

Guidelines to Safeguard Good Scientific Practice at Karl-Winnacker-Institut of DECHEMA e.V.

Preamble

The work of the Karl-Winnacker-Institut (KWI) supports DECHEMA Society for Chemical Engineering and Biotechnology in accomplishing the aims laid down in its statutes of promoting and fostering research in its sphere of interests. This activity includes 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 diploma dissertations and doctoral theses at KWI, whereby the final examinations take place at the university concerned. Furthermore senior scientists at KWI hold teaching posts at various universities.

Scientific work at KWI serves the acquisition of knowledge and the promotion of understanding in the fields of chemical engineering (including apparatus and plant 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 KWI. In contrast to error, dishonest scientific practice is incompatible with the self-definition of science.

Hitherto the chief executive of DECHEMA, the heads of KWI and the heads of research groups were responsible for adherence to correct scientific practice. There was no written set of rules. Several factors brought about a change in this situation: in particular the public discussion of cases of scientific malpractice at various research institutions, the 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 28.11.2001 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". For these reasons the chief executive and the heads of the institute together with the Scientific Advisory Board of KWI have drawn up the following Guidelines to Safeguard Good Scientific Practice at Karl-Winnacker-Institut of DECHEMA e.V. and declare them to be the binding basis of scientific work at KWI. These guidelines were compiled on the basis of the recommendations of the DFG commission mentioned above using those of the Faculty of Medicine of Albert-Ludwig University of Freiburg for orientation, and adapted to the specific situation at KWI. They are an integral part of the Employment Contract for scientific staff at KWI and in conjunction with the Arbeitsordnung (Regulations for Employees of DECHEMA) and the Institutsordnung (Institute Regulations) they regulate work at KWI.

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. Several research groups together form a department. The responsible organization of this type of research is simpler if certain rules are observed.

Size of a Department

In general a department ("Bereich" in KWI's Institute Regulations) should comprise no more than 5 scientific research groups. Central functions can also be assigned to these departments. The head of department (HOD) should be a professor or have a professorial qualification.

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 or comparable qualification
- one to three post-doctoral scientists (post-docs)
- one to three PhD or diploma candidates per post-doc
- one to two 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 and technicians, address specific research fields and projects.

Duties of the Head of Department

- The HOD sets the research priorities of the department, coordinates the individual research groups and represents the department externally.
- The head plays a vital part in determining work methods and ensuring a high scientific standard.
- Generally the HOD is also the head of a research group.
- The HOD's overall responsibility for the department does not extend to the individual investigations and publications of the various research groups and project teams unless he meets the criteria for co-authorship (see below).

Duties of the Head of Research Group

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

Duties of Post-Docs, PhD and Diploma Students

- For PhD and diploma students the diploma dissertation or doctoral 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 and diploma 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 and diploma students are under the same obligation as all other KWI 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 HOD and HRG regarding all issues concerning scientific objectives and the publication or utilization of research results.
- Like all other scientific staff, post-docs, PhD and diploma 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 rules governing the new appointment of senior scientists are laid down in the Institute Regulations of KWI. 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 KWI 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.

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 HOD about internal conflicts and to follow the advice given.
- Furthermore, an ombudsperson for PhD and diploma students and scientific staff shall be nominated to assist in solving any conflicts arising from scientific malpractice.
- If conflicts cannot be otherwise resolved, the HOD, head of personnel and the staff council shall be involved.

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 department 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 form (available at the KWI- 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 HOD and the executive director of DECHEMA for information and authorization prior to submission. This is essential with respect to DECHEMA's right to protect its intellectual property.
 - Copyright for work carried out within a project or with DECHEMA funds at KWI can only be transferred by DECHEMA, 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.):

- The HOD and, in exceptional cases, the Executive Director are to be informed.
- The HOD or Executive Director of DECHEMA will give the person concerned an opportunity to respond to the charges in writing within a given period (in general two weeks). During this period the HOD or Executive Director must treat the matter strictly confidentially.
- On receipt of the written response of the person concerned (as a rule no later than two weeks afterwards) the HOD, if necessary jointly with the Executive Director of DECHEMA, will decide whether a formal investigation is to be held. A formal investigation requires an investigation committee, consisting of the HOD and the HRGs of Karl-Winnacker-Institut. If need be experts or members of the Institute's Scientific Advisory Board can be appointed. The deliberations of the investigation committee are to be held orally and in camera.
- 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 Director of DECHEMA and involving the Head of Personnel and the Staff Council.