

**Guidelines to ensure Good Scientific Practice
and prevent scientific misconduct
at MARUM – Center for Marine Environmental Sciences
of the University of Bremen**

Adopted by the MARUM Center Council on 22.1.2020

Guidelines to ensure Good Scientific Practice and prevent scientific misconduct at MARUM – Center for Marine Environmental Sciences of the University of Bremen

Preamble

Scientific work is founded on basic principles. Honesty towards oneself and others is first and foremost. This ethical standard is the foundation of scientific professionalism, and is referred to as Good Scientific Practice. A central task of self-regulation in science is to create a set of conditions that assures its validity and application. MARUM – the Center for Marine Environmental Sciences at the University of Bremen is conscious of its obligation to ensure unconditional internal compliance with Good Scientific Practice. The purpose of the guidelines laid out here is to implement the current version of the Principles for Safeguarding Good Scientific Practice of the University of Bremen in everyday research. The present document is based on the relevant DFG guidelines of August 2019.

All members of MARUM, and the university professors in particular, are obliged to adhere to these principles of Good Scientific Practice and to convey the principles by their own example. Scientists at all career stages will regularly refresh their understanding of the standards of Good Scientific Practice.

Scientific work serves to advance knowledge. The fundamental prerequisite for this is honesty on the part of the scientist. Dishonesty in scientific work is inconsistent with the very essence of science and the scientist's responsibility to society. MARUM has an obligation to the public and to the scientific community to resolve any credible suspicion of scientific misconduct by its members. This should take into account that honest errors are an inherent part of scientific work. An open and non-repressive attitude toward errors is inherent to good science, especially since their

discovery and resolution support science in revealing the truth, and this ultimately leads to the further refinement of scientific processes.

A list of rules cannot be a substitute for the inherent integrity of the individual scientist. Legal constraints cannot categorically prevent misconduct in scientific work. However, regulations can aim to minimize misconduct. Nor can scientific misconduct be judged on the basis of general rules alone; consideration of the circumstances of each individual case must be applied in imposing appropriate penalties.

General

The following guidelines to ensure Good Scientific Practice are intended to help prevent scientific misconduct as far as possible, and thereby enhance the quality of scientific work.

MARUM fulfils its responsibility to early career researchers by imparting these guidelines on the principles of scientific work and Good Scientific Practice to doctoral candidates and postdocs, and by encouraging honesty and responsibility in science. At the same time, they are also made aware of the possibility of inadvertent scientific error. Doctoral candidates are required to take part in advanced training courses on Good Scientific Practice and research data management (the content of which focuses on the analysis of original data, statistics, authorship and the avoidance of plagiarism). MARUM meets its responsibility to the scientific personnel by instructing them on the principles of scientific work and Good Scientific Practice in compliance with these guidelines. The instructions are in written form and must be confirmed by their signature. This usually

takes place at the time of employment. MARUM supports and fosters the ongoing learning and continuing education of its members with regard to Good Scientific Practice.

All members of MARUM are required to comply with the Principles for Safeguarding Good Scientific Practice of the University of Bremen. This also applies to guest researchers and scholarship recipients who are not directly employed by the University of Bremen. In these cases the requirement is expressly included in the guest contract.

Fundamentals of Good Scientific Practice

In particular, the general principles of scientific work include:

- Working according to the present state of knowledge and possessing the necessary qualifications and training. Knowledge of the current status of research and the most appropriate methods is essential.
- Documentation of all information related to the development of a research result in a comprehensible and enduring form (see “Documentation and backup and storage of data” in these guidelines).
- Consistently questioning one’s own findings.
- When scientific results are made publicly accessible (in the narrow sense in the form of publications, but in a broader sense also through other communication channels), the quality assurance methods used will be reported. This is especially important when new methods are being developed.
- Observance of the recognized principles of scientific work within individual disciplines.

All members of MARUM are responsible for ensuring that these principles are adhered to by themselves as well as by all of their subordinate staff. They are an integral part of the teaching and training as well as the advanced and continuing education of early career researchers, and of the training, advanced and continuing education of scientific and technical personnel. In these efforts, not only theoretical knowledge and

technical skills, but also a sound ethical attitude toward scientific work should be conveyed.

Authorship of scientific publications

An author is someone who has made a genuine, demonstrable contribution to the content of a scientific text, data or software publication. The authors of a scientific publication are jointly responsible for its content unless the responsibility is explicitly stated to be otherwise. Honorary authorship is not permissible. When publications are intended to report new scientific findings, they should:

- completely and transparently describe the results, providing or making appropriate reference to all methodical details,
- completely and correctly cite the references to one’s own as well as external work,
- report previously published findings in a clearly stated manner and restate those findings only to the extent necessary for an understanding of their context.

All co-authors shall confirm their approval of a manuscript for publication by signature or electronic consent. The contribution of each person or working group must be identified (e.g., a publisher’s form or special agreement). If unpublished research results by other persons are cited in the manuscript or findings by other institutions are used, their written consent must be obtained – subject to other conventional standards for scientific disciplines.

Signed authors of an original scientific publication should include all of, but only, those who have significantly contributed to the conception of the study or its experiments, or to the processing, analysis and interpretation of the data and the formulation of the manuscript, and who have agreed to its publication, i.e., persons who have made responsible contributions. Individuals who have significantly contributed to the conception of the study or its experiments, or to the processing, analysis and interpretation of the data must be given the opportunity to par-

ticipate in the preparation of the manuscript for publication of the results and to become co-authors. By this definition of authorship other contributions, not necessarily insignificant, such as

- formal responsibility for the procurement of funding
- providing rooms, materials, personnel or other resources
- providing existing sample material
- training of co-authors in established methods
- participation in the compilation of data
- mere reading of the manuscript without participation in development of the content and
- leadership of an organizational unit in which the publication was generated

alone are not considered sufficient to justify authorship.

Agreement to be named as a co-author implies a shared responsibility for assuring that the publication meets scientific standards. This applies particularly to the content for which the co-author has made a contribution. Each co-author is responsible for the correctness of his/her own contribution as well as for ensuring that it is presented in a scientifically sound manner in the publication.

If individual scientists are named as co-authors in a publication without their consent and they do not feel that it is appropriate for them to be included, they are expected – if they are aware of the publication – to expressly contest being named as co-authors vis-à-vis the principal author and/or the editorial staff of the journal or publisher concerned.

Before submission of a scientific manuscript for publication, all results must be documented and electronic data must be backed up (see “Documentation and backup and storage of data” in these guidelines). Furthermore, an author’s statement of the contribution by each author to the manuscript will be drawn up and held in safekeeping.

Early career researchers

The training and development of early career researchers is a central goal of MARUM. In addition to methodological skills, MARUM will impart a solid ethical foundation for scientific work to early career researchers, with particular regard to the responsible handling of results and interactions with other scientists.

Doctoral candidates and other early career researchers shall be advised by at least two experienced scientists, one of whom does not belong to the same research group as the young researcher. The names of the two advising scientists must be documented in writing at the beginning of the work. The two advising scientists shall be available for advice and help and, if necessary, to mediate in the case of conflict situations. Every early career researcher must have a primary contact person in their own working group who communicates the content of these guidelines to them.

Cooperation and leadership responsibility in working groups

Every scientist is responsible for his or her own conduct. Those who assume supervisory roles also bear responsibility for the conditions in their organizational unit (e.g., working group). Open and active communication within the working group and sound supervision are the most effective means of preventing a lapse that could lead to improper practices. The leader of a working group is responsible for ensuring that these conditions are maintained at all times.

The head of a scientific working group should create an organizational structure in which the results achieved through a specialized division of work can be reciprocally communicated, criticized, and integrated into a common knowledge base.

The leaders of scientific working groups are responsible for an effective organization that guarantees that the tasks of management, supervi-

sion, conflict resolution and quality assurance are clearly assigned and effectively performed.

Documentation and backup and storage of data

MARUM members document all information relating to the generation of research results in a comprehensible way as is required and appropriate within the particular discipline, such that the results can be verified and evaluated. As a matter of principle, they also document findings that do not support their research hypothesis. Selectivity in reporting the results is not acceptable in this context. Where specific technical recommendations are available for review and evaluation, these will be applied. If the documentation does not meet these requirements, the limitations and the reasons for them will be clearly explained. Documentation and research results must not be manipulated; they must be protected against manipulation to the greatest possible extent.

All data collected in the course of a scientific project are original data, whether they are collected at the original source or contracted for collection. From these, primary data are generated, upon which the results presented in scientific publications are based. The original data must remain accessible to authorized staff members on durable and protected media in the working group/institution where they were generated in accordance with legal requirements, but at least for ten years after their collection or ten years after the appearance of the scientific publication for which they form the basis. Storage obligations based on legal regulations shall not be affected by this.

Responsibility for creating the documentation lies with the individual scientist. It is incumbent upon him or her to provide evidence of proper documentation. The scientist may make copies, if this is permitted by data protection regulations.

Original data are the property of the University of Bremen unless other contractual arrangements have been made within the framework of a project. Copies may be taken by individuals

working in science as long as there are no data protection regulations to the contrary. The Director and persons authorized by him or her have the right to access the original data at any time.

Scientific misconduct by researchers

The MARUM will address any suspicion of non-compliance with Good Scientific Practice with the utmost seriousness and severity. Violations of good scientific practice include, in particular:

- fabrication of data (invention of data and/or results) and their publication;
- falsification (manipulation of data, suppression of data or alterations of experimental conditions that are not properly accounted for in the interpretation);
- plagiarism (use of ideas, references, results, or the arguments and representations of others, or of oneself, without adequately stating and recognizing this);
- presumptuous or unjustified acceptance of scientific authorship or co-authorship, asserting the co-authorship of another person without their consent;
- concealment of conflicts of interest or of parallel publications or submissions;
- wrongful obstruction of the research activities of other scientists and attempts to undermine the scientific reputations of others;
- sabotage of research activities (including the damage, destruction or manipulation of experimental setups, equipment, records, hardware, software, chemicals or other items that others need to carry out their research);
- wrongful removal of original data and violation of the documentation and storage obligation;
- improper removal of sample material from MARUM;
- other deliberate or grossly negligent breaches of the principles of Good Scientific Practice.

Joint responsibility for misconduct

Shared responsibility for misconduct may result from, among other things,

- participation in the misconduct of others,
- shared knowledge of the scientific misconduct of others,
- gross negligence of supervisory obligations.

Investigation of allegations of scientific misconduct

Procedures for investigating scientific misconduct are carried out in accordance with the current version of the Principles for Safeguarding Good Scientific Practice of the University of Bremen.

If scientific misconduct is suspected, members of MARUM shall notify the MARUM ombudsperson or the appropriate contact person of the University of Bremen.

The notice must be given in good faith. Accusations should not be made without careful scrutiny or without sufficient knowledge of the facts. A frivolous approach to allegations of scientific misconduct, and especially the deliberate raising of false accusations, can itself constitute a form of scientific misconduct.

*Adopted by the MARUM Center Council on
22.1.2020*