analyses - use and report only the one that delivers a significant result

**Data
Analysis**



VIEW



Report/ Publication



? pre-publish at arXiv to claim ownership of an idea/ experimental setup/ ...

? change order of authors for reasons of seniority



**? delegate reviews to Master-student
you are supervising (as training)**

**? accept review although
you're pretty sure who
the author of the
paper is**

r Perish!"

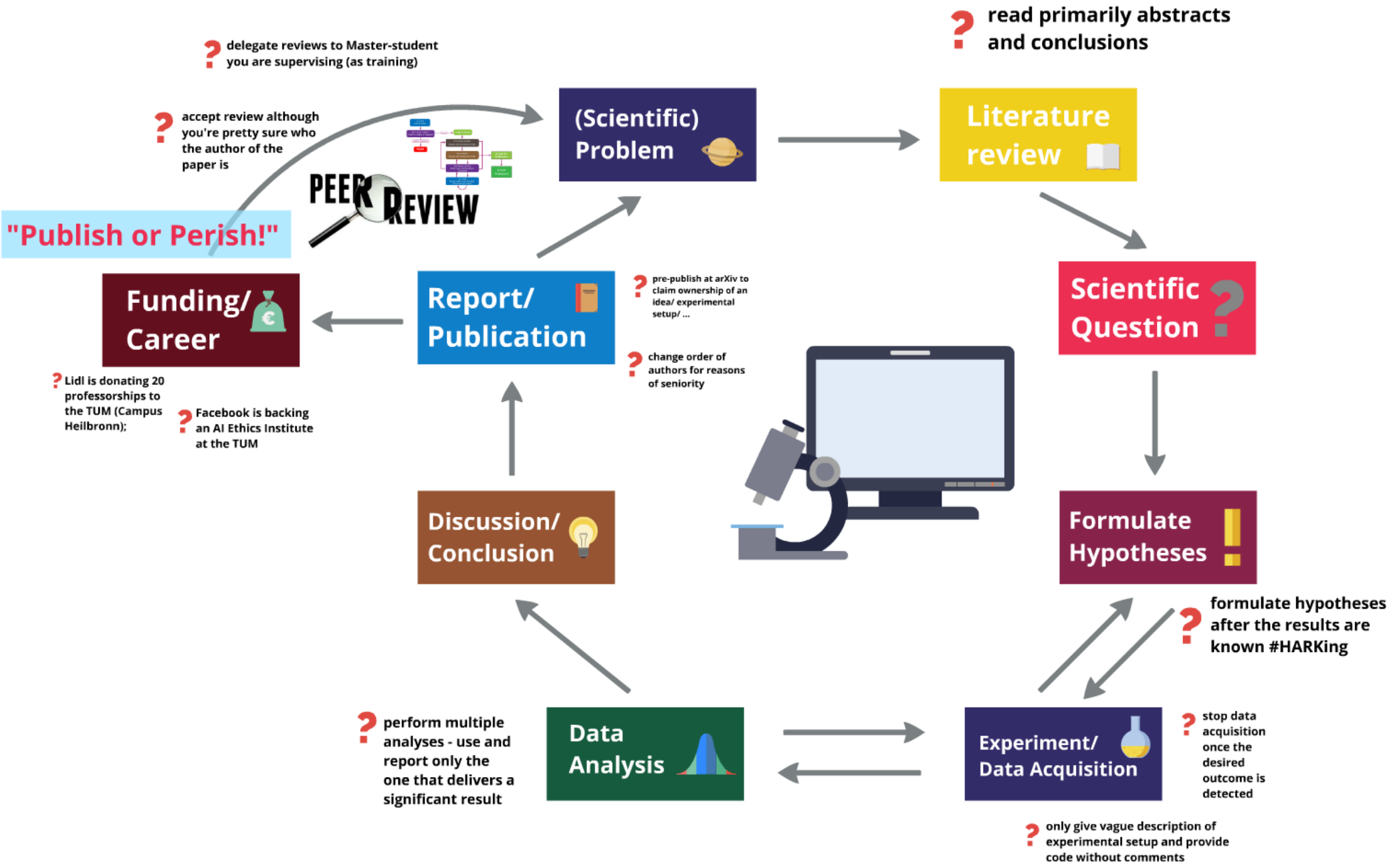


Funding/ Career



? Lidl is donating 20 professorships to the TUM (Campus Heilbronn);

? Facebook is backing an AI Ethics Institute at the TUM



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Misrepresentation 

- **Journal of publications**
- **Unpublished publications cited as 'preprint' along with acknowledgments**
- **Preprints cited as published in publications**
- **Journal articles and preprints published**
- **Journal articles published in preprint servers**

Inaccuracy 

- **Journal articles and preprints**
- **Journal articles and preprints**
- **Journal articles and preprints**
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Biases 

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Questionable Research Practices



FESSING UP TO FRAUD



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

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me)

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accuracy



research errors (wrong
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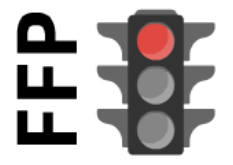
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Fabrication
Plagiarism

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Degree of Scientific Impurity

(Stenek et al., 2006; Simmons et al. 2012)

Continuum of Scientific Conduct

FESSING UP TO FRAUD

72%

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



34%

Researchers who say they've committed other questionable research practices



14%

Researchers who've seen colleagues commit fraud

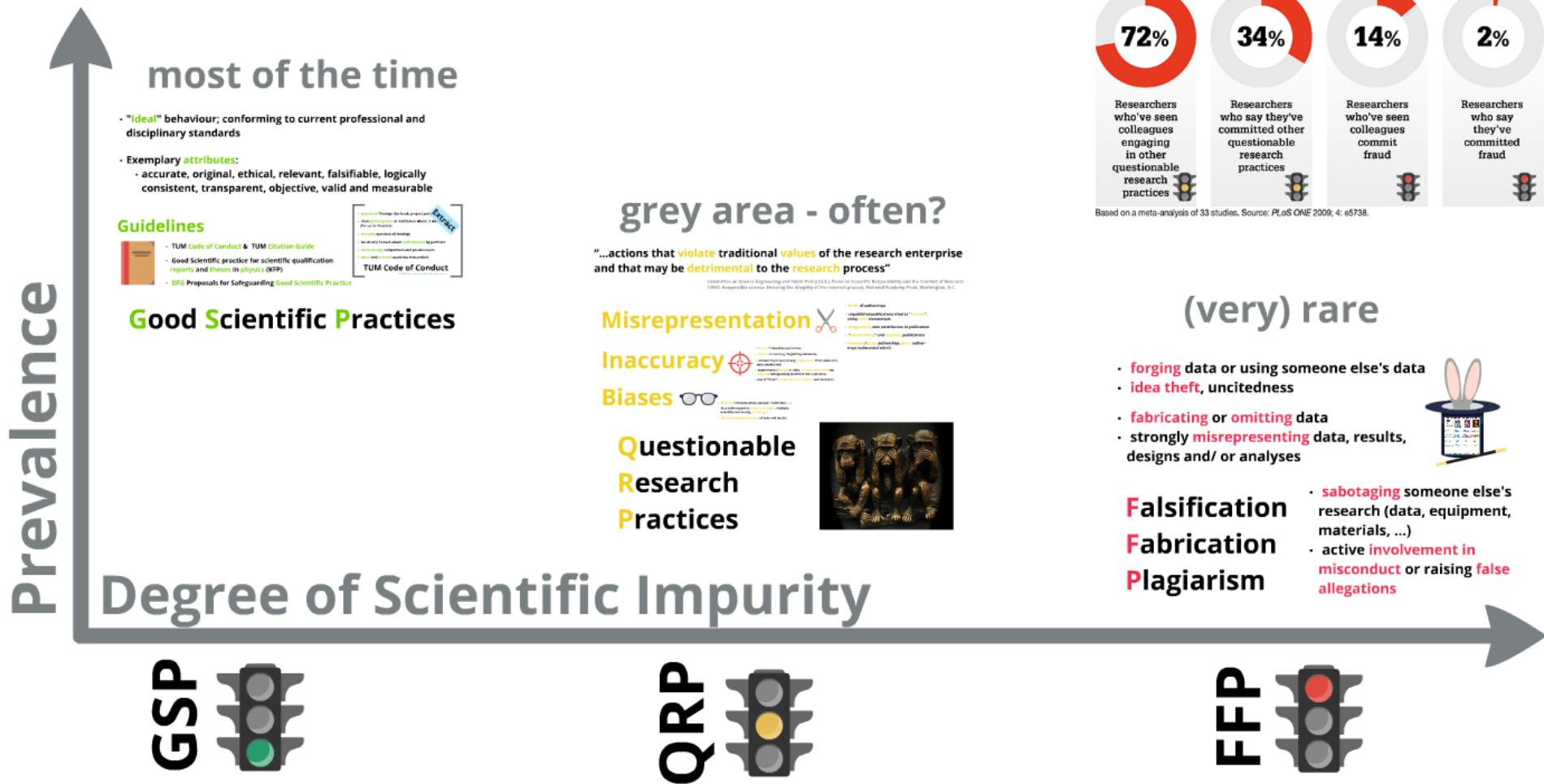


2%

Researchers who say they've committed fraud

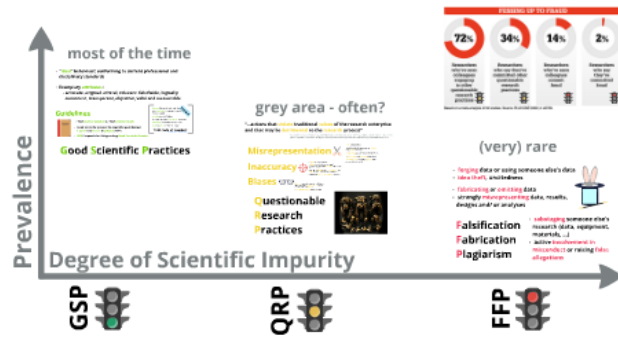


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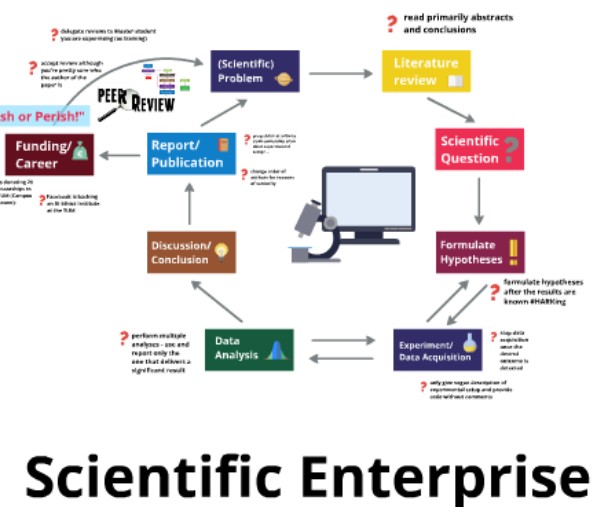
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Continuum of Scientific Conduct



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Continuum of Scientific Conduct



TUM Kickoff Event for PhD candidates
Dr. Emil Ratko-Dehnert – Garching - 16.07.2019

"...it's kinda complicated..."

Good Scientific Practices

ProLehre Thank you for your attention and active participation! See too with your PhD project!

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 infrastructure** (e.g. TUM research data management center)

Recommendations

Prevention

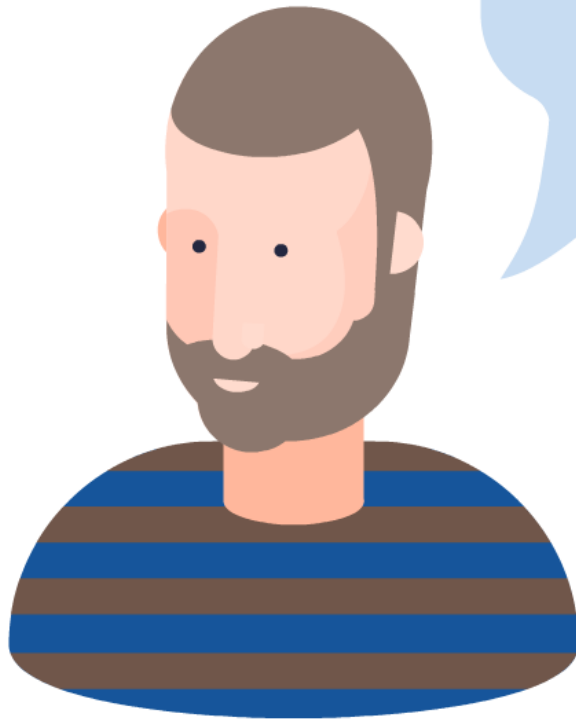
What should I **do** if I **suspect** or **detect** a case of scientific misconduct?

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

Contact Points

Escalation

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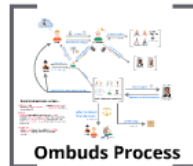
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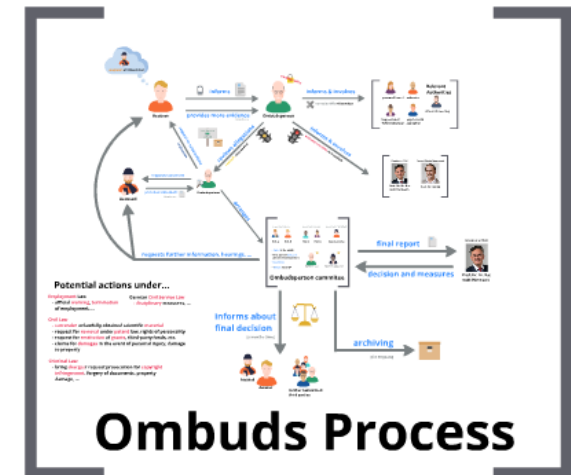
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- **(DFG Ombudsperson)**

Project Leader: Erika Schropp
 Ombuds person: Prof. em. Joachim Heinzl
 Deputy Ombuds person: Prof. em. Angelika Görg

ombudsperson@tum.de
Research Integrity Office TUM



Contact Points



Project Leader



Erika Schropp

Ombuds person



Prof. em. Joachim Heinzl

Deputy Ombuds person



Prof. em. Angelika Görg

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Research Integrity Office TUM

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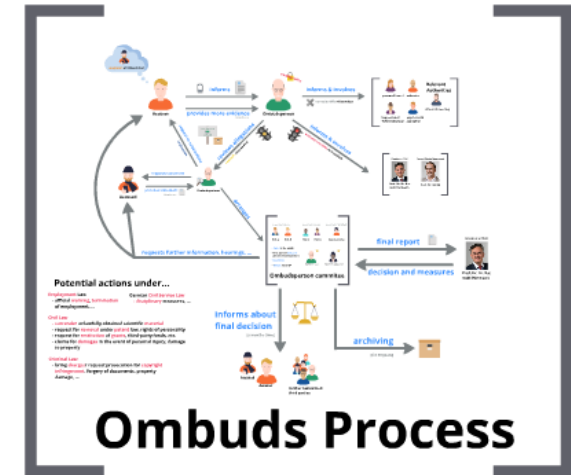
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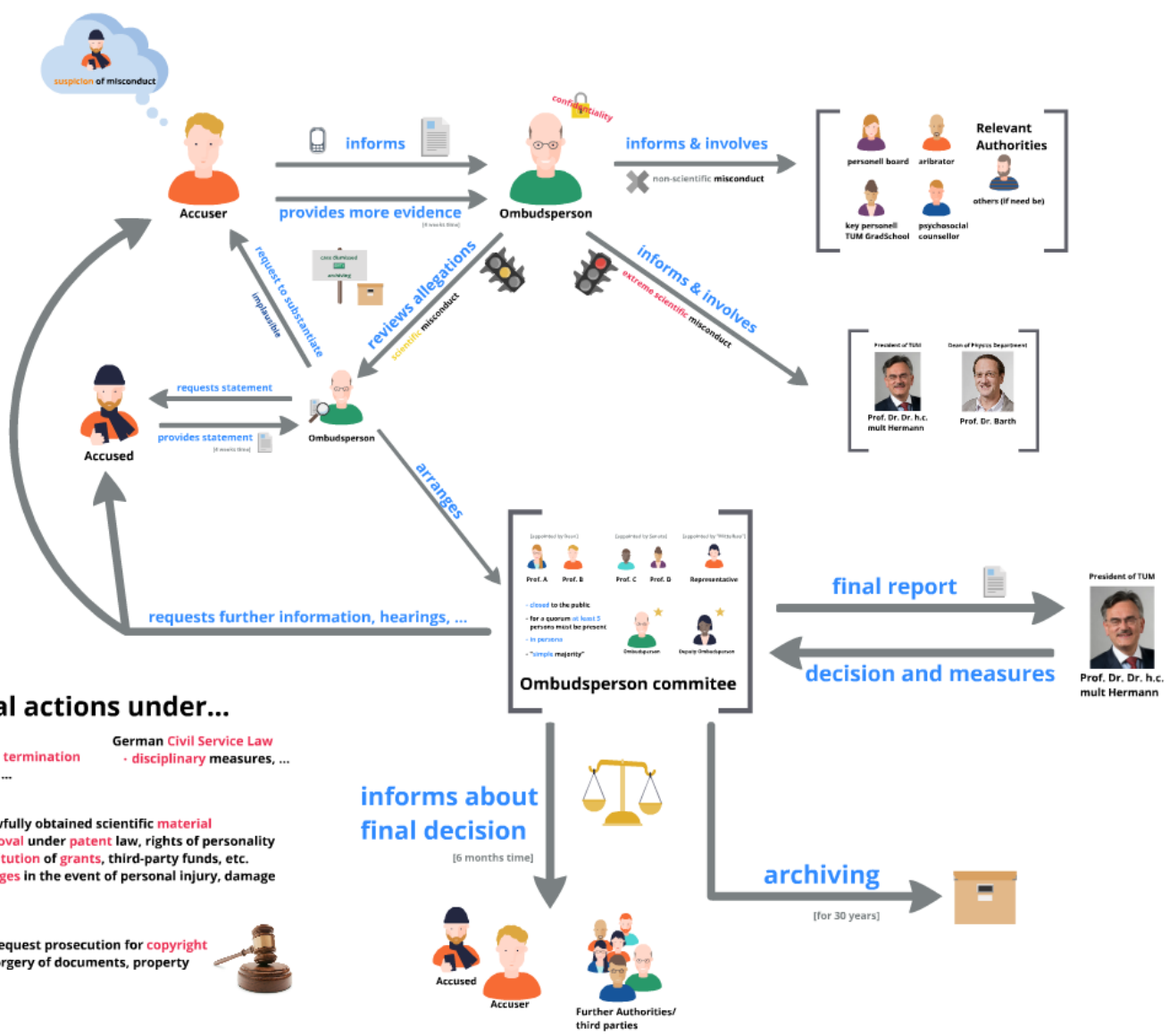
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Contact Points





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, ...

Ombuds Process



Accuser



—
—
prov



Accuser



informs



provides more evidence

[4 weeks time]



Ombudsperson

confidentiality

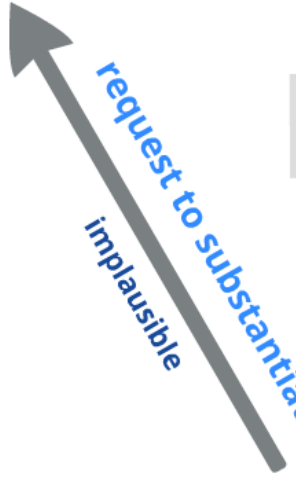


reviews allegations

scientific misconduct

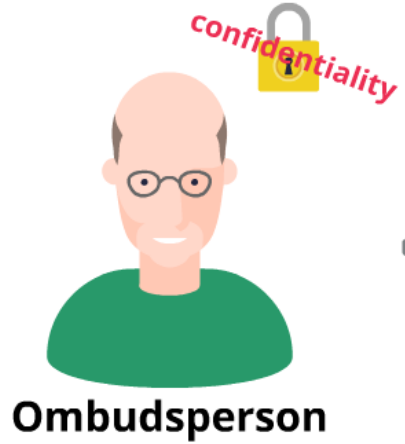


request to substantiate
implausible



requests statement

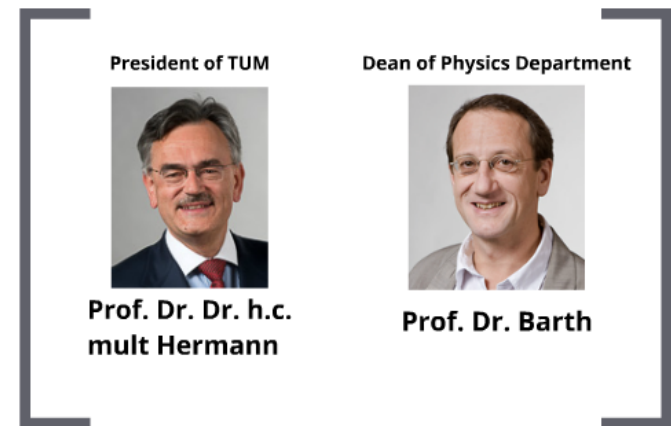
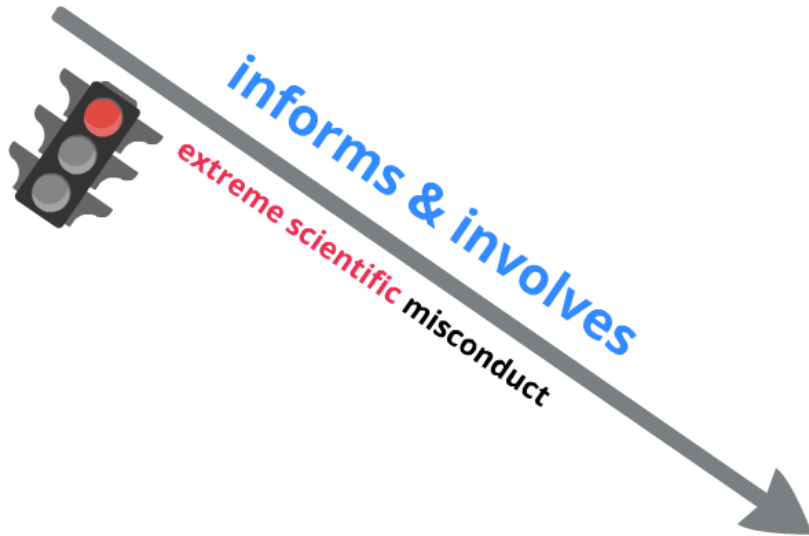


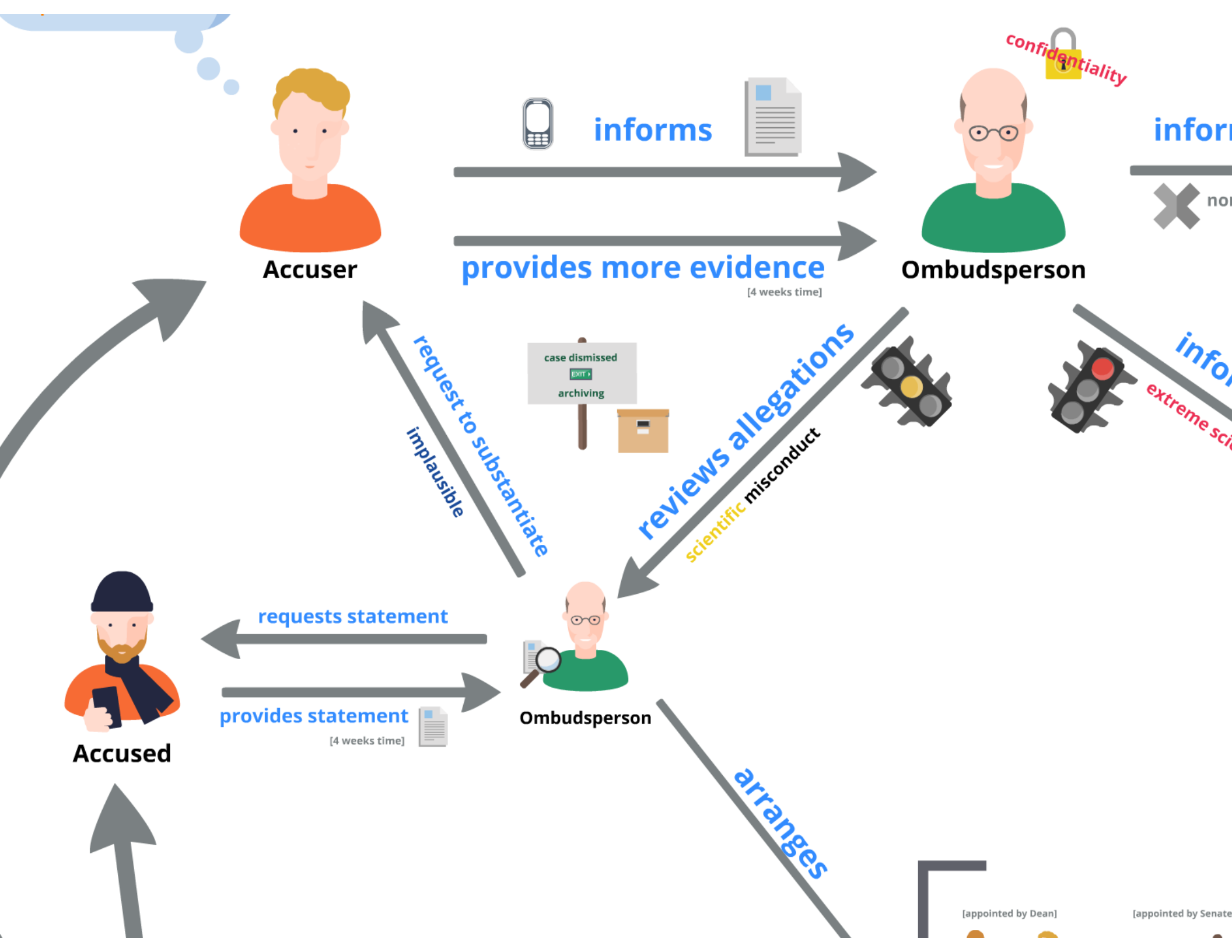


informs & involves



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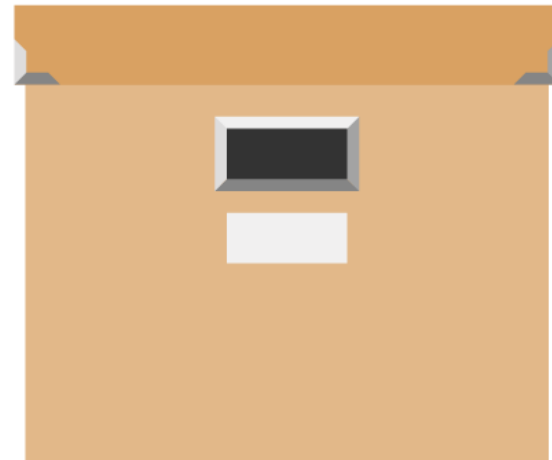


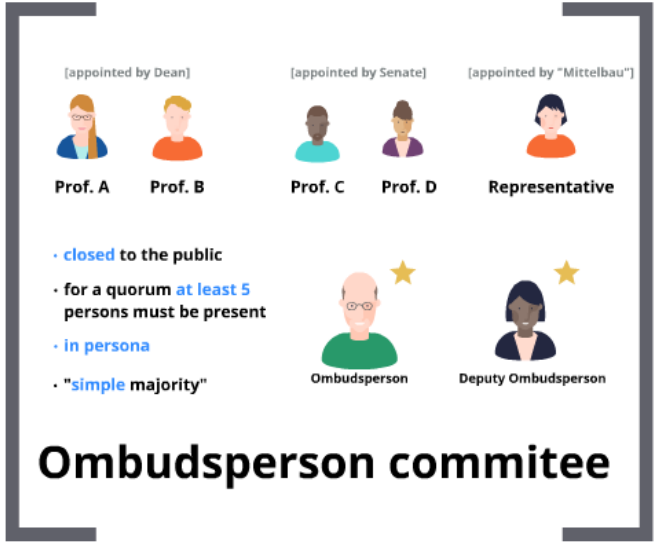
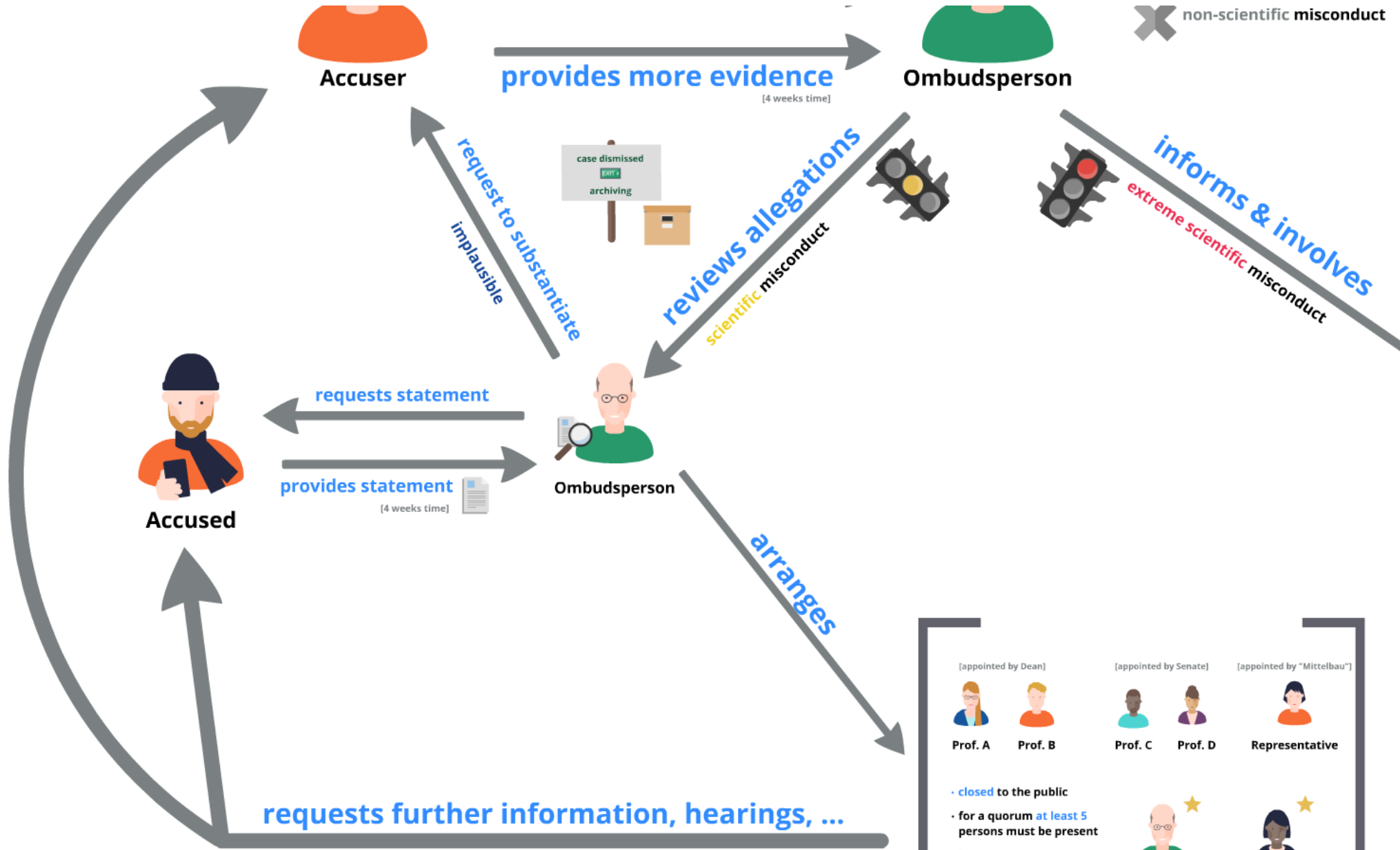


case dismissed



archiving





potential actions under...

W
ing, termination

German Civil Service Law
• disciplinary measures, ...



[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"

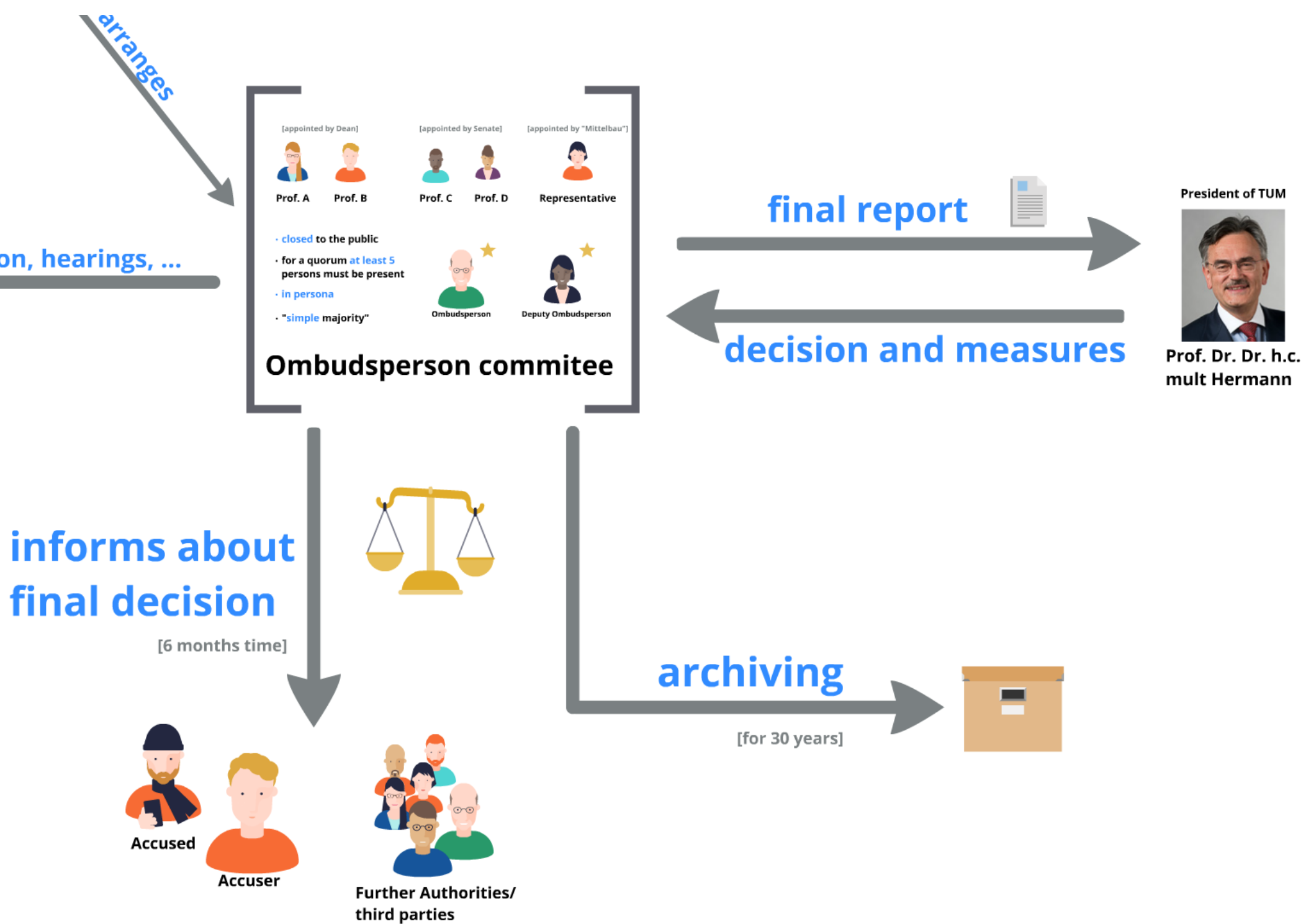


Ombudsperson



Deputy Ombudsperson

Ombudsperson committee



Potential actions under...

Employment Law

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

German Civil Service Law

- **disciplinary** measures, ...

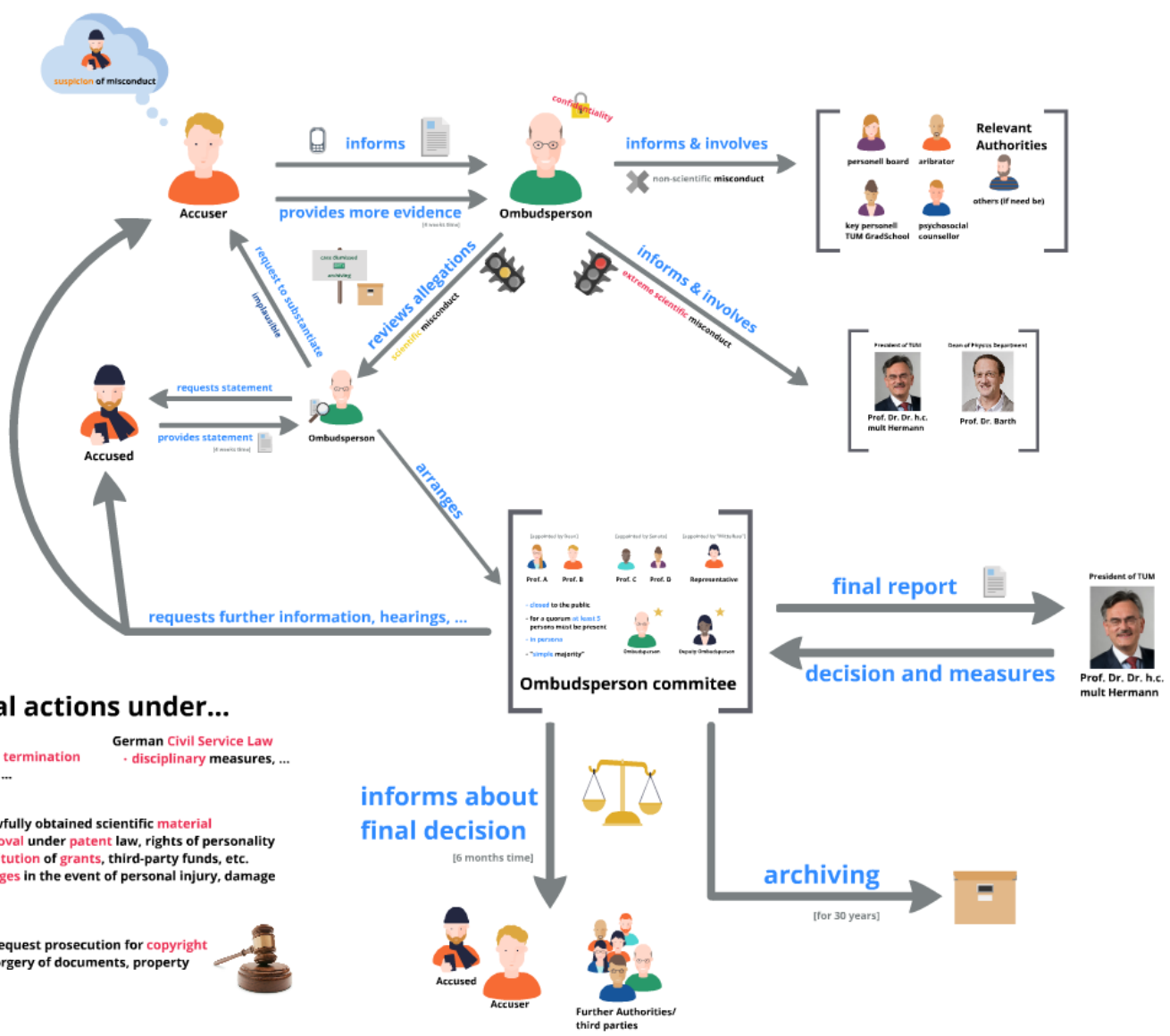
Civil Law

- **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, ...

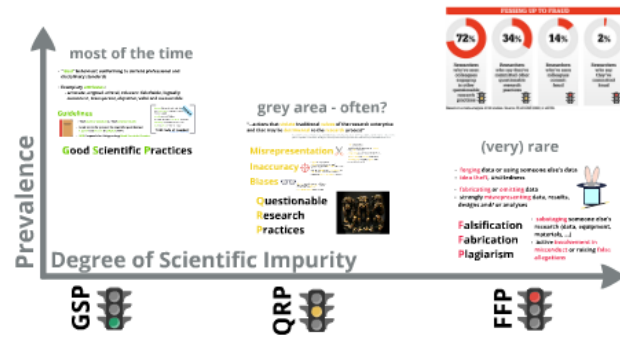




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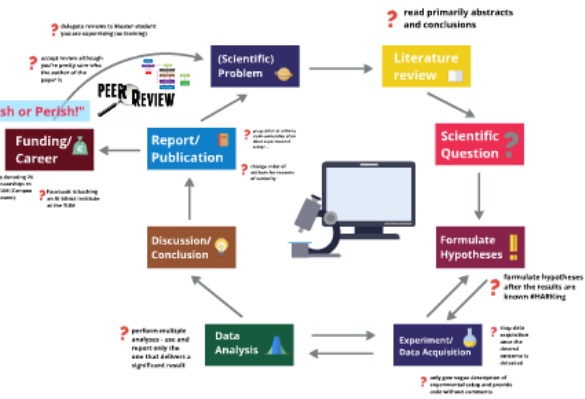
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Ombuds Process



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

Continuum of Scientific Conduct



TUM Kickoff Event for PhD candidates
Dr. Emil Ratko-Dehnert – Garching - 16.07.2019



"...it's kinda complicated..."

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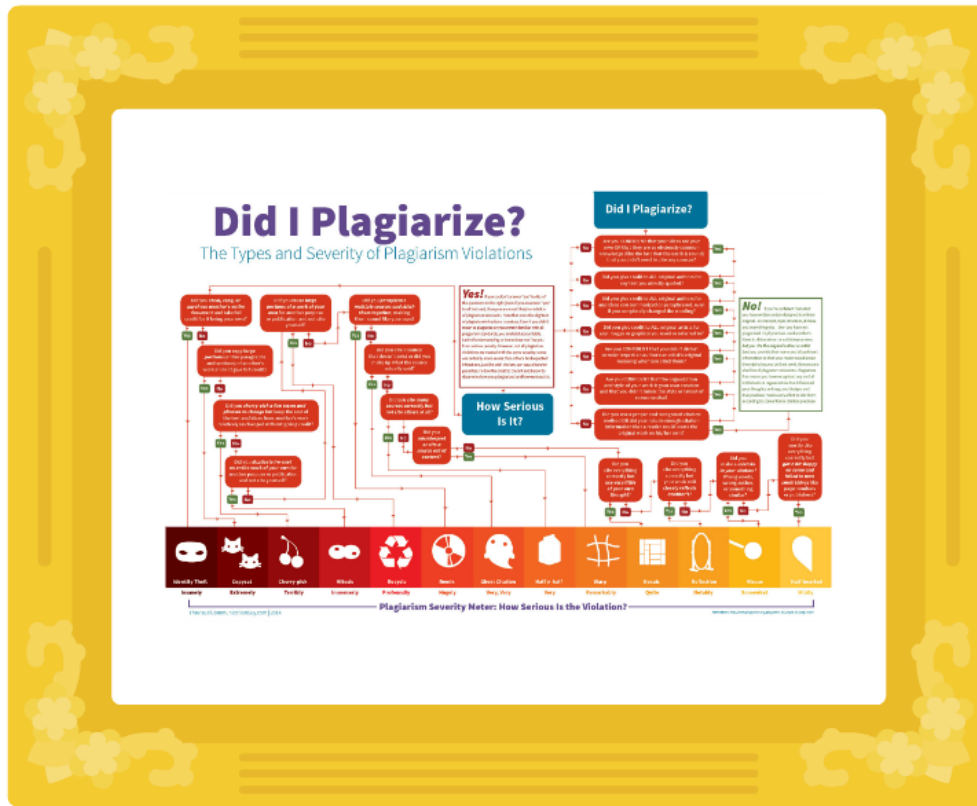
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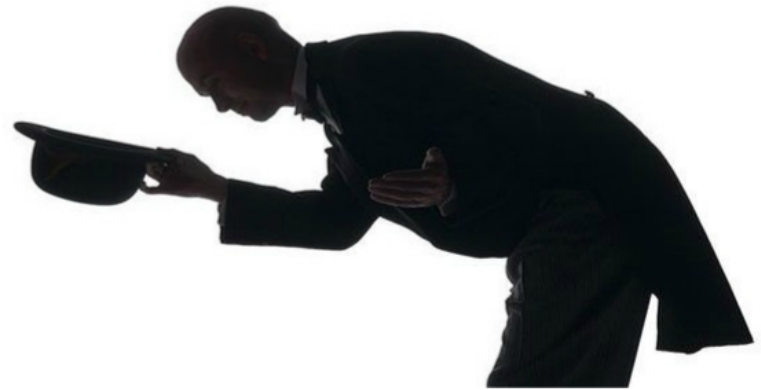
Escalation



"...it's kinda complicated..."

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**Thank you for your
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**Good luck with
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