

Guidelines to Safeguard Good Scientific Practice at DECHEMA-Forschungsinstitut (DECHEMA-Research-Institute)

Preamble

The work of the DECHEMA-Forschungsinstitut (DFI) is devoted to the research for sustainable technologies. The activities include basic and pre-competitive research and also the education and qualification of the next generation of scientists. The latter takes place in close cooperation with different universities. It also covers the supervision of bachelor, master and diploma dissertations as well as doctoral theses at DFI, whereby the final examinations take place at the university concerned. Furthermore senior scientists at DFI hold teaching posts at various universities.

Scientific work at DFI serves the acquisition of knowledge and the promotion of understanding in the fields of chemical engineering materials science, biotechnology and environmental technology. Generally the results of scientific research are published. Honesty is a fundamental pre-requisite of the work of scientists at DFI. In contrast to error, dishonest scientific practice is incompatible with the self-definition of science.

Already at the predecessor institute, the Karl-Winnacker-Institut of DECHMEA e.V. rules existed in order to safeguard correct scientific practice. With the foundation of DECHEMA-Forschungsinstitut on 1st March 2012 these rules were adopted and modified according the new situation. The present document describes these rules in detail. The rules are based on recommendations of the Commission "Self-regulation in Science" of Deutsche Forschungsgemeinschaft (DFG) (the German Research Council) of January 1998, a written communication from DFG of 28th November 2001 on the implementation of these recommendations and finally the second draft of the AiF (German Federation of Industrial Cooperative Research Associations) "Rules to Safeguard Good Scientific Practice in Industrial Cooperative Research". These guidelines were complemented with those of the Faculty of Medicine of Albert-Ludwig University of Freiburg and adapted to the specific situation at DFI. They are an integral part of the Employment Contract for scientific staff at DFI and in conjunction with the Arbeitsordnung (Regulations for Employees) and the Institutsordnung (Institute Regulations) they regulate work at DFI.

General Principles of Scientific Work

Science promotes both our understanding of nature and progress in technology. Scientists thus bear a great deal of responsibility. With few exceptions, future technological developments and their impact on mankind depend directly or indirectly on the results of scientists' work. This has consequences for scientific work and the treatment of results:

- Investigations must be conducted according to the current status of knowledge. It is imperative to have up-to-date knowledge of the literature and the appropriate methods.
- The methods used and the findings must be documented. A fundamental characteristic of scientific work is reproducibility; this is only possible if the scientific procedure and the results are precisely documented.
- A further characteristic is doubt. The results of scientific work and their interpretation should be treated critically until they appear to be the most plausible possibility.
- Scientific findings are communicated in the form of publications which are the public disclosure of new knowledge. Thus, similar to scientific observation or scientific experiments, they are a product of the work of the scientists, who are the authors.

These aspects are covered by the recommendations given below.

Organization of Team Work

Generally several persons contribute to a particular research problem. Thus a research group or project team consists of several persons who are responsible for defining the problem, the means of tackling it, interpreting the results and reporting to the scientific community. The responsible organization of this type of research is simpler if certain rules are observed.

Structure of the Institute

The institute consists of the management (executive board of the foundation), the scientific research groups, the research clusters and the non-scientific units. The latter serve for the technical and administrative support of the research activities. Furthermore, a special work group organizes the continuing education courses offered by the institute. The executive board reports to the foundation council. The functions of the foundation council and of the executive board are described in the statutes of the foundation and the document of the management duties of the executive board.

Size of a Research Group

Research groups should not exceed a certain size. A typical research group might be composed of the following:

- head of research group (HRG) with a professorial (habilitation) or comparable qualification
- for large groups a deputy group head
- one to five post-doctoral scientists (post-docs)
- one to three PhD, diploma, master or bachelor candidates per post-doc
- one to five technicians

The size of such a group can vary according to the area of research. Large research groups may consist of several project teams, generally with a post-doc as the project coordinator. Such teams, comprising post-docs, PhD students, diploma students, candidates for a master or bachelor degree and technicians, address specific research fields and projects.

Duties of the Head of Research Group (HRG)

- Definition of the research priorities of the group
- Guaranteeing a high scientific standard
- Determination and supervision of procedures
- Compilation of work schedules and introduction to scientific methodology for PhD/diploma/master/bachelor students; scientific supervision
- Organization of regular laboratory discussions with reports by the scientists (post-docs, PhD, diploma, master, bachelor students, etc.).
- Release of results for publication. The dissemination of methods and results by scientific staff is subject to the approval of HRG and a member of the executive board.
- Cultivation of a spirit of cooperation based on trust; resolution of internal conflicts among co-workers and superiors.

Duties of the Research Cluster Coordinators

- Organization of regular meetings in the frame of the research cluster
- Preparation of short minutes of the meetings
- Analysis of the situation with regard to the most recent knowledge in the field of the research cluster
- Coordination of the preparation of research proposals in the frame of the cluster
- Coordination of the research work in the frame of the cluster
- Representation of the research cluster outside the institute in agreement with the executive board of the institute

Duties of Post-Docs, PhD, Diploma, Master and Bachelor Students

- For PhD, diploma, master and bachelor students the dissertation or thesis marks the commencement of work based on scientific principles. This entails communicating not only technical skills, but also ethical standards in scientific research, the responsible treatment of results, and cooperation with other scientists.
- The work of post-docs, PhD, diploma, master and bachelor students entails active participation in shaping scientific investigations. They are supported in their work by regular discussions of their findings and of the next steps with the HRG, project

team meetings and/or research group meetings. Post-docs, PhD, diploma, master and bachelor students are under the same obligation as all other DFI co-workers to work responsibly and cooperatively.

- They are obliged to make regular progress reports on their research, attend internal seminars and share the routine tasks of their research group.
- Particularly in the case of large research groups, discussions of results and future work plans mainly take place in the project teams. The relevant project scientist or team coordinator is responsible for holding regular (in appropriate periods) project team meetings. These meetings should be attended by the scientific and technical staff involved in the project, although in individual cases attendance will depend on the status of the project. The project scientist or team coordinator takes brief minutes of each meeting on the appropriate form and passes them on to the head of the research group.
- They are bound to observe the instructions of the executive board and HRG regarding all issues concerning scientific objectives and the publication or utilization of research results.
- Like all other scientific staff, post-docs, PhD, diploma, master and bachelor students are under an obligation to document their research findings comprehensively and in accordance with the regulations. This documentation must be retained in the department for at least 10 years.

New Appointment of Senior Scientists

- The new appointment of senior scientists is a task of the executive board together with the foundation council. The originality and quality of scientific achievements have priority over quantity.

Quality Control in the Laboratory and Documentation of Data

The following quality control (QC) measures have been drawn up for scientific investigations:

- The appointment of a QC officer for every research group means that the implementation of QC is delegated to the research group itself. Separate recommendations for QC in the laboratory already exist. Malpractice is to be reported to the HRG.
- All scientific investigations and primary data of the research group are to be fully documented. These data are to be treated as documents and retained in DFI on durable, protected electronic media for at least 10 years.

- Documentation, such as data media, printouts and films, must be labelled precisely and, for example, filed in chronological order. These data must also be treated as documents and retained for at least 10 years.
 - As a matter of principle, investigations intended for publication should be presented to all members of the research group prior to submission (e.g. at the regular group meetings). The methods and findings should be dealt with in detail. The authors benefit from the fact that any criticism of the methods and interpretation of the findings can be duly incorporated into the manuscript.
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Resolution of Conflicts

- If conflicts arise within a research group, in the first instance the HRG is responsible for resolving them. HRGs are obliged to inform the executive board about internal conflicts and to follow the advice given.
 - Furthermore, an ombudsperson for PhD, diploma, master and bachelor students and scientific staff shall be nominated to assist in solving any conflicts arising from scientific malpractice.
 - The ombudsperson can only be an external scientist without an employment contract with DECHEMA-Forschungsinstitut. As a rule the ombudsperson will be designated by the executive board out of the members of the scientific advisory board or the foundation council.
 - If conflicts cannot be otherwise resolved, the executive board and the staff council shall be involved.
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Authorship of Scientific Publications

The Form of Scientific Publications

The results and interpretation of scientific investigations are made public in scientific publications. Scientific publications play an important part in scientists' careers, e.g. for the "habilitation" process (post-doctoral qualification) or appointments. The way scientific publications are assessed by "habilitation" or appointment committees can have repercussions on the way scientists organize their investigations and publications. It is, therefore, important to establish general criteria for publications.

- The communication of new observations or experimental results, including the conclusions drawn, constitutes original work. From this it follows that recycling results in reputed journals is not acceptable.

- Scientific publications must be verifiable, hence they must contain an exact description of the methods and results.
- Findings which support the authors' hypothesis and those which reject it must be communicated in equal measure.
- Investigations should not be fragmented for the purpose of separate publications.
- Both the findings and ideas of other scientists and relevant publications by other authors must be cited appropriately.
- Assistance by third parties should be honoured in an acknowledgement.

Criteria for Authorship of a Scientific Publication

In the case of scientific reports by one research group, the author, who is thus co-responsible, can be anyone who has made a considerable contribution

1. to the definition of the problem, the research plan, the implementation of the research work, the evaluation or the interpretation of the results, and also
2. to the draft or the critical revision of the content of the manuscript.

Both criteria must be fulfilled. The following do not constitute authorship: data collection, financial support of the investigations, or headship of the group in which the research was carried out.

- In the case of reports by several research groups the contribution of the individual groups should be manifest.
- The release of a manuscript for publication should be confirmed by the signature of all the authors on a standard "Release for Publication" form (available at the DFI-office).
- If unpublished observations of other persons are cited or findings of other institutions used, their written agreement should be obtained.
- Manuscripts together with the "Release for Publication" form signed by the authors are to be handed in to the head of the institute for information and authorization prior to submission. This is essential with respect to DECHEMA-Forschungsinstitut's right to protect its intellectual property.
- Copyright for work carried out within a project of DECHEMA-Forschungsinstitut can only be transferred by DECHEMA-Forschungsinstitut, not by the author as a private person.
- HRGs provide the Institute library with a printed copy of every dissertation written in-house.

- A reprint of all Institute papers is to be filed in the library. All authors are obliged to give the library one copy of all reprints received.

Procedure to follow in cases of suspected scientific malpractice

Scientific malpractice can incur consequences pertaining to civil, penal and labour legislation. The following procedure is to be followed in cases of concrete suspicions (e.g. invention and forgery of data, plagiarism, breach of confidence as a proposal evaluator, etc.). Hereby, the specific situation of the respective case has to be taken into account:

- The executive board of DECHEMA-Forschungsinstitut and the ombudsperson are to be informed immediately.
- In the first stage the executive board will give the person concerned an opportunity to respond to the charges in writing within a given period (in general two weeks). The ombudsperson is in charge of this first stage procedure in which the charges and the responses of the person concerned will be summarized and a recommendation concerning the further steps will be given to the institute's management.
- On receipt of the written response of the person concerned (as a rule no later than two weeks afterwards) and the recommendation of the ombudsperson the executive board will decide whether a formal investigation is to be held. A formal investigation requires an investigation committee, consisting of the executive board, the ombudsperson in a consulting function and the HRGs of DFI. If need be experts or members of the Institute's Scientific Advisory Board can be appointed. The investigation committee designates a chairman who will lead the investigations. Furthermore the investigation committee designates an investigator who collects and summarizes all information and facts needed for the investigation procedure. The deliberations of the investigation committee are to be held orally and in camera. Written documentation of all steps of the formal investigation procedure has to be prepared.
- In the first stage as well as in the formal investigation procedure a prejudice situation can be claimed by the person concerned or all other persons involved, with regard to the person of the investigator. In this case a new investigator has to be designated in consensus of all persons involved including the person concerned.
- Up to the moment of proof of scientific malpractice all information about the persons involved and the results of the investigation have to be kept strictly confidential.
- In cases of proven scientific malpractice the pertinent publications are to be withdrawn or corrected. Cooperation partners are to be informed. At the same time it should be clarified whether funding bodies and scientific organisations, ministries and the public have to be notified.

- In cases of deliberate fraud, labour or penal measures are to be initiated in coordination with the executive board and involving the Staff Council.