

# Research Integrity

Guidelines for Good Scientific Practice at Empa

HONESTY

OPENNESS

SELF-CRITICISM

RELIABILITY

FAIRNESS

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# Integrity in research: our quality assurance

**A**s stated as the first priority in our mission, Empa is committed to excellence in research. In order to achieve this goal, several criteria need to be fulfilled. These include the need to recruit highly motivated and qualified staff and to develop the very best research infrastructure. We must also create an environment which promotes responsible conduct through the memory of clear and comprehensive rules, derived from commonly accepted norms and values.

Clear rules form the basis on which credible research can be performed:

- **First** and foremost, because they facilitate the dissemination of sound knowledge by minimizing the occurrence of errors.
- **Secondly**, research increasingly involves a large number of groups comprising various institutes or several disciplines. The promotion of important values, such as mutual respect, policies regarding authorship, confidentiality or data sharing, is essential for any successful and long-lasting collaboration.
- **Thirdly**, in an institute such as Empa, transparent procedures are important in sustaining the trust of the public, as well as that of our industrial partners or funding agencies.

This revision considers recently released guidelines on authorship<sup>2</sup>, collaboration, referencing and actions in case of alleged violation of integrity. Public trust in science is directly related to responsible actions of researchers. In order to maintain a sustainable high-quality research in our institution, it is every one's responsibility to implement and follow these rules.



**Prof. Dr Gian-Luca Bona**  
Director

**Supporting documents**

*The following publications served as the basis for the present guidelines:*

- *“Guidelines for Research Integrity” of the ETH Zürich (2008)*<sup>11</sup>
- *“Guidelines for research integrity and good scientific practice” of EPF Lausanne (2009)*
- *“Wissenschaftliche Integrität – Grundsätze und Verfahren” of the Swiss Academies of Arts and Sciences (2008)*

**Remark**

*In case of variations with regard to contents between the German and the English document the German version has priority.*

**Imprint****Publisher**

Management Empa

**Editors**

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Empa, Eawag, WSL<sup>1</sup>

**Layouting & Printing**

Communication Empa

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*«Honesty, openness, self-criticism, reliability and fairness are the basis for credibility and acceptance in science. Researchers at Empa are committed to these values and to the guidelines which derive from them».*

# General remarks

## **Purpose**

The present guidelines identify the principles and rules for the planning, execution, evaluation, publishing and peer review of research activities, and indicate the procedures which will be implemented in the case of suspected misconduct in research.

## **Scope**

These guidelines apply to all persons working in research at Empa, in particular for researchers and technical staff.

In the context of international collaboration, in particular in large, international research consortia, these guidelines may be adapted.

For staff without an Empa employment contract, such as bachelors and masters degree students, the guidelines of their employer or university apply.

## **Definitions**

### **Integrity**

Integrity encompasses all values and norms which create and maintain trust and credibility.

### **Scientific Research**

Scientific research (also called simply 'research') is the method-driven search for new knowledge. Research is generally organized and performed as projects within the institute or in collaborations with third parties.

### **Primary data**

Primary data are the original, unprocessed data collected from experiments or from other sources (e.g. observation or polls).

### **Materials**

Materials are samples or products of any kind (e.g. prototypes, algorithms, computer programs, materials, manipulated biological systems and organisms) collected or created during research activities.

### **Researchers**

Researchers are experts who are charged with the planning and generation of new knowledge, products, processes, methods and systems, as well as with the management of these projects, therefore also including bachelors, masters and doctoral students. The scientific community comprises all researchers.

### **Technical staff in research**

The technical staff involved in research at Empa comprises those who contribute directly with materials and methods, or intangibly, to a piece of research, above and beyond the maintenance of the large facilities and providing infrastructure support.

### **Research Leader**

The leader of a piece of research, or a research project (the research leader), is the responsible person who is in charge of defining and achieving the research goals. He or she ensures that all persons involved are aware of these guidelines and committed to their implementation and is supported by the employer therefor.

# Integrity in research

## 1. Research planning

### **Selection of research objectives and methods**

The freedom of education and research is ensured within the Constitution of the Swiss Confederation (BV Art. 20). Researchers are free to select their research objectives and methods, taking into consideration the prevailing strategy of Empa, the research focal areas, the annual performance agreement, the available resources and justified restrictions.

### **Restrictions of freedom in research**

Empa researchers shall comply with legal and internal Empa regulations, including the following regulations for:

- a. Safety at work – technical, operational and organisational
- b. Risks which are specific to Empa: protection against radiation and laser beams, the safe handling of chemicals and synthetic nanomaterials, etc.
- c. Research on human beings, in particular the handling of probands
- d. Animal protection (laws, regulations and guidelines)
- e. Activities involving genetically modified organisms (bio-safety)
- f. Intellectual property (e.g. copyright and patentright)
- g. Contractual restrictions during contract research and collaboration with spin-off or external companies. Contracts should be formulated in such a way as to retain independence and freedom of research as much as possible.

### **Reflection on the consequences of research activities**

Empa researchers periodically reflect upon the societal benefits and the potential negative effects of expected or achieved research results, especially the long-term effects (sustainability). Empa engages in open discussion and informs the public about its research activities.<sup>3</sup>

### **Duties of research leaders**

The research leader submits a research plan for internal and/or external assessment, if requested. In each case, the responsibilities, accountability and financing have to be defined prior to the start of the research. The research leader takes all reasonable efforts to ensure that sufficient resources are provided to be able to successfully carry out an approved research project.

### **Supervision and support of young scientists**

The Empa Management takes all reasonable measures to ensure that young scientists at all levels are appropriately supported. The doctoral supervisor and adviser are responsible that a written research plan for a PhD thesis is available in due time, according to the specific regulations of the corresponding academic institution, and that the progress of the project is regularly assessed.

### **Conflict of interest**

All those involved in a research project are requested to disclose potential conflicts of interest of any kind to the project management, the sponsor and the responsible member of the Empa Management. If independence and objectivity cannot be sufficiently assured, the research activity should not be started or should be discontinued as soon as possible.

### **Third-party projects**

The duties and rights to research results in projects (co-)funded by third-party investment and undertaken at Empa must be specified in a contract with the sponsor before the start of a project. The responsible persons must pay attention to retain the freedom of research and independence as far as possible. Recently released guidelines for trans-boundary collaborations in research should be respected.<sup>4</sup>

## 2. Execution of research

### **Collection, documentation and archiving of primary data**

Each person involved in a research project bears the responsibility for that part of it which lies under his or her direct control. In particular, the person who conducts the experiment is responsible for the correctness of the acquired data, and the research leader for the data management (processing, storage and utilisation).

Access to primary data, in particular data used for publications, has to be ensured after its acquisition for a sufficient period of time in accordance with accepted internal and external regulations, and the destruction of primary data must be regulated.

Storage of laboratory logs and electronically stored data must be accordingly organized and its access controlled. The research leader is responsible for the secure storage of material and primary data after completion of a research project.

### **Generation of research results**

Research results are the knowledge gained from primary data.

All steps in the processing of primary data (statistical analysis, conditioning and conversion, evaluation, etc.) must be documented in accordance with good scientific practice, to ensure that the results obtained from the primary data are reproducible and that the experimental steps can be fully reconstructed.

Misconduct such as the fabrication and theft of primary data, plagiarism, or improper manipulation of data is strictly forbidden.

Gray zones, such as the subjective ignoring of acquired data, are to be avoided. The causes for poor experimental reproducibility must be revealed, quantified through statistical analysis and, if necessary, overcome by means of additional experiments.

## 3. Publication of research results

### **Rights to primary data and materials**

Primary data derived from research projects undertaken at Empa remain the property of Empa, unless otherwise agreed on by contractual regulation with external partners.

Prior to the publication of research results, Empa researchers are not obliged to disclose primary data and materials to persons outside the research project, with the exception of disclosure during evaluations by commissions monitoring the research activities or deciding about the distribution of resources.

The research leader determines, on an individual basis, on the usage of primary data, research results and materials by project participants after they have left the project.

### **Publication of research results**

Planned and ongoing research projects, as well as ongoing patent applications, are fundamentally not public prior to their publication.

The results of research should be made available to project partners, commissions, the scientific community and the public, while respecting patentability and agreements reached. Results from publicly financed projects are basically to be published in the appropriate scientific journals (duty to publish) upon completion of the project.

Following completion of the project and publication of the results, the information necessary for repeating the experiments and verifying the results has to be made accessible to interested third parties. For projects lasting longer than five years data will be made available on an ongoing basis, according to the normal practice within the discipline.

Research results are to be published in a coherent and concise form, while the subdivision into a number of small, incomplete publications (salami tactics)



and the publication of the same content in various scientific journals or media (duplication) is prohibited. Uncertainty, uncertainty and ignorance should be openly and adequately addressed in the discussion.

### **Authorship**

Reputation is the most valuable asset of every researcher. The assessment of the performance and the quality of a researcher is primarily based on his or her publications and their impact. A fair publication practice is therefore of central importance for all researchers.

A person is considered as an author of a scientific publication who fulfils all of the following criteria:

- a. Personally providing a significant contribution to the planning, execution, supervision or interpretation of a piece of research,
- b. participating in the drafting of the manuscript, and
- c. approving the final version of the manuscript.

Contributors who only partially meet the three criteria set out above should be mentioned in the "Acknowledgements" section of the publication.

A managing function, or providing financial, logistic or organisational support for a research project, does not, of itself, entitle a person to appear as an author.

Honorary or courtesy authorship is not acceptable.

Authorship and the order of authors must be discussed and agreed upon at an early stage with all those involved.<sup>5</sup> Before starting collaborations responsibilities and procedures for giving credits and for publishing should be agreed upon. The two major criteria for setting the order of authors are transparency and fairness, as best realised by listing the specific contribution of each author (contribution). An alphabetic order should be marked as such. Usually authors are listed in the order according to their contributions, except the last or corresponding author. Equal contribution by the first two authors can be labeled as such. Footnotes and acknowledgments will further contribute to transparency. Agreements should be amended if further persons are involved or after changes of the

content. Before submission of the end version of a manuscript, the corresponding author must have available the agreement of all authors for the content and the order of authors. If a single author moves back, all other authors should be able to take the responsibility of his/her contribution.

The corresponding author has overall responsibility for the content of the publication and is charged with checking that the designated authors fulfil the criteria for authorship. All co-authors are accountable for the accuracy of content, correct presentation and conclusions that have been drawn from the data, to the extent that they can be verified.

### **References**

Authors must give their sources of material and methods they have used, and cite any work of others that has been used.

Full or partial use of the work of others, without correct citation, is plagiarism and impermissible. Guidelines for avoiding plagiarism in publications as well in proposals are respected.<sup>6</sup>

The sources of financial support for the project from third parties should be fully acknowledged.

### **Institute affiliation**

In all publications of research work undertaken partially or entirely at Empa, in particular if use has been made of Empa's large facilities, the following Empa address has to the following Empa address has to be indicated<sup>7</sup>:

Empa  
Swiss Federal Laboratories for  
Materials Science and Technology  
CH-ZIP-Empa-location  
Schweiz/Switzerland  
www.empa.ch

Authors working in two or more institutions should indicate all of their affiliations.

# Integrity of peer reviewing

## **Peer reviewing**

Reviews are an essential element of research and we researchers at Empa are therefore committed to act as reviewers, especially for:

- a. The evaluation of research proposals (the Empa Research Commission) and project financing
- b. The assessment of manuscripts for publication
- c. The selection of applicants for employment (e.g. for appointments or promotions)
- d. The assessment of research groups, laboratories or departments (audits)
- e. An expertise requested by courts of law and authorities or requested by all parties involved in the specific issue.

Criteria for the selection of experts include their professional competence and integrity, and the avoidance of conflicts of interest.

An appointed person must provide an opinion which is unbiased, constructive and punctual, and refrain from making emotional, derogatory or offensive remarks.

The reviewer is obliged to retain confidentiality, and therefore:

- a. treat all data and information subjected to the assessment as confidential, as long as this has not been made public by the persons being reviewed,
- b. may not obtain other opinions to use as part of his or her judgement, without the consent of the body responsible for requesting the review,
- c. make no personal use of confidential information disclosed to him or her in the context of the reviewing process.

## **Disclosure of interests and conflicts of interest**

Researchers at Empa who are asked to provide an expert opinion on a research project that competes directly with their own research interests must disclose their conflict of interest and/or decline to offer an opinion. It is then left to the body making the request to choose another expert.

# Final regulations

## **Action following alleged violation of integrity**

Researchers should report any suspected research misconduct to the appropriate authorities, to justify the trust of the society in self-regulation of sciences. Confidential and independent mediators can be addressed as consultant.<sup>8</sup>

In the case of an alleged violation of integrity in research at Empa, the procedure prescribed for Empa (Verfahrensordnung)<sup>9</sup> will be followed.

## **Duty to inform**

Empa Management and the Human Resources Section will ensure the release, distribution and implementation of these guidelines to all active staff and new Empa employees, according to the scope of their applicability.

## **Enforcement date**

The revision of the guidelines issued 1<sup>st</sup> June 2010 will become effective on February 1<sup>st</sup> 2014.<sup>10</sup>

# Endnotes

<sup>1</sup> The efforts of those who have helped to create the present guidelines are acknowledged with thanks.

<sup>2</sup> Issued by the “Swiss Academies”, an association of the four Swiss Scientific Academies, namely the Swiss Academy of Natural Sciences (SCNAT), the Swiss Academy of Medical Sciences (SAMS), the Swiss Academy of Human and Social Sciences (SAGW) and the Swiss Academy of Engineering Sciences (SATW). [www.akademien-schweiz.ch](http://www.akademien-schweiz.ch)

<sup>3</sup> The Empa Academy is as a permanent organisation entrusted with the task of disseminating information on Empa’s research activities and results. Guided tours are conducted for groups of visitors and school classes interested in Empa’s work.

<sup>4</sup> The Montreal Statement on Research Integrity in Cross-boundary Research Collaborations (2013) contains Guidelines addressing the particular challenges regarding integrity in large collaborative research efforts (transnational, institutional, disciplinary, sectorial). [www.wcri2013.org/Montreal\\_Statement\\_e.shtml](http://www.wcri2013.org/Montreal_Statement_e.shtml)

<sup>5</sup> Based on the recommendations of the Swiss Academies of Arts and Sciences “Authorship in scientific publication, Analysis and recommendations, 2013.”

<sup>6</sup> Selected guidelines and explanatory notes regarding Research Integrity can be found on the webpage [www.psi.ch/integrity](http://www.psi.ch/integrity):

- Singapore Statement on Research Integrity (2010)
- Montreal Statement on Research Integrity (2013)
- Code of practise “Citation etiquette - How to handle the intellectual property of others”, webpage ETH Zurich
- Swiss National Science Foundation, Scientific Integrity

<sup>7</sup> Empa address: Empa  
Swiss Federal Laboratories for  
Materials Science and Technology  
CH-ZIP-Empa-location  
Schweiz / Switzerland  
[www.empa.ch](http://www.empa.ch)

<sup>8</sup> The research institutions of the ETH-domain have designated several trusted persons, which can be contacted by any researcher across institution boundaries.

<sup>9</sup> The document “Rules of Procedure in the event of a suspected violation of research integrity at Empa” is an integral part of the present guidelines (see Appendix).

<sup>10</sup> Revisions to these guidelines will be publicised via the Empa Intranet.

<sup>11</sup> The reader’s attention is drawn to the ETH Zurich’s Rechtssammlung (“Compilation of Regulations”), in particular Section 4 “Research and scientific services”. Some of these ordinances and recommendations are relevant to the research organisations of the ETH Domain. <http://www.rechtssammlung.ethz.ch>



# Appendix:

## Rules of Procedure in the event of a suspected violation of research integrity at Empa

### Reference

The document “Research integrity at Empa” defines the binding guidelines for our scientific work.\*

### Article 1 Scope of application of the Rules of Procedure

<sup>1</sup> In the event of a suspected violation of the guidelines set out in “Research integrity at Empa”, the stages of the procedure and the sanctions are determined

- a. by personnel law in the case of scientific and technical personnel at Empa (Federal Personnel Act/ ETH Personnel Ordinance or BPG/PVO-ETH),\*\*
- b. by the applicable employer or university law for staff without an Empa employment contract (guest scientists, undergraduates and postgraduates).

<sup>2</sup> The Federal Law on Administration Procedure of 20th December 1968 is applicable for procedural matters, particularly the granting of the right to be heard and inspect files, and also for instances of bias (SR 172.021).

### Article 2 Misconduct in research

Misconduct exists when there is a violation of the rules of good scientific practice, as outlined in the “research integrity at Empa” guidelines. Co-responsibility exists when there has been active participation in the violations of others and serious neglect of direct and institutional responsibility.

### Article 3 Trusted person

The trusted person\*\*\* will be selected by the Board of Directors and will be available in an advisory, intermediary and supportive capa-

city to the researchers for any questions about research integrity and good scientific practice. They will also be the contact person for any reports of suspected conflicts of interest as well as self-serving conduct that impedes research work (whistle blowing).

### Article 4 Initiation of the procedure

<sup>1</sup> A procedure is to be initiated if suspected misconduct is reported or made public. A complaint can be passed on to the director or the person of trust.

<sup>2</sup> If the person of trust believes that an investigation is appropriate, they will inform the director after a consultation with the person seeking advice.

<sup>3</sup> The director decides whether to set up a fact-finding commission.

### Article 5 Fact-finding commission

<sup>1</sup> The investigation will be carried out exclusively by the fact-finding commission.

<sup>2</sup> The director will decide on the composition of the fact-finding commission, its chairman and members, on a case-by-case basis. Where there is no impediment, such as bias, members of the commission include:

- a. the departmental manager of the area concerned;
- b. a further member of Empa;
- c. two external experts;
- d. one lawyer.

<sup>3</sup> The fact-finding commission makes the necessary investigations. It holds hearings with the person who has made the complaint. It gives the accused the opportunity

to see the files, express their views on the accusations, present evidence and apply for additional investigative measures.

<sup>4</sup> The fact-finding commission summarises the results of its investigation and assesses whether there has been a misconduct or not. The accused has the right to see this report before it is sent to the director and to add any comments in writing.

<sup>5</sup> If the investigation finds that there are no grounds for the accusation, the fact-finding commission proposes to the director that the investigation is terminated.

<sup>6</sup> Measures will be taken against anyone who accuses an innocent person against their better judgement (eg. notification of libel in accordance with article 174 of the Swiss Penal Code (StGB)).

<sup>7</sup> If the investigation finds that the accusation is fully or partially justified, the fact-finding commission refers the dossier with the report to the director.

### Article 6 Investigation and continuation of the procedure

<sup>1</sup> Based on the results of the investigation, the director decides what further actions and measures should be taken.

<sup>2</sup> If the procedure is continued, the director holds personal hearings with the accused and the accuser.

<sup>3</sup> The director bases his decision on the files from the fact-finding commission as well as the personal hearings with the accused and the accuser, unless any further information comes to light.

<sup>4</sup> If new aspects of the case emerge, the director can request that the fact-finding commission carries out further investigations to add to the dossier. The accused and accuser are both given the opportunity to comment on the new findings.

<sup>5</sup> The director informs the board of directors about the fact-finding commission's report, and advises them what decision has been made regarding the sanctions and about the procedure for publicising the decision.

<sup>6</sup> The director informs the accused of the decision and the reason for the decision and decides on sanctions within the scope of an appealable decree including instructions on the right to appeal.

<sup>7</sup> The decision must be made public in an appropriate way if the instigation of an investigation has already been revealed or if this is demanded by the accused. If a public statement is issued, the personal privacy of all concerned is protected.

#### **Article 7 Termination of the procedure**

<sup>1</sup> If the director terminates the proceedings, he or she states the reasons for termination in a decision.

<sup>2</sup> At the request of the accused, the termination of the procedure is to be made public in an appropriate way.

#### **Article 8 General procedural provisions**

<sup>1</sup> Duration: The procedure will be commensurate to each case but must be completed as quickly as possible. The director sets the timeframe when the fact-finding commission is appointed.

<sup>2</sup> Documentation: Minutes will be taken of each procedural step. The files must be stored for at least 10 years following the completion of the procedure.

<sup>3</sup> Privacy protection: Privacy protection applies in principle to all procedures.

- a. The director decides on the timing, form and content in the event of the publication of the facts and results of a case.
- b. The accuser has the right to full privacy protection. The director guarantees protection from reprisals or discrimination, especially if the accuser has a relationship of dependence with the accused. Reprisals are penalised as violations.

<sup>4</sup> Abstention: The accused is to be informed of the people that will be involved at the beginning of every phase. He or she is given the opportunity to request that anyone with any form of prejudice abstains from the proceedings.

#### **Article 9 Issue of an injunction**

If no agreement is reached in disputes relating to compliance with the "research integrity at Empa" guidelines, the director issues an injunction.

#### **Article 10 Criminal liability**

<sup>1</sup> Empa will file a report if a case of serious misconduct in research leads to the consideration of a criminal charge under Swiss or Cantonal Penal law.

<sup>2</sup> Article 58b of the PVO-ETH applies to Empa employees.

#### **Artikel 11 Entry into force**

These Rules of Procedure come into force on 1st September 2010.\*\*\*\*

#### **Remark**

In case of variations with regard to contents between the German and the English document the German version has priority.

#### **Footnotes**

\* The "Research integrity at Empa" guidelines are part of the employment contract.

\*\* Personnel law (BPG/PVO-ETH)

All staff can refer to the Federal Personnel Act (BPG, SR 172.220.1), which among other things regulates any sanctions taken in the event of a breach of employment obligations. For Empa and other institutions from the ETH Domain, the Personnel Ordinance of the domain of Swiss Federal Institutes of Technology (PVO, SR 172.220.113) also applies. Article 9 governs privacy protection and article 58 rules on the violation of legal employment obligations. All staff members also have the PVO at their disposal.

\*\*\* Persons of trust are independent internal and/or external professionals who are trusted with Empa research conduct and can be contacted in relation to research-specific matters and conflicts.

\*\*\*\* Revisions of the Rules of Procedure are publicised via the Empa Intranet.

# Empa – The Place where Innovation Starts

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