GUIDELINES TO ENSURE GOOD SCIENTIFIC PRACTICE AND TO DEAL WITH SCIENTIFIC MISCONDUCT AT **INM - LEIBNIZ INSTITUTE FOR NEW MATERIALS** AND PROCESS PRINCIPLES

PLEASE NOTE: THIS DOCUMENT IS FOR INFORMATION OF ENGLISH-SPEAKING COLLEAGUES AT INM. THE LEGALLY BINDING DOCUMENT IS THE VERSION IN GERMAN LANGUAGE.
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PREAMBLE

The foundations of valid scientific work are the honesty of scientists towards themselves and others and the honesty in the search for truthful findings. The INM - Leibniz Institute for New Materials (INM) is aware of its responsibility to ensure the norms and standards of good scientific practice and to communicate these to all scientists, especially during the qualification phase. The framework for these standards is set by the Code of the German Research Foundation (DFG) "Guidelines for Ensuring Good Scientific Practice" of July 2019.

The code is addressed to the scientists as well as all other actors in the scientific system who contribute to ensuring scientific integrity, such as editors of scientific journals, professional societies, whistleblowers and ombudspersons. These guidelines for good scientific practice at the INM are addressed to all scientists at the institution and will be made known by the management in an appropriate manner.

1 GENERAL PRINCIPLES

The standards of good scientific practice, which are announced in this guideline and are based on the DFG code, are obligatory for all scientists at the INM as well as for all other actors in the scientific system working at the INM who contribute to ensuring scientific integrity.

Guideline 1 Commitment to general principles
Every scientist is responsible for ensuring that his or her own conduct complies with the standards of good scientific practice.

Guideline 2 Professional ethics
Every scientist at the INM is fundamentally responsible for adhering to the standards of good scientific practice and must regularly inform themselves about these standards. The teaching of the basics of good scientific work begins at the earliest possible stage. Experienced scientists as well as young scientists support each other in the continuous learning and training process and are in regular exchange. Once a year, the INM offers a practical seminar on good scientific practice, which is open to all scientists working at the INM. Participation in this seminar is mandatory for doctoral students.

Guideline 3: Organisational responsibility of the INM management
The organisational responsibility for the creation of suitable framework conditions for the implementation of and compliance with the guidelines for good scientific practice lies with the management. The management of the INM guarantees the conditions for the scientists to comply

with legal and ethical standards. The responsibility for the mediation, implementation and compliance with good scientific practice lies with the management of the respective scientific working unit of the INM, in which the tasks of management, supervision, quality assurance and conflict regulation are clearly assigned and communicated to the respective members and affiliates in an appropriate manner. Sincere advice for career and further career paths as well as further training opportunities and mentoring for scientific and science support staff are offered.

Applicants for advertised positions are subject to a formalised application management process that is not based exclusively on academic performance. In order to ensure a balanced, non-discriminatory evaluation, the Equal Opportunities Officer and the Works Council are also formally involved in the application process. The INM is certified according to the audit "beruf und familie" (work and family), which also realises the compatibility of work and family for the scientists. Personnel development is also subject to the above-mentioned non-discriminatory evaluation and is supported, among other things, by the binding annual appraisals between employees and superiors. Gender equality and diversity are also taken into account in personnel selection and development. The corresponding processes are transparent and, as far as possible, avoid unconscious bias.

Guideline 4: Responsibility of the management of work units
The head of each scientific work unit bears responsibility for the entire unit. This includes the appropriate supervision of junior academics in the preparation and academic assessment of qualification work. The responsible cooperation and performance of management tasks in program divisions and service groups includes the supervision of their members, including junior academics, so that all members are aware of their roles, rights and duties and the abuse of power and the exploitation of dependencies are prevented.

Guideline 5: Performance dimensions and evaluation criteria
The INM is subject to the evaluation criteria of the Leibniz Association when assessing its scientists. Originality and quality have priority over quantity as performance and evaluation criteria. Quantitative indicators can only be included in the overall evaluation in a differentiated and reflected manner. The scientific attitude of the scientist, such as openness to knowledge and willingness to take risks, is also taken into account. Appropriate consideration is given to personal, family or health-related absences or the resulting extension of training or qualification periods, alternative career paths or comparable circumstances. Program division-specific achievements are surveyed each year for the preparation of an annual report, which includes, among other things, publication activity, the extent to which third-party funding has been acquired, teaching activities and the supervision of qualification theses.

The overarching goals of the INM, which are agreed upon in the form of program budgets with the funding bodies, are concretised for the current year in confidential annual meetings with the heads of the program divisions. In the annual meeting, the scientists receive performance feedback on their work results, commitment, efficiency and social competence during the past period.

Guideline 6: Ombudspersons

(1) As a contact point in case of discrepancies, suspicions and disputes concerning the standards of good scientific practice, the scientists of the INM elect two independent ombudspersons for a term of three years. All scientists with an M.Sc or comparable degree are eligible for election. Doctoral employees whose contract period includes the term of office are eligible for election. The ombudspersons can represent each other. The representation applies in particular in the case of concern of bias or prevention. Even the appearance of bias precludes the ombudsperson concerned from acting. The bias rules of the DFG and the Leibniz Association apply. The first contact persons for those seeking advice or making a complaint are the elected ombudspersons of the INM. Those seeking advice or making a complaint have the right to choose between the ombudspersons of the INM, the central ombudsman committee of the Leibniz Association and the "Ombudsman for Science" committee of the DFG. The ombudspersons may not be members of the management. A single re-election as ombudsperson is permissible. The management is responsible for the execution of the secret election and is responsible that the ombudspersons are announced in an appropriate way at the INM. The ombudspersons receive the necessary content-related support and acceptance from the management in the performance of their tasks, if necessary also other relief from tasks.

(2) At the request of one tenth of the members of the scientific community, a vote shall be held to remove an ombudsperson from office. The ombudsperson may be voted out of office by a two-thirds majority of the scientists and scholars if the ombudsperson can no longer be relied upon to fulfil his/her duties in the long term or if there is no longer confidence in the ombudsperson's ability to fulfil his/her duties properly. The ombudsperson is to be heard before the decision on the deselection. The management is responsible for conducting the secret ballot.

(3) The ombudspersons shall become active if a suspicion is brought to their attention. The ombudspersons are not an investigative body, i.e. they do not actively check on their own initiative for compliance with the standards of good scientific practice at INM. However, they can become active in justified cases if they are informed by third parties of a suspicion of scientific misconduct, insofar as the suspicion is related to the activities at INM.

(4) The ombudspersons advise as neutral and qualified contact persons in questions of good scientific practice and in suspected cases of scientific misconduct and contribute, as far as possible, to solution-oriented conflict mediation. The principles of the ombudspersons' activities are confidentiality, neutrality, fairness and transparency towards the parties involved.

2 RESEARCH PROCESS - GUIDELINES FOR GOOD SCIENTIFIC WORK

Guideline 7: Quality assurance across phases

The standards of good scientific practice include working *lege artis, i.e.* all work steps, research data and results are fully and comprehensibly documented and are presented together with the publicly available scientific findings (both in publications and in other communication channels).

Similarly, the quality assurance mechanisms used are always outlined, particularly when new methods are developed. All protocols and primary data are stored securely and long-term, and subject-specific standards and established methods are adhered to. Continuous, research-related

quality assurance also relates to processes such as the calibration of equipment, the collection, processing and analysis of research data, the selection and use of research software incl. its development and programming, and the maintenance of laboratory books in all INM laboratories.

Validity and reproducibility of all results are to be critically and consistently reviewed. Strict honesty must be maintained with regard to the contributions of staff and to third-party funding bodies. If scientists have made findings publicly available and subsequently notice discrepancies or errors, they must correct them. If the discrepancies or errors are the reason for the retraction of a publication, the scientists and scholars shall work with the relevant publisher or infrastructure provider as quickly as possible to ensure that the correction or retraction takes place and is marked accordingly. The same applies if the researchers are informed of such discrepancies or errors by third parties.

The origin of data, organisms, materials and software used in the research process is identified and subsequent use is documented; the original sources are cited. The type and scope of research data generated in the research process are described. The handling of such data is designed in accordance with the requirements of the subject concerned. The source code of publicly accessible software must be persistent, citable and documented. The fact that the results or findings can be replicated or confirmed by other scientists (for example, by means of a detailed description of materials and methods) is - depending on the subject area concerned - an essential component of quality assurance.

Guideline 8: Actors, responsibilities and roles
The roles and responsibilities of the scientists and research support staff involved in a research project must be clear at all times. All those involved are in regular contact with each other. They define their roles and responsibilities in an appropriate manner and adapt them as necessary. An adjustment is particularly indicated if the focus of the work of one of the participants in the research project changes.

Guideline 9: Research design
When planning a project, scientists take the current state of research fully into account, research it carefully and acknowledge it. The management ensures the necessary framework conditions for the research of publicly accessible research achievements. Methods to avoid (unconscious) bias in the interpretation of findings are applied as far as possible. Researchers consider whether and, if so, how gender and diversity might be relevant to the research program. When interpreting findings, the respective framework conditions are taken into account.

Guideline 10: Legal and ethical framework, rights of use
The scientists handle their research freedom responsibly. They take into account rights and obligations, especially those arising from legal requirements or contracts with third parties, obtain rights of use, approvals and ethical votes, and thoroughly assess the research consequences and ethical aspects.

Scientists are continuously aware of the risk of misuse of research results. Their responsibility is not limited to compliance with legal requirements, but also includes the obligation to use their knowledge, experience and skills in such a way that risks can be identified, assessed and

evaluated. The management of INM is responsible for ensuring that the actions of its employees conform to the rules and promotes this through suitable organisational structures. The staff members develop and use binding principles for research ethics in exchange with the responsible authorities and, if applicable, the Leibniz Commission for Research Ethics (Leibniz-KEF), procedures for the corresponding assessment of research projects and observe national and international regulations.

The scientists of the INM are aware that the use of the data belongs in particular to the scientist who generated it. In the context of research projects, the authorised users decide whether third parties should be given access to the data, subject to data protection regulations. The INM generally follows an open science approach, which provides for the most open availability and free re-usability of scientific achievements and underlying data possible through recommendations in the INM's Open Access Policy. The scientists provide correct evidence of their own and others' preliminary work.

Guideline 11: Methods and standards
The scientists apply scientifically sound and comprehensible methods. When developing and applying new methods, they pay attention to quality standards and their establishment.

Guideline 12: Documentation
The scientists of the INM document all information relevant to the occurrence of a research result as comprehensibly as is necessary and appropriate in the field concerned in order to be able to check and evaluate the result. Individual results are documented and not discarded from the outset if they do not support the research hypothesis. A selection of results does not take place in this context. Documentation and research results must not be manipulated and must be protected as best as possible against manipulation.

The staff of the INM give the highest priority to the comprehensive documentation of research processes and results in order to be able to guarantee a high degree of transparency, traceability and reusability of the results. If the documentation does not meet these requirements, the limitations and the reasons for them are explained in a comprehensible manner. The traceability of citations shall be ensured and, as far as possible, third parties shall be allowed access to the information necessary for the understanding of the research. In the development of research software, the source code shall be documented.

Guideline 13: Establishing public access to research results
As a matter of principle, scientists and scholars contribute all their results to the scientific discourse. They decide on their own responsibility - taking into account the practices of the discipline concerned - to what extent there are reasons to deviate from this principle in individual cases and to refrain from making the results publicly available. This decision may not be made dependent on third parties.

For publications, "quality before quantity" applies, i.e. inappropriately small publications should be avoided and previously published results should be cited. Scientists should limit the repetition of the contents of their publications and self-citations to the extent necessary for an

understanding of the context. All publications must respect the intellectual authorship of others and all quotations and reproductions must be properly acknowledged.

For reasons of traceability, connectivity of research and reusability, the scientists of the INM strive to deposit suitable research data underlying the publication in recognized, publicly accessible repositories and archives.

Guideline 14: Authorship
Authors of an original scientific publication are those who have made a genuine contribution to the content of a scientific text, data or software publication and have approved the final version. The authors bear joint responsibility for the publication, unless explicitly stated otherwise. In particular:

1. A comprehensible genuine contribution exists in particular if a scientist contributes in a scientifically relevant way to the
    a. development and conception of the research project or
    b. the development, collection, procurement, provision of the data, software sources or
    c. the analysis/evaluation or interpretation of data, sources and the conclusions drawn therefrom; or
    d. participated in the writing of the manuscript.
2. If a contribution is insufficient to justify authorship, such support may be acknowledged in footnotes, the preface, or the acknowledgement.
3. A so-called honorary authorship is excluded. The sole provision of infrastructure and/or financial resources or a management or supervisory function does not entitle the author to authorship.
4. agreement on the order of authors is reached in good time, at the latest when the manuscript is being formulated, on the basis of comprehensible criteria.
5. Consent to the publication of results may not be withheld without sufficient reason. The refusal of consent must be justified by a verifiable criticism of data, methods or results.

Guideline 15: Publication organ
All research contributions must be correctly citable by users. The authors decide where and how the research results are to be made publicly available and strive for open access. They choose the publication medium carefully, and new publication media are examined with regard to their seriousness. The scientific quality of a contribution does not depend on the publication medium in which it is made publicly accessible. In addition to publications in books and journals, specialist repositories, data and software repositories and blogs are also considered. Scientists and scholars who assume the function of editors also carefully consider the publication organ for which they take on this task. An important criterion in the selection decision is whether the publication body has established its own guidelines for good scientific practice.

Guideline 16: Confidentiality and neutrality in assessments and consultations
Scientists who assess submitted manuscripts, funding applications or the credentials of individuals, or who are members of scientific advisory and decision-making bodies, undertake to behave honestly and in strict confidence. This excludes the disclosure of content to third parties and their own use of such content. They shall disclose all facts that could give rise to concerns of bias.

Guideline 17: Archiving / long-term storage
Primary data and publicly accessible research data or research results are stored at the INM in an accessible and traceable manner for the long term, but for at least ten years (this period runs from the publication of the data) or deposited in repositories across sites. In the case of shortened retention periods, this is justified in a comprehensible manner. If, in exceptional cases, there are comprehensible reasons for not retaining certain data, the scientists will explain this. The INM ensures that the necessary infrastructure is in place to enable this long-term storage. Long-term archiving according to the state of the art is aimed for.

3 NON-COMPLIANCE WITH GOOD SCIENTIFIC PRACTICE, PROCEDURES

Guideline 18: Whistleblowers and those affected by allegations
INM ombudspersons and investigative commissions reviewing allegations of scientific misconduct are committed to protecting both the whistleblower and the person(s) affected by the allegations in an appropriate manner. The investigation of allegations of scientific misconduct shall be conducted with explicit regard to confidentiality - both for the whistleblower and for the person(s) affected by the allegations - and to the fundamental principle of the presumption of innocence. The whistleblower's report must be made in good faith and based on objective evidence of a violation of good scientific practice. Deliberately false or wanton allegations may themselves constitute scientific misconduct. Neither the person making the report nor the person affected by the allegations should suffer any disadvantages for his/her own scientific or professional advancement as a result of the report. If possible, the report should not lead to delays in the whistleblower's qualification - especially in the case of junior researchers - and the preparation of theses and doctorates should not be disadvantaged. This also applies to working conditions and possible contract extensions. The whistleblower must also be protected in the event of unproven scientific misconduct, unless it can be proven that the accusations were made against one's better knowledge.

Guideline 19: Procedures in suspected cases of scientific misconduct
At INM, the facts of scientific misconduct, procedural rules and measures in the event of a finding of scientific misconduct are defined in corresponding sets of rules (see Section 4. Facts of Scientific Misconduct, Section 5. Procedures for Conflict Resolution and for Investigating Allegations of Scientific Misconduct and Section 6. Conclusion of the Procedure).

4 INSTANCES OF SCIENTIFIC MISCONDUCT

Scientific misconduct occurs if (in a scientific context) false statements are made intentionally or through gross negligence, if other people's scientific achievements are adopted without justification or if the research activities of others are impaired. These elements of offense are specified in the following:

1. False statements are in particular:
    a. the invention of data and/or research results,
    b. falsification of data and/or research results, in particular
        i. by suppressing and/or eliminating data and/or results obtained in the research process without disclosing this,
        ii. by manipulating a representation or illustration,
    c. by the incongruent representation of a picture and the corresponding statement,
    d. by providing incorrect information in publication lists, in grant applications or in the context of reporting requirements (including incorrect information on the publication organ and on publications in print),
    e. by claiming the (co-)authorship of another person without his or her consent;
2. Unauthorized appropriation of third-party scientific achievements is committed in particular by:
    a. the unauthorised copying or other use of passages from third parties without proper and adequate proof of authorship (plagiarism),
    b. the exploitation of research approaches and ideas without consent (in particular as a reviewer) ("theft of ideas"),
    c. the unauthorised disclosure of data, theories and findings to third parties or their unauthorised use for own scientific purposes,
    d. d) the presumption or unfounded assumption of authorship or co-authorship, in particular if no genuine, comprehensible contribution to the scientific content of the publication has been made, as well as the denial of a justified co-authorship,
    e. the distortion of the content,
    f. unauthorised publication or making available to third parties as long as the work, finding, hypothesis or research approach has not been lawfully published;
3. Interference with the research activities of others is defined as
    a. Sabotage of research activities (e.g. by damaging or manipulating experimental setups),
    b. falsification or unauthorised disposal of research data or research documents,
    c. falsification or unauthorised disposal of documentation of research data,
    d. inadequate supervision of qualification theses.
4. The disposal of primary data is considered scientific misconduct if it violates legal provisions or accepted principles of scientific work (see above). This also applies to the unlawful non-disposal of (in particular personal) data;
5. Violation of confidentiality in the review process through unauthorised disclosure of data, theories or findings to third parties shall also constitute scientific misconduct.

Shared responsibility for misconduct may result from, among other things, participation in the misconduct of others, gross neglect of supervisory duties, or co-authorship of publications containing falsification.

5 PROCEDURES FOR CONFLICT RESOLUTION AND FOR INVESTIGATING ALLEGATIONS OF SCIENTIFIC MISCONDUCT

(1) An ombudsperson usually acts upon request (see above).

(2) The review of anonymous reports is to be considered by the ombudspersons. In principle, an appropriate investigation requires the confidential naming of the whistleblower to the ombudsperson. The instances of violation of good scientific practice applicable to the INM are defined in section 3 (Non-compliance with good scientific practice) and serve as orientation.

(3) The ombudspersons shall take appropriate action to protect both the whistleblower and the person affected by the allegations. The name of a whistleblower shall be treated confidentially. In individual cases, it may be necessary to disclose the name to the accused person if he or she is otherwise unable to defend him or herself properly, but this should only be done if the whistleblower suffers no disadvantages for his or her own academic and professional advancement.

(4) The whistleblower's report must be made in good faith. Deliberately false or wanton allegations may themselves constitute scientific misconduct.

(5) The ombudspersons shall confirm receipt of the report to the whistleblower within one week of receipt.

(6) If a case of scientific misconduct that has not yet occurred (e.g. publication of falsified data), but is rather a case of advice on how to avoid misconduct or of mediation between persons (e.g. supervisor and supervisee), the talks can be terminated by all parties involved at any time without giving reasons. In the case of mediation, it is the responsibility of the conflict parties themselves to implement and enforce the proposed solutions. The ombudspersons have no authority to take measures to enforce or monitor the agreements reached.

(7) In case of suspected scientific misconduct, the ombudspersons shall conduct a preliminary examination. For the purpose of this preliminary examination, at least the accused persons and the whistleblowers shall be heard. Persons who are asked by the ombudspersons for an interview for the purpose of this preliminary examination are obliged to comply with this request in a timely manner (within a maximum of 2 weeks after the request).

(8) Interested parties and persons providing information shall be given the opportunity to comment at each stage of the procedure.

(9) The investigation of allegations of scientific misconduct shall respect confidentiality and the fundamental principle of the presumption of innocence.

(10) The ombudspersons may hear other persons and commission external expert opinions. All statements and consultations with an ombudsperson are confidential. Inspection of files is not granted in the course of a preliminary examination, not even by the management (unless all parties agree to this). If it emerges in the course of the preliminary review that it is not possible to clarify the allegations at the level of the member institution or that an ombudsperson or a member of the management is affected by the allegation of scientific misconduct, the case is submitted to the Leibniz Ombudsman Board. All parties involved are informed before an external opinion is sought.

(11) As a result of the preliminary examination, the ombudsperson responsible for the specific case shall decide whether to discontinue the proceedings or whether it is necessary to transfer the proceedings to the INM management for further investigation. The ombudspersons shall inform the whistleblower, as well as the accused and the INM management in writing about the result of the preliminary examination and, if applicable, about the reasons for the necessity of further investigation.

(12) If the ombudspersons discontinue the examination, the parties involved may appeal to the management, which will then decide whether a further investigation is necessary.

(13) In the event that the management of the INM considers scientific misconduct to be sufficiently probable, it shall set up an Committee of inquiry to review the allegations of scientific misconduct. If the management decides not to investigate further, it shall inform the whistleblower, the accused and the ombudspersons. In this case, the parties involved can file an objection. The proceedings are then forwarded to the central ombudsman committee of the Leibniz Association.

(14) The Committee of inquiry shall consist of at least four members, including one or two members of the Scientific Advisory Board of the INM as well as one additional member who is also qualified to comprehensively understand the scientific facts of the case and who is not an employee of the INM. Two deputies shall be appointed. The bias rules of the DFG and the Leibniz Association apply. In addition, a fully qualified lawyer should be appointed to the Committee of inquiry. The Committee of inquiry shall appoint a chairperson and a deputy chairperson from among its members.

(15) One of the ombudspersons shall be a member of the committee of inquiry, but without voting rights. All voting members have equal voting rights.

(16) The committee of inquiry shall deliberate in closed session and orally. It shall agree on rules of procedure at its first meeting. The members of the Committee of inquiry and the staff members of the INM involved as well as all persons involved in the proceedings or informed about the proceedings shall be bound to confidentiality.

(17) INM shall provide organisational support for the work of the committee of inquiry; in particular, all requested data and documents shall be made available to a committee of inquiry.

(18) The committee of inquiry shall examine whether scientific misconduct has occurred by freely evaluating the evidence. It shall hear the accused person(s) and the whistleblower(s) and may also question further persons and commission and consult experts.

(19) As a rule, the review by the committee of inquiry should be completed within a period not exceeding six months from the constituent meeting of the committee of inquiry.

(20) The committee of inquiry may decide to terminate the proceedings.

(21) The committee of inquiry shall draw up a report either justifying the termination of the proceedings or establishing the scientific misconduct. If the committee of inquiry comes to the

conclusion that scientific misconduct has occurred, i.e. if the majority of the committee of inquiry considers scientific misconduct to be sufficiently proven, the report shall in particular:

- determine whether such conduct was grossly negligent or intentional; and
- assess the seriousness of scientific misconduct
- also state what further action the committee of inquiry recommends (referral to other institutions and bodies, initiation of appropriate measures, etc.).

(22) The report shall be submitted to the parties concerned and to the management of INM. The management shall deal with the report in a timely manner and, if necessary, decide on further measures.

6 CLOSURE OF THE PROCEDURE

(1) The management board shall decide on the necessary measures on the basis of the report of the Committee of Inquiry on the existence of scientific misconduct or on the termination of the proceedings. The following measures may be taken against the person concerned:

- written reprimand, warning or further action under employment law,
- exclusion from INM-internal competitions for project funding and the Leibniz Competition for one to five years (depending on the severity of the scientific misconduct),
- request to withdraw (an) incriminated publication(s) in whole or in part and to correct incorrect data,
- depending on the seriousness of the case: disciplinary, labor, civil or criminal consequences.

(2) If, on the basis of the report of the committee of inquiry, the management of the INM determines that the academic misconduct could necessitate the withdrawal of academic degrees, it shall forward the matter to the awarding university.

(3) The report submitted by the investigating committee as well as the decisions taken by the management close the proceedings within the INM in each case.

(4) The essential reasons which led to the discontinuation of the proceedings or to the management's decision on measures to be implemented shall be communicated to the person concerned and to any whistleblowers.

(5) The outcome of the investigation shall be communicated to the scientific organisations concerned and, where appropriate, to third parties having a legitimate interest in the decision, once the investigation has been completed.

(6) The management of the INM shall decide on the publication of the decisions and reports of the committee of inquiry on a case-by-case basis, taking into account the existence of a legitimate public interest.

Issued at .... by the management of the INM

Prof. Dr. Eduard Arzt	Prof. Dr. Aránzazu del Campo	Günter Weber
Scientific director Chairman of the Board	Scientific Managing Director	Commercial Managing Director