# Rules for Safeguarding Good Scientific Practice

## 1 Purpose

Good scientific practice is a basic requirement for scientific work. Good scientific practice represents the professional ethics of scientists and includes a process that involves the development of many elements of scientific work, management (e.g. staff management), social interaction and even interpersonal relationships. Although violations of good scientific practice (e.g. scientific dishonesty) cannot be categorically prevented by mandatory framework conditions, they can, in fact, be made more difficult.

Good scientific practice includes honest work and integrity in science. These are indispensable for a successful, sustainable and trustworthy scientific gain of knowledge that recognizes our core social values. Every scientist is responsible for integrating this principle into his/her thinking and actions and for complying with the ethical principles of professional ethics in science. Organizations, institutes and employers are required to create a work and organizational culture in which all participating parties are able to act accordingly. To this end, this Quality Procedures document sets out guidelines and objectives that apply to the scope of application given in section 2.

The *Deutsche Forschungsgemeinschaft* (DFG) (German Research Foundation) drew up the memorandum ***Empfehlungen zur Sicherung guter wissenschaftlicher Praxis*** **[Recommendations for Safeguarding Good Scientific Practice]** in 1998. It was revised for the first time in July 2013.

The memorandum was supplemented by the **"Guidelines for Safeguarding Good Research Practice" (Code of Conduct)** in September 2019 and considerably enhanced in its scope. In the related revision of the previous memorandum, particular attention was paid to aspects of digital change as well as to the current developments in publishing, in the structures of scientific institutions and in the structure of forms of cooperation. The main objective remains the establishment of a culture of scientific integrity and of quality assurance throughout all phases in each step of the research process. The preservation of professional ethical principles by the scientists and academics will play an increased key role in this process. In the case of suspected research misconduct, the presumption of innocence applies as a matter principle, as does the protection of the legitimacy of the scientific system and of persons reporting misconduct (in the following called "complainants").

In addition, the DFG and the German National Academy of Sciences Leopoldina e.V. (*Deutsche Akademie der Naturforscher Leopoldina – Nationale Akademie der Wissenschaften*) drew up the joint document **"Scientific Freedom and Scientific Responsibility – Recommendations for Handling Security-Relevant Research"** in 2014 with regard to the so-called "dual-use problem". These recommendations were taken into account in the above-mentioned Code of Conduct of September 2019.

Against this background, the following rules are laid down for PTB for the purpose of internal systematic self-control and voluntary commitment (see **PTB's Self-Declaration on Quality Management**). By means of these, the rules of good scientific practice, which have always been internalized and followed by the vast majority of scientists, are to be made as clear as possible and proceedings for the handling of actual or alleged wrong conduct are to be defined.

A **reference list** for the QM documentation and for other applicable documents of PTB is included in the Annex (see **section 7** of these Quality Procedures).

## 2 Scope

The rules apply to all scientific staff members working in the organizational units of PTB (in the following, these organizational units will be abbreviated to: "OUs") and also to research teams working across the divisions and bodies of PTB – if applicable, also with the participation of external cooperation partners.

They apply analogously also in the case of a participation in external bodies and in other research institutions. The factual area of application extends to all scientific work including assessment and consulting activities in which PTB is involved through its staff members.

## 3 Terms and Abbreviations

| | |
|---|---|
| Research team | An association of staff members for the purpose of working on scientific questions and projects. Here, the team members can be from various OUs of PTB. External cooperation partners can also belong to these teams. In the case of third-party-funded projects, additional staff is recruited and will be employed, as a rule, as personnel of PTB. |
| Primary data | Primary data (raw data) are data that have been directly obtained by means of data acquisition. They cannot be derived from other data.<br>**Note:**<br>Primary data can be, for example: measurement data, collections, study surveys, cell cultures, material samples, data obtained by simulation, questionnaires. |
| Measurement data | Data and records that are part of a measurement or that are generated in connection with the performance of a measurement or that are derived from it.<br>**QP "Handling of measurement data and measurement data processing systems"** |
| The problem of "dual use" in research | Dual use of research results and the risk resulting therefrom that research that has been intended for peaceful applications is misused for war and terrorist purposes |

see **Quality Procedures (QP) "Terms and Abbreviations"**

# 4 Competencies and Responsibilities

**D** - Responsibility for implementation
**M** - Cooperation
**I** - Information

**1** President of PTB
**2** Senior Quality Manager of PTB
**3** Central Quality Management
**4** Heads/Quality Managers of Divisions/Bodies
**5** Ombudspersons of PTB
**6** Scientists

| Task | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Commitment to the general principles of good scientific practice according to section 5.1.1 | D | M | I | M | I | I |
| Compliance with ethical principles according to section 5.1.2 and section 5.2.4.1 | D | D | D | D | D | D |
| Head of PTB according to the Charter of PTB, §5 and section 5.1.3 | D | M | I | M | I | I |
| Support of early career scientists – suitable scientific promotion of postdocs, doctoral candidates and advanced students according to section 5.1.4 | D | I | I | M | M | M |
| Determining dimensions of performance and assessment criteria according to section 5.1.5 | D | I | I | D | I | I |
| Appointment of PTB ombudspersons to ensure good scientific practice according to section 5.1.6 | D | I | I | I | I | I |
| Performing the duties of PTB's ombudspersons according to section 5.1.6 | I | I | I | I | D | I |
| Integrating the reports of the ombudspersons for safeguarding good scientific practice into the Management Review (step 2) according to section 5.1.6 | M | D | I | I | M | I |
| Implementing quality assurance measures in all partial steps of the research process according to section 5.2.1 | I | I | I | I | I | D |
| Agreeing on the tasks, responsibilities and rights of use relating to research projects according to section 5.2.2 and section 5.2.4.2 | M | I | I | M | I | D |
| Defining research questions on the basis of investigations on the state of the art of research according to section 5.2.3 | M | I | I | M | I | D |
| Ensuring the operation of **"PTB's Ethics Commission"** according to section 5.2.4.1 | D | I | I | I | M | I |
| Applying comprehensible methods and standards according to section 5.2.5 | I | I | I | M | I | D |
| Ensuring the traceability of the research results by documenting the relevant information and archiving it according to section 5.2.6 and section 5.2.11 | I | I | I | M | I | D |
| Providing public access to research results according to section 5.2.7 | I | I | I | M | I | D |
| Complying with copyrights (authorship) according to section 5.2.8 | I | I | I | M | I | D |
| Complying with rules on publications according to section 5.2.8.6 and section 5.2.9 | D | D | D | D | D | D |
| Maintaining confidentiality and neutrality of review processes and discussions according to section 5.2.10 | D | D | D | D | D | D |
| Protection of complainants and respondents (persons concerned in cases of suspected scientific misconduct) according to section 5.3.1 | I | I | I | I | D | M |
| Initiation of formal proceedings in the case of scientific misconduct in coordination with the responsible ombudspersons for the safeguarding of good scientific practice and the competent bodies at Division Z according to section 5.3.2 | D | I | I | I | M | I |

# 5 Description

## 5.1 Principles - Good scientific practice

Good scientific practice manifests itself in honest and responsible conduct. This includes the below-mentioned fundamental principles which have to be complied with.

### 5.1.1 Commitment

The scientists will be bound to observe the rules of good scientific practice within the framework of the **Quality management system of PTB**, and they will be informed in a suitable way about these rules and in which way these rules are implemented at PTB, and/or they will receive further training on this. Each scientist is responsible for ensuring that his/her own conduct complies with the standards of good scientific practice.

*Note:*
*In particular, the principles include working lege artis according to the latest state of the art, maintaining strict honesty in attributing one's own contributions and those of others (here, the **"PTB-Drittmittelkodex zur Annahme von F+E-Mitteln"** **[PTB's Third Party Funds Code for the Acceptance of R&D Funds]** applies), rigorously questioning all findings, and permitting and promoting critical discourse (e.g. in internal lectures and meetings) within the research community.*

### 5.1.2 Professional ethics

Scientists are responsible for putting the fundamental values and norms of scientific work into practice and advocating for them. Education in the principles of good scientific work begins at the earliest possible stage in academic teaching and scientific training. Scientists regularly update their knowledge about the standards of good scientific practice and the current state of the art.

*Note:*
*Experienced and early career scientists support each other in a process of continuous mutual learning and ongoing training and maintain a regular dialogue. Young colleagues are suitably supervised. The **"Policy for the Support of Doctoral Candidates at PTB" (Doctoral Candidate Concept of PTB)** must be observed. Within the framework of the **Curriculum for Doctoral Candidates**, young scientists in particular are trained in workshops and lectures on the rules of good scientific practice that must be observed. Experienced scientists provide the mentoring for the junior scientists. Within the framework of the **Further Training for PTB Managers** program, PTB managers are trained in the field of quality management. This includes compliance with the requirements of the rules of good scientific practice that are integrated in PTB's Quality Management system.*

### 5.1.3 Organizational responsibility of the heads

Within the scope of its internal structure which is laid down in PTB's ***Geschäftsverteilungsplan*** **(GVPL) [Schedule of Responsibilities]**, PTB ensures the framework conditions for scientific work. These rules for good scientific practice will be published on PTB's **INTRANET/ INTERNET** websites in the form of "Quality Procedures" as part of the Quality Management documentation. In addition, the local ombudspersons provide information in the **INTRANET/ INTERNET** about the rules of good scientific practice that have to be observed. The implementation of this document (QP-16) will be scrutinized in annual internal audits according to the ***QM-VA "Internes Audit"*** **[QP "Internal Audit"]**. The results are subsequently evaluated by the management in a two-stage process according to the ***QM-VA "Managementbewertungen"*** **[QP "Management review"].**

Appropriate career development is supported for all scientists within the scope of the staff development programs. Within the scope of staff selection and staff development **(see *QM-VA "Personalqualifizierung"* [QP "Training of staff members"])**, due consideration is given to gender equality and diversity. To handle complaints within the

meaning of the *Allgemeines Gleichbehandlungsgesetz* (General Act on Equal Treatment), a conflict management office was set up under the head of Division Z **(see *Hausverfügung HV-01/20 "Zuständige Stelle für Beschwerden i.S. des allgemeinen Gleichbehandlungsgesetzes (Beschwerdestelle AGG)"* [Internal Directive HV 01/20 "Office for Complaints within the Meaning of the General Act on Equal Treatment"])**. Maintaining good cooperation and responsible management (i.e. providing scientific support, promoting the staff members, fulfilling the responsibility of supervision and mentoring) in the OUs and in the research teams is to be maintained. It is regulated, for example, within the scope of doctoral mentoring. Any potential conflicts are to be handled in accordance with the ***Dienstvereinbarung* "*Konfliktmanagement in der PTB*" [Agreement between PTB and PTB's Staff Council on "Conflict Management at PTB"].** All early career scientists have the opportunity to participate in the doctoral program and curriculum. Specific further training courses are also offered in these programs.

### 5.1.4 Responsibility of the heads of research teams

The head of a research team is responsible for the entire team. Collaboration within the team is designed such that the team as a whole can perform its tasks, the necessary cooperation and coordination can be achieved, and all members understand their roles, rights and duties. The leadership role includes ensuring adequate individual supervision of early career scientists as well as career development for staff. The **"Policy for the Support of Doctoral Candidates at PTB" (Doctoral Candidate Concept of PTB)** must be observed. Important tools of mentoring are the conclusion of qualification agreements between the mentor and the doctoral candidate and the mentoring by experienced scientific staff. Established subject-related and disciplinary management structures at the levels of working group/section, department/staff office, division, presidential board in accordance with the ***Geschäftsordnung der PTB (GO-PTB)* [Statutes of PTB]** and the associated principle of multiple control are in place to counteract the abuse of power and exploitation of dependent relationships. Additionally, the ombudspersons (see **section 5.1.6**) offer advice on questions relating to good scientific practice and are the primary point of contact in cases of conflicts.

### 5.1.5 Dimensions of performance and assessment criteria

The assessment of the performance of scientists is based on a multidimensional approach: in addition to academic and scientific achievements, other aspects may be taken into consideration. Performance is assessed primarily on the basis of qualitative measures, while quantitative indicators may be incorporated into the overall assessment only with appropriate differentiation and reflection. By this approach, as well as by observing the **"*Leitlinien für Führung und Zusammenarbeit*" [Guidelines on Leadership and Teamwork between Superiors and Staff]**, exemplary scientific conduct is promoted.

Where provided voluntarily, individual circumstances stated in curricula vitae (see the **"*Dienstvereinbarung (DV) zur Umsetzung der DV über die dienstliche Beurteilung der Beschäftigten im Geschäftsbereich des Bundesministeriums für Wirtschaft und Energie in der PTB*" [Agreement between PTB and PTB's Staff Council on the implementation of this agreement concerning the job-related assessment of PTB**

**employees within the competence of the Federal Ministry for Economic Affairs and Energy]** – as well as the categories specified in the German General Equal Treatment Act *(Allgemeines Gleichbehandlungsgesetz)* – are taken into account when forming a judgement.

*Note:*
*In addition to the criterion "generation of and critical reflection on findings", other aspects of performance are taken into consideration in the evaluation process. Examples include involvement in teaching, academic self-governance, public relations, and knowledge and technology transfer; contributions to the general good of society may also be recognized. An individual's approach to science, such as an openness to new findings and a willingness to take risks, is also considered. Appropriate allowance is made for periods of absence due to personal, family or health reasons or for prolonged training or qualification phases resulting from such periods, and for alternative career paths or similar circumstances.*

### 5.1.6 Ombudspersons

5.1.6.1 The president appoints two experienced scientific staff members for the Braunschweig and Berlin sites who will be available as ombudspersons to all staff members of PTB for the purpose of advising and assisting in questions relating to the safeguarding of good scientific practice. The appointment is effective for a period of **two years** and can be extended for a further term of office.

5.1.6.2 The ombudspersons stand in for each other during an absence and are entitled to exchange information at any time.

5.1.6.3 The ombudspersons undertake to maintain confidentiality in the course of their task. At the express request of the staff member seeking advice, this anonymity must be preserved.

5.1.6.4 When an ombudsperson becomes aware of problems in the safeguarding of good scientific practice, he/she will immediately work out – at his/her discretion and together with the persons affected – solutions (e.g. erratum or cancellation of a scientific publication, informing cooperation partners) for resolving the problems. In the course of his/her task, he/she can avail himself/herself of the professional assistance of other PTB staff members at any time.

5.1.6.5 In the case of a prejudicial conflict, the ombudsperson is to delegate his/her responsibility to the other ombudsperson.

5.1.6.6 The ombudsperson is entitled to propose to the president that formal proceedings be initiated in the case of a concrete suspicion becoming known to him/her of a considerable breach of the rules for safeguarding good scientific practice. The duration of the entire proceedings should not exceed a period of two years.

5.1.6.7 The ombudspersons are to inform the president of PTB annually in a joint report. In specific, this report contains the solutions and proposals worked out and may not contain any reference to the involved parties. It is a part of step 2 of the Management Review (see ***QM-VA "Managementbewertung"*** **[QP "Management review"**]. In addition, the ombudspersons will contribute to the formulation of supplementary internal standards.

5.1.6.8 In addition, PTB staff members also have the opportunity to turn to the suprare-gional committee **"Research Ombudsman"** for support in questions relating to safeguarding good scientific practice and its violation through dishonesty in science.

## 5.2 Research process

### 5.2.1 Cross-phase quality assurance

Scientists carry out each step of the research process *lege artis*. When scientific findings are made publicly available (in the narrower sense: in the form of publications, in a broader sense: through other communication channels), the quality assurance mechanisms used are always explained. This applies especially when new methods are developed (see ***QM-VA "Entwicklung und Validierung neuer Mess-, Kalibrier- und Prüfverfahren"*** **[QP "Development and Validation of new measuring, calibration and testing methods"]**.

Publications also undergo sample testing retroactively in an internal quality control test, for example as stated in ***QM-VA "Interne Audits"*** **[QP "Internal Audits"]**.

Continuous quality assurance during the research process includes, in particular, ompliance with subject-specific standards and established methods, processes such as equipment calibration according to ***QM-VA "Messmittelüberwachung"*** **[QP "Control of inspection, measuring and test equipment"]**, the collection, processing and analysis of research data, the selection and use of research software, software development and programming in accordance with ***QM-VA "Umgang mit Messdaten und Messdatenverarbeitungssystemen"*** **[QP "Handling of measurement data and measurement data processing systems"]**, and the keeping of laboratory notebooks as part of the recording according to ***QM-VA "Aufzeichnungen"*** **[QP "Records"]**.

If scientists have made their findings publicly available and subsequently become aware of inconsistencies or errors in them, they make the necessary corrections. If the inconsistencies or errors constitute grounds for retracting a publication, the scientists will promptly request the publisher, infrastructure provider, etc. to correct or retract the publication and make a corresponding announcement. The same applies if scientists are made aware of such inconsistencies or errors by third parties.

The origin of the data, organisms, materials and software used in the research process is disclosed and the reuse of data is clearly indicated; original sources are cited. The nature and the scope of research data generated during the research process are described. The source code of publicly available software must be persistent, citable and documented.

*Note:*
*It is an essential part of quality assurance that results or findings can be replicated or confirmed by other scientists (for example with the aid of a detailed description of materials and methods).*

### 5.2.2 Stakeholders, responsibilities and roles

The roles and responsibilities of the scientists and support staff (e.g. technicians, laboratory assistants, administrative staff) participating in a research project must be clear at each stage of the project. The tasks and powers of the staff are laid down in target specifications, research programs and work scheduling (see ***Hausverfügung HV 04/16 "Arbeitsplanung und Dokumentation"*** **[Internal Directive HV 04/16 "Work Planning and Documentation"]**. The tasks and competencies of PTB staff are documented in the ***Geschäftsverteilungsplan*** **(GVPL) [Schedule of Responsibilities]**.

### 5.2.3 Research design

Scientists take into account and acknowledge the current state of research when planning a project. To identify relevant and suitable research questions, they familiarize themselves with existing research in the public domain. PTB ensures that the necessary basic framework for this is in place by providing, among other things, the available services of the **Scientific Library (Q.11).**

### 5.2.4 Framework conditions

5.2.4.1 Legal and ethical aspects

PTB's research serves to expand knowledge and is committed to human well-being as well as to the protection of – above all, constitutionally protected – goods. The scientists are to avoid both direct and indirect damage to these goods as far as possible. In addition to judicial rules, they are also to observe ethical principles. The scientists must, as a matter of principle, be aware of the risk of misuse of research. In critical cases, they must, based on their knowledge and experience, make a personal decision as to what they can justify in their research. The document **Scientific Freedom and Scientific Responsibility – Recommendations for Handling Security-Relevant Research** must be observed for the "dual-use problem". The **"*PTB-Drittmittelkodex zur Annahme von F+E-Mitteln*" [PTB Third Party Funds Code for the Acceptance of R&D Funds]** must be taken into account.

- **Risk analysis**
  Scientists must analyze the consequences as well as the possible fields of application and the possibility of misuse of their work as well as the manageability of all this. In doing so, they must also consider the risks which may arise if they refrain from a certain field of research. If they conclude that their research could bear risks, they must take care to minimize this risk, they must review publications appropriately and they must document and communicate these risks in the way described below.

- **Risk minimization**
  Scientists need to minimize risks in the implementation and use of their work by applying the relevant safety measures as well as by carefully selecting and enlisting reliable staff and cooperation partners (see ***QM-VA "Vertrauensschutz, Unparteilichkeit und Integrität"*** **[QP "Protection of confidence, impartiality and integrity"**].

- **Review of publications**
  The consequences of publishing the results of high-risk research must be assessed. If there is an increased risk of misuse, it is recommended, as a matter of principle, to publish parts of research only, to delay publications or even not to publish at all.

- **Refraining from research as a last resort**
  Weighing the risk of damages and benefits of research as well as estimating the effort needed to avoid damages may result in termination of the project, even if the project would not be prohibited by law.

- **Documentation and communication of risks**
  If research would lead to risks to human dignity, to life, to human health, to the environment or to other important constitutionally protected goods, the risks – weighed against the potential benefit – and the measures taken to minimize these risks should be documented before beginning research (and in case of changes, also during research), and they should be submitted to the corresponding head of the division for a decision.

- **PTB's Ethics Committee**
  For a final decision on the ethical and legal aspects of a research work and in order to advise the responsible scientists, **PTB's Ethics Committee** was set up. Applications must be submitted to the committee and are mandatory for all scientific work on (or involving) humans or human material that is not covered by another ethics committee. Furthermore, PTB's Ethics Committee provides advice for research projects or for their leaders on questions about the assessment of dual-use applications of research results.

5.2.4.2 Rights of use

Within the scope of each research project, documented agreements on the rights of use of research data and research results arising from the research project must be made and complied with. The regulations of the ***QM-VA "Anfragen-, Angebots- und Auftragsbearbeitung"*** **[QP "Handling of inquiries, offers and orders"]** must be taken into account. As regards the drawing up of the agreement, PTB's **"Legal Matters" Section (Z.13)** must be consulted.

*Note:*
*Documented agreements are especially useful when multiple academic and/or non-academic institutions are involved in a research project or when it is likely that a scientist will move to a different institution and continue using the data he or she generated for his or her own research purposes. In particular, the scientist who collected the data is entitled to use them. During a research project, those entitled to use the data decide whether third parties should have access to them (subject to data protection regulations).*

### 5.2.5 Methods and standards

To answer research questions, scientists use scientifically sound and appropriate methods. When developing and applying new methods, they attach particular importance to quality assurance and the establishment of standards (see ***QM-VA "Entwicklung und Validierung neuer Mess-, Kalibrier- und Prüfverfahren"*** **[Quality Procedures "Development and validation of new measuring, calibration and testing methods"]**.

*Note:*
*The application of a method normally requires specific expertise that is ensured, where necessary, by suitable cooperative arrangements. The establishment of standards for methods, the use of software, the collection of research data and the description of research results is essential for the comparability and transferability of research outcomes.*

### 5.2.6 Documentation

Scientists document all information relevant to the production of a research result as clearly as is required by and is appropriate for the relevant subject area to allow the result to be reviewed and assessed. To allow a review, the obtained results, the steps of experiments, the measurements or studies are documented reproducibly according to ***QM-VA "Aufzeichnungen"*** **[QP "Records"]** using generally available technology, and they are kept accessible and are protected against manipulation. Measurement

data must be stored in a traceable manner according to ***QM-VA "Umgang mit Messdaten und Messdatenverarbeitungsystemen"*** **[QP "Handling of measurement data and measurement data processing systems"].**

In general, this also includes documenting individual results that do not support the research hypothesis. The selection of results must be avoided. Where subject-specific recommendations exist for review and assessment, scientists create documentation in accordance with these guidelines. If the documentation does not satisfy these requirements, the constraints and the reasons for them are clearly explained.

***Note:***
*An important basis for enabling replication is to make available the information necessary to understand the research (including the research data used or generated, the methodological, evaluation and analytical steps taken, and, if relevant, the development of the hypothesis), to ensure that citations are clear, and, as far as possible, to enable third parties to access this information. Where research software is being developed, the source code is documented.*

### 5.2.7 Providing public access to research results

As a rule, scientists make all results available as part of scientific/academic discourse. As far as primary data are concerned, the regulations in **section 5.2.11** are to be observed.

In specific cases, however, there may be reasons not to make results publicly available (in the narrower sense: in the form of publications, in a broader sense: through other communication channels); this decision must not, as a matter of principle, depend on third parties. Scientists decide autonomously – with due regard for the conventions of the relevant subject area and respecting the legal and ethical framework conditions as well as the agreed rights of use (see **section 5.2.4**) – whether, how and where to they make their results publicly available.

If the decision has been taken to make results publicly available, scientists describe them clearly and in full. Where possible and reasonable, this includes making the research data, materials and information on which the results are based, as well as the methods and software used, available and fully explaining the work processes. Self-programmed software is made publicly available along with the source code as soon as a final version of this source code is available and if this serves for the documentation of the scientific proceeding and for the traceability of the results. Scientists provide full and correct information about their own preliminary work and that of others (see **section 5.2.6**).

In line with the principle of “quality over quantity”, scientists avoid splitting research into inappropriately small publications. They limit, as a matter of principle, the repetition of content from publications of which they were (co-)authors to that which is necessary to enable the reader to understand the context. They cite results previously made publicly available unless, in exceptional cases, this is deemed unnecessary by the general conventions of the field of work.

*Note:*
*In the interest of transparency and to enable research to be referred to and be reused by others, **whenever possible** scientists make the research data and principal materials on which a publication is based available at appropriate/suitable storage locations such as recognized archives and repositories in accordance with the FAIR principles (**F**indable, **A**ccessible, **I**nteroperable, **R**eusable). Restrictions to public availability may apply in the case of patent applications. If self-developed research software is to be made available to third parties, this software will be provided with an appropriate licence.*

### 5.2.8 Authorship

5.2.8.1 Only persons who have made a substantial and traceable contribution to at least one of the following aspects of a scientific text, data or software publication may be named as co-authors:

- Development and conceptual design of the research project
- Gathering, collection, acquisition or provision of data, software or sources
- Analysis/evaluation or interpretation of data, sources and conclusions drawn from them
- Drafting of the manuscript

Neither a purely technical participation nor a mere allocation of financial resources nor the general management of a publishing OU and/or of a research team constitutes a co-authorship. If, in this sense, a contribution is not sufficient to justify authorship, the individual's support may be properly acknowledged in footnotes, in a foreword or in an "acknowledgement". The release of a manuscript for publication must be confirmed, as a matter of principle, by the signature of all co-authors, and the contribution of an individual person and/or OU or of the research team must be documented. The scientists decide on the question who is going to become the author of the research results. The decision as to the order in which authors are named is made in good time, normally no later than when the manuscript is drafted, and in accordance with clear criteria that reflect the practices within the relevant subject areas.

5.2.8.2 All authors of a scientific publication who are named by mutual agreement are always jointly responsible for the content of this publication. If the contributions of the individual authors are indicated, this complete responsibility only applies to the respective contribution.

5.2.8.3 If staff members feel disregarded, they may turn to the ombudspersons who are charged with the matter as foreseen in **section 5.1.6.**

5.2.8.4 If a person is named as a co-author without his/her consent and against his/her will, it can be expected that the falsely named person will expressly protest against it as soon as this circumstance becomes known. The named authors must declare their consent to being named (see paragraph 5.2.8.1.). A tacit approval of authorship with the corresponding responsibility for the publication is not allowed.

5.2.8.5 In the publication, one's own preliminary work and that of others (quotations) are to be proven completely and correctly. To this end, previously published results are to be repeated only in the already existing form and only insofar as necessary for understanding the correlation. The authors must make sure and see to it that their research contributions are published by publishers or infrastructure providers in such a form that they can be cited correctly by users. For the technical support of the work in terms of content, thanks should be shown in an appropriate form.

5.2.8.6 The administrative procedures for the publishing and translation of publications at PTB are regulated in an Internal Directive (see ***Hausverfügung HV 01/09 "Regelung zur Veröffentlichung von PTB-Autoren"*** **[Internal Directive HV 01/09 "Regulations for the Publications of PTB Authors"]**. Scientists may not refuse to give their consent

to publication of the results without sufficient grounds. Refusal of consent must be justified, as a matter of principle, with verifiable criticism of data, methods or results.

5.2.8.7 The **BIPM's brochure "The International System of Units (SI)"** provides a detailed overview of the use of the SI units. This brochure should be considered in publications as a matter of principle. As regards the statements about measurement uncertainties, the ***QM-VA "Messunsicherheitsangaben in Publikationen, Forschungs- und Ergebnisberichten aus der PTB"*** **[QP "Statement of measurement uncertainties in publications and in research and result reports from PTB"]** is to be observed.

### 5.2.9 Publication medium

Authors select the publication medium carefully, with due regard for its quality and visibility in the relevant field of discourse. Scientists who assume the role of editor carefully select for which publication medium they will assume this task. The scientific/academic quality of a contribution does not depend on the medium in which it is published. As regards negotiations with publishers and securing PTB's rights to republish, the specifications in ***Hausverfügung HV 01/09 "Regelung zur Veröffentlichung von PTB-Autoren"*** **[Internal Directive HV 01/09 "Regulations on Published Material of PTB Authors"]** must be observed. The **Scientific Library (Q.11)** is able to provide the necessary support.

*Note:*
*In addition to publication in books and journals, authors may also consider academic repositories, data and software repositories, and blogs. A new or unknown publication medium must be evaluated to assess its seriousness. A key criterion to selecting a publication medium is whether it has established guidelines of its own for the safeguarding of good scientific practice.*

### 5.2.10 Confidentiality and neutrality of review processes and discussions

Fair behaviour is the basis for the legitimacy of any judgement-forming process. Scientists who evaluate submitted manuscripts, funding proposals or personal qualifications are obliged to maintain strict confidentiality with regard to this process (see ***QM-VA "Vertrauensschutz, Unparteilichkeit und Integrität"*** **[QP "Protection of confidence, impartiality and integrity"]**. They disclose all facts that could give rise to the appearance of a conflict of interest. The duty of confidentiality and disclosure of facts that could give rise to the appearance of a conflict of interest also applies to members of scientific advisory and decision-making bodies.

***Note:***
*The confidentiality of material of others to which a reviewer or committee member gains access precludes sharing the material with third parties or making personal use of it. Scientists immediately disclose to the responsible body any potential or apparent conflicts of interest, bias or favouritism relating to the research project being reviewed or to the person or matter being discussed.*

### 5.2.11 Archiving

Scientists back up research data and results made publicly available, as well as the central materials on which they are based and the research software used, by adequate means. Where justifiable reasons exist for not archiving particular data, the scientists explain these reasons. PTB provides the respective technical infrastructure for archiving and introduces the respective **research data management**.

Primary data which are the basis of a scientific publication, e.g. measurement data (see ***QM-VA "Umgang mit Messdaten und Messdatenverarbeitungssystemen"*** **[QP "Handling measurement data and measurement data processing**

**systems"]**), collections, study data, cell cultures, material samples and study surveys are kept available in the responsibility of the publishing OU and/or of the publishing research team for usually **ten years** at PTB, where they have been generated, or in repositories that are accessible from all sites, so that the results are traceable. The retention period begins upon the date at which public access has been established. If well-founded reasons can be given, the divisions/bodies may specify shorter retention periods for primary data if these cannot be stored in durable and secured media. If there are reasonable grounds not to store certain data, these facts must be recorded.

Details of how the storage of data and documents will be organized and how the storage will be carried out technically as well as details of the – possibly needed – supplementary documentation are to be laid down in the QM documents of the divisions/bodies (see also ***QM-VA "Lenkung von QM-Dokumenten"*** **[QP "Control of quality documents"]**). This also applies if the work has been performed by an entire research team. After the work of the research team has been concluded, the records and data are to be handed over to an organizational unit (OU) of PTB. Binding documentation regulations exceeding these regulations - e.g. due to legal or technical approval requirements - remain unaffected. Within the scope of ongoing research projects, the respective OU or the respective research team decides to which degree it will make the generated primary data available to third parties.

If external partner parties are participating in a research project, it is recommended that a contractual regulation for the use of primary data by third parties or by possible new contract partner parties be used (see **section 5.2.4.2**). Normally, original data remain at the location of their creation and duplicates of these are created and/or authorization to access these data is given.

## 5.3 Non-compliance with good scientific practice, procedures

Deviations from good scientific practice are deemed to be scientific misconduct. Intentional scientific misconduct exists particularly in the case of:

- fabrication and falsification of data;
- inaccurate information, e.g. in the case of publications, job applications, etc.;
- infringement of intellectual property by
  - unauthorized exploitation under the presumption of authorship (plagiarism),
  - presumption or unfounded assumption of scientific authorship or co-authorship, assumption of an honorary authorship,
  - exploitation of non-published scientific ideas or approaches to research of others (theft of ideas) as well as
  - publication or making accessible without the consent of the authorized person;
- damage, destruction, disabling or manipulation of scientific test set-ups, data, data media or software;
- unauthorized destruction or dissemination of primary data;
- unfounded hindrance of the publication of scientific results;
- infringement of accepted rules of authorship

Further offenses of scientific misconduct may arise from negligent behaviour. Examples include unreliable – or unintended lack of – data storage and data protection, insufficient study of literature, incomplete documentation and incomplete recording of the achieved results.

### 5.3.1 Complainants and respondents

5.3.1.1 The investigation of allegations of scientific misconduct must be carried out in strict confidentiality, adhering to the presumption of innocence. The information disclosed by the complainant must be provided in good faith. Knowingly false or malicious allegations may themselves constitute misconduct. The disclosure of scientific misconduct alone should not disadvantage the scientific or professional career prospects of either the complainant or the respondent. The ***"Dienstvereinbarung über die Einführung eines externen Hinweisgebersystems in der PTB" vom 9. Oktober 2019*** **[Agreement between PTB and PTB's Staff Council on "The introduction of an external whistleblower system at PTB"** dated 9 October 2019] must be taken into account.

5.3.1.2 Part of scientific honesty is not silently tolerating the scientific misconduct of others. Accordingly, PTB expects its staff members to assist in clarifying the circumstances in the case of concrete suspicion and, if necessary, to participate in correcting or rectifying the circumstances. The usual procedure in this context should be to address the originators about the possible misconduct and ask for clarification and, if necessary, to seek correction.

5.3.1.3 It may be difficult to clear up scientific misconduct for many reasons. Therefore, a procedure is introduced in **section 5.3.2** in case a suspicion of scientific misconduct cannot be clarified in direct talks.

### 5.3.2 Procedures in cases of alleged scientific misconduct

5.3.2.1 Depending on the circumstances of the individual case, grave scientific misconduct can have the following consequences:

(1) consequences under civil service law: Initiation of disciplinary action, recourse for culpably caused damage;

(2) consequences under labour law: Notice of a (formal) warning or extraordinary termination, liability in the case of culpably caused damage;

(3) consequences under civil law: e.g. issuing an off-limits order (order to stay away from the premises), damage claims made by financial supporters;

(4) consequences under criminal law: e.g. penalty in the case of illicit exploitation of copyright protected works.

5.3.2.2 PTB will, if a margin of discretion is available in the decision on the initiation of formal proceedings or in the evaluation of the resulting findings, strive to work out the conflict jointly with the ombudspersons and to take the solution found into consideration, insofar as this is legally possible.

5.3.2.3 The ombudspersons report suspected cases of scientific misconduct to the president of PTB within the scope of the Management Review, step 2 (see **section 5.1.6.7**).

5.3.2.4 In the event of an acute suspicion of scientific misconduct, the President of PTB will establish an ad hoc group for further investigation. The scientific members of this group lead the procedure and form the majority. If necessary, external experts can be consulted. The initiated procedure respects the principles of hearing of the involved parties, confidentiality, the presumption of innocence and the principles of bias. Furthermore, the principles of free evidence and the rule of law are applied. The ad hoc group decides, taking into account the facts and the provided evidences, according to its own conviction, whether an actual allegation is to be regarded as true or not. In the result, the reasons must be given, which form the basis of the recommended measures. If actual scientific misconduct with a corresponding external impact as a result of the initiated procedure is determined, the affected scientific organizations will be informed by the President of PTB.

# 6 Explanatory Notes and Comments

## 6.1 Other applicable documents

- *PTB-Drittmittelkodex zur Annahme von F+E-Mitteln vom 14. November 2005*
  [PTB third party funds code for the acceptance of R&D funds dated 14 November 2005]
- *Hausverfügung HV 01/09 "Regelungen zu Veröffentlichungen von PTB-Autoren*"
  [Internal Directive HV 01/09 "Regulations for the Publications of PTB Authors"]
- *Hausverfügung 04/16 "Arbeitsplanung und Dokumentation“*
  [Internal Directive 04/16 "Work Planning and Documentation"]
- *Hausverfügung HV 02/19 "Bibliotheksordnung"*
  [Internal Directive 02/19 "Library Regulations"]
- *Hausverfügung HV 01/20 "Zuständige Stelle für Beschwerden i.S. des allgemeinen Gleichbehandlungsgesetzes (Beschwerdestelle AGG)*
  [Internal Directive 01/20 "Office for Complaints within the Meaning of the General Act on Equal Treatment"]
- *Regelungen zur Betreuung von Doktoranden in der PTB (Doktorandenkonzept) vom 15. Juli 2013*
  [Policy for the Support of Doctoral Candidates at PTB (Doctoral Candidate Concept) dated 15 July 2013]
- *Dienstvereinbarung über die Einführung eines externen Hinweisgebersystems in der PTB vom 9. Oktober 2019*
  [Agreement between PTB and PTB's Staff Council on "The introduction of an external whistleblower system at PTB"] dated 9 October 2019
- *Dienstvereinbarung (DV)* "*Konfliktmanagement in der PTB*"
  [Agreement between PTB and PTB's Staff Council on "Conflict Management at PTB"] dated 22 December 2016
- *Dienstvereinbarung (DV) zur Umsetzung der DV über die dienstliche Beurteilung der Beschäftigten im Geschäftsbereich des Bundesministeriums für Wirtschaft und Energie in der PTB"*
  [Agreement between PTB and PTB's Staff Council on the implementation of this agreement concerning the job-related assessment of PTB employees within the competence of the Federal Ministry for Economic Affairs and Energy] dated 6 February 2020

## 6.2 References

- BIPM brochure "The International System of Units (SI)", 9th edition from 2019
- Deutsche Forschungsgemeinschaft (German Research Foundation): "Guidelines for Safeguarding Good Research Practice", Code of Conduct, from September 2019
- Deutsche Forschungsgemeinschaft (German Research Foundation)/Leopoldina: "Scientific Freedom and Scientific Responsibility – Recommendations for Handling Security-Relevant Research" dated 28 May 2014

## 6.3 Remarks

**Granting of funds**

Applications for the granting of funds of the *Deutsche Forschungsgemeinschaft* (DFG) (German Research Foundation) must, in addition to the information found in the **"Merkblatt für Anträge auf Sachbeihilfen mit Leitfaden für die Antragstellung" der DFG ["Information sheet on applications for grants with a guideline for the application" of the DFG]**, also contain the following statement:

***"The recommendations of the Deutsche Forschungsgemeinschaft (German Research Foundation) for the safeguarding of good scientific practice have been integrated into the quality management system of PTB since January 2001."***

# 7 Annex

**Reference list of the DFG recommendations/Recommendations for the QM documentation and other applicable documents of PTB, Vol. 4, dated 4 May 2020.**