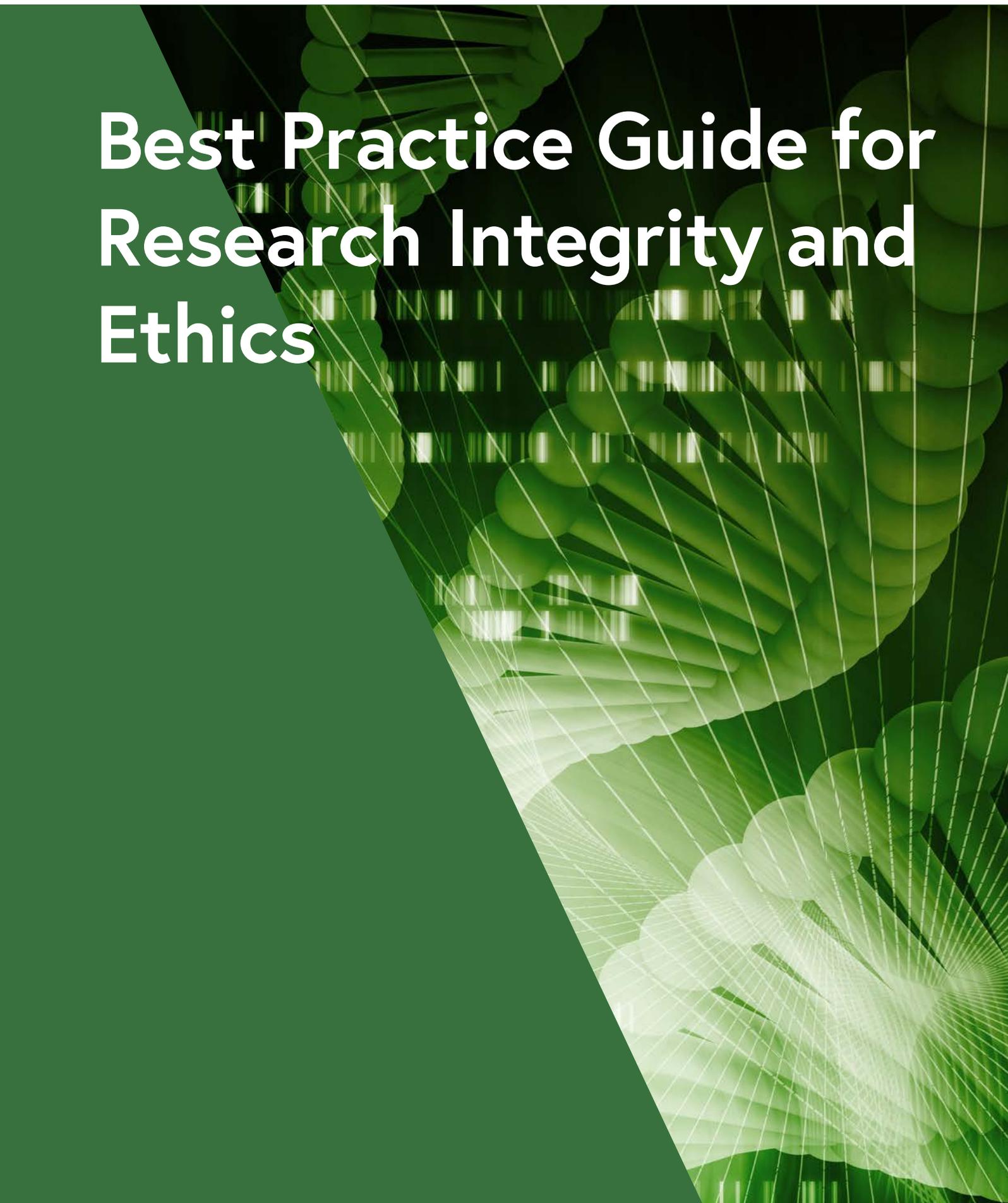# Best Practice Guide for Research Integrity and Ethics

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Acknowledgement

Preamble

The guide for research integrity and ethics presented here is a compilation of standards for good research practice and principles of research ethics. This text drawn up by scientists, researchers, and experts is to be expressly understood not as a legally binding set of rules, but rather as a guide for scientists and researchers from all disciplines and the people in charge at their institutions. These institutions include numerous universities, universities of applied sciences, university colleges of teacher education, non-university research institutes, and funding agencies, funded both publicly and privately. In addition, this text is intended for students and an interested public as many of the topics discussed below are of relevance beyond the scientific community in the strict sense.

This is due not least to the fact that our society attaches particular importance to science and research as they not only provide new insights into every aspect of our lives, but they also make significant contributions to our social and economic development. To help scientists and researchers best fulfil this role, Article 17 of the Basic Law on the General Rights of Nationals ("The Freedom of Science and Its Teaching") guarantees them the freedom of research and teaching in Austria. Science and scientific freedom are inextricably linked to responsibility. Responsible research should not only focus on scientific progress but keep the good of society and the environment in mind—in specific research projects as well as in their management or in terms of their potential consequences.

Owing to the great importance of research and its impact on society, science and its representatives are faced with constantly new challenges not only in their respective fields, but from an ethical perspective as well. The rapid advances in all areas of science and research pose new complex challenges. The position paper presented here takes this into consideration by addressing the responsibility of the researchers and the research institutions. In its examination of the general normative principles of the research process and through its recommendations on specific best practices, these guidelines for good research practice are intended to contribute to raising awareness of research integrity and research ethics in Austria and ensuring the freedom of researchers. Although the guidelines mainly focus on research, aspects of teaching will also be addressed.

To ensure the trustworthiness and quality of research, researchers and their institutions must adhere to the guidelines for research integrity and the principles of research ethics,

which can differ in terms of focus. While the rules of good research practice (i.e., research integrity) mainly ensure responsible, honest, transparent, and fair behaviour on the part of researchers within the scientific community, the rules of research ethics are designed to prevent research and the use of research results from causing harm to people as well as animate and inanimate nature.

Many international publications on these topics deal either with research integrity or research ethics. These guidelines, however, examine both areas together since scientists and researchers must consider and keep in mind both during the research process and their other research activities. The purpose of dividing them into research integrity and research ethics is to make it easier to differentiate between the two areas and thus enhance the relevant competence of the scientists and researchers.

These guidelines are designed to not only facilitate the application of existing standards and rules on research integrity and research ethics but also to encourage independent reflection on them. Therefore, this document is intended to contribute to scientists and researchers identifying relevant issues regarding good research practice and research ethics in their own work and dealing with them in an appropriate manner. At the same time, this document calls upon the responsibility of the research institutions and the ethical sensitivity of the individuals involved. Finally, researchers ought to be encouraged to accept their responsibility to the scientific community and society and to make this responsibility one of the basic principles of their research practice.

Concerning the contents, this best practice guide is divided into three sections. Section 2 discusses the general fundamental principles of research integrity and research ethics, which are closely interrelated with the guidelines on appropriate action (Section **Fehler! Verweisquelle konnte nicht gefunden werden.**). Following that, the guide presents the guidelines for research integrity and research ethics during the research process and from the researcher's point of view (Section 2.2). After that, there is a discussion of the duty of care that research institutions are expected to perform to support research integrity and research ethics on the institutional level and to minimise incentives for misconduct (Section 2.3).

The third section focuses on research integrity committees and ethics committees as well as their respective duties. This section offers research institutions guidance on setting up the relevant committees and the ombudsman and advisory bodies that precede them (Section 3.1).

This is followed by a list of potential suspected cases and violations of good research practice. It is the responsibility of research integrity committees to handle this form of research misconduct (Section 3.2). The subsequent section on ethics committees is addressed to scientists and researchers whose research projects involve legally or ethically relevant issues which should be examined accordingly beforehand (Section 3.3). Finally, the section outlines possible sanctions in the case of research misconduct and possible ways of communicating these to the public (Section 3.4).

The fourth section offers detailed guidance on several important fields of action. These include recommendations on dealing with specific challenges addressed in the guidelines for good research practice and research ethics from the proper way to prepare and store data (Section **Fehler! Verweisquelle konnte nicht gefunden werden.**) to better ways to involve the public (Section 4.5) to the careful use of resources (Section 4.9). These fields of action are subject to dynamic developments, meaning that their focus can shift, and new fields of action may be added. These guidelines are therefore to be understood as a "living document", which will be revised and further developed at regular intervals.

1 Working Group

1.1 Mission of the Working Group

At its meeting on 20 September 2017, the Austrian Higher Education Conference decided to commission the BMBWF to form a "Research Integrity / Research Ethics" Working Group. The mission of the Working Group was to develop recommendations based on the European Code of Conduct for Research Integrity and national and international expertise in the area of "Research Integrity / Research Ethics" for their implementation in Austria and their further development for the Austrian science and research system and its institutions. The institutions are responsible for the practical application of this guide, which should also include consideration of any subject- or topic-specific features.

1.2 Composition of the Working Group

The Working Group was constituted on 13 April 2018, with Prof. Dr. Klement Tockner, President of the Austrian Science Fund FWF, as chairman, and Kmsr. Mag. Lothar Hahn, staff member of the BMBWF, as secretary, and commenced its work in May 2018 with 16 experts. The following participants (in alphabetical order) formed the "Research Integrity / Research Ethics" Working Group of the Austrian Higher Education Conference:

Prof. Dr. Klement Tockner, FWF/ÖAWI (Chairman)

PD Dr. Ole Döring, Karlsruhe Institute of Technology/Austrian Conference of Private Universities (ÖPUK)

Prof.in Dr.in Christiane Druml, Medical University of Vienna

Prof.in Dr.in Iris Eisenberger, University of Natural Resources and Life Sciences, Vienna

Prof.in Dr.in Ulrike Felt, University of Vienna

Dr.in Nicole Föger, ÖAWI

Prof. Dr. Johannes Fröhlich, Vienna University of Technology/uniko

Mag. Dr. Erich Grießler, IHS

Kmsr. Mag. Lothar Hahn, BMBWF (minutes)

Prof. Dr. Ulrich Körtner, University of Vienna

Prof. Dr. Gernot Kubin, Graz University of Technology/Conference of Senate Chairpersons

Prof.ⁱⁿ Dr.ⁱⁿ Barbara Obermayer-Pietsch, Medical University of Graz/Conference of Senate Chairpersons

Prof. Dr. Karl Peter Pfeiffer, FH Joanneum/Austrian Conference of Universities of Applied Sciences

Mag. Nikolaus Possanner, Austrian Science Council

Dr. Marjo Rauhala, Vienna University of Technology/uniko

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Dr.ⁱⁿ Nicole Föger

Dr. Marjo Rauhala

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Klaus Taschwer (*Der STANDARD*)

Prof. Dr. Klement Tockner

1.3 Working method of the Working Group

On the basis of the discussions of the Working Group in 2018 and the resulting text contributions, the editorial team drew up a first draft of this best practice guide in July 2019. This document was submitted to the members of the Working Group for an initial written feedback round; the suggestions for improvement received were incorporated into the document by the editorial team and were discussed again with the Working Group at a meeting in September 2019. After further revision by the editorial team, the new document was reviewed by four experts (two from Germany and two from Austria) in October/November 2019. Their comments and suggestions for improvement were incorporated into the next version (beginning of December 2019), which was submitted once again to the Working Group. The current version was prepared in January 2020 on the basis of the final suggestions for improvement from the Working Group, reviewed by national and international experts, and was then finalised by an editorial board appointed by the Austrian Higher Education Conference in September 2020.

2 Guidelines for research integrity and research ethics

2.1 Important basic principles

The guidelines for research integrity and research ethics outlined below are based on several basic principles, which in turn are guided by the overarching principle of responsibility. This responsibility is particularly important at the individual level of the researchers and teachers as well as at the institutional level. In the context of research ethics, responsibility means that researchers or representatives of research institutions must respect and protect the welfare of people and the animate and inanimate environment as well as bear in mind the potential impact on society and the environment and avoid causing harm. Naturally, researchers, teachers, and research institutions also have a responsibility to the scientific community. They therefore adhere to good research practice and support junior scientists and researchers to the best of their knowledge and belief (see Section 4.7).

A crucial factor in the actual practice and continuous further development of research integrity and ethics is the researchers' competence in this respect. Research institutions should take responsibility for fostering and promoting this, which in turn represents one of the fundamental concerns of these guidelines.

Principles of research integrity

Responsible research activity should be based on the following five additional basic principles which are closely interrelated: independence, honesty, scrupulousness, transparency, and fairness; their importance for research can be briefly outlined as follows:

- Independence means not allowing the choice of method, assessment of research data and materials, and the weight attributed to alternative statements nor the assessment of others' research to be guided by political, economic, ideological, or similar factors. Independence therefore ensures the best possible objectivity and impartiality throughout the entire research process.

- Honesty means ensuring impartiality throughout the entire research process, i.e., avoiding unfounded claims and promises, or refraining from presenting research results more favourably or unfavourably than they are.
- Scrupulousness means applying methods in accordance with the state of the art *(lege artis)*, developing and implementing research processes with great care, and reporting on the research in an appropriate form.
- Transparency means ensuring that it is clear what data, materials, and methods the research was based on and how the results were achieved. The line of reasoning must be clear, and the individual steps in the research process must be verifiable. Transparency must also be ensured in terms of potential conflicts of interest, both of a financial or other nature.
- Fairness means treating other researchers fairly and with respect throughout the entire research process. Fairness towards other researchers is especially important in the review processes and in the investigation of research misconduct.

These principles can be distilled into the following guidelines for good research practice for the different stages of the research process. Specific strategies, processes, and procedures for compliance with them are to be defined by the research institutions.

Principles of research ethics

Apart from basic principles of research integrity, there are also several basic principles of research ethics for the protection of third parties—of people, animals, the environment, and society. Particularly in biomedical and clinical research, such principles have long been established and set out in international declarations. Together with legal requirements, research ethics forms important guidelines for the reviewing activities of ethics committees.

- Autonomy/self-determination (including respect for the dignity and integrity of human beings) acknowledges the right of individuals to make their own decisions. The informed consent process for participation in studies and the ban on the instrumentalisation of human beings are based on the autonomy principle.
- The principles of beneficence and non-maleficence encapsulate the moral obligation to minimise the potential harm of a research project. It should be borne in mind here that the risk of harm is multidimensional and can comprise physical, mental, social, financial, or ecological dimensions.
- Justice encompasses fairness, equal treatment, and the distribution of resources. The key question is who ought to receive the benefits of research and bear its risks and

burdens. The principle of justice thus also applies to the selection of participants and test subjects of studies.

2.2 Good research practice and ethical issues during the research process

Obligations of good research practice for researchers

Scientists and researchers should take into account several fundamental considerations concerning research integrity and research ethics already during the planning stage of a new research project. In this first stage which deals with the research questions and the research design, it must be ensured that, taking into account the current state of research, the planned projects are scientifically relevant and make a novel contribution to the state of research. In addition, it should be determined in advance whether the research questions can be answered using the chosen research design and whether the methods employed are well-founded, appropriate, and conform to the current state of the art.

Regarding research funding, it is recommended that researchers ensure the greatest possible transparency and reflect critically on the integrity of the funding body. This involves researchers disclosing the role of any external interest groups, project participants, and any resulting conflicts of interest as early as when applying for funding. Contract research should only be accepted if it falls within the area of one's own expertise and if it is consistent with the guidelines for good research practice (see Section 4.4).

If the project is to be carried out together with research partners from other institutions, written cooperation arrangements should be concluded in advance that set down in writing the issues concerning research integrity—in particular, what body and what guidelines will be used in the case of disputes— or the shared use of research data and research materials. This is intended to ensure that there is no lowering of standards (ethics dumping) when working with research partners from other countries. In case of doubt, the stricter standards should always apply.

The researchers should not allow themselves to be influenced by economic, political, ideological, or personal interests in the assessment of the results and in the consideration of possible explanations. Research data and materials and the research results associated with them may not be altered or omitted without explicit and reasonable grounds. The

researchers should ensure that sources are verifiable and research data and materials used and collected are described as precisely and clearly as possible.

When publishing the results arising from the project, all those who contributed to the research process should be mentioned in accordance with their contributions. The fair mention, attribution, and order of authors should conform to the standards of the discipline. Particularly in the case of interdisciplinary projects, arrangements should be made as early as possible on which standards will be applied. To be named as an author, scientists and researchers should have made at least demonstrable contributions in one of the following areas of research: research design, preparation of research data and materials, their analysis, and/or their interpretation. The type of the author's contribution should be documented in the publication as precisely as possible. It is also important that all authors have agreed on the final version of the research results before their publication. Author status comes with the responsibility for the content of the publication unless indicated otherwise.

The presentation of the sources, materials, data, and arguments should be precise and scrupulous. The methods used and the respective steps of the entire research process must be clear. The manner in which the outcome was achieved and its interpretation should be presented in a transparent way. As a rule, the results and the manner in which they were achieved are to be described in as much detail as possible to make the collection and analysis of the research data and materials reproducible. This means, for instance, that researchers explicitly disclose all relevant research data and materials—in particular, those that could possibly lead to other conclusions (see Section **Fehler! Verweisquelle konnte nicht gefunden werden.**).

The presentation of the results and conclusions as well as their implications should be as unambiguous as possible. This especially concerns any uncertainties and contradictions that could be relevant for the interpretation of the research data and materials as well as the results.

If ideas, methods, results, or texts of others have been used, this must, in any case, be indicated by citations, where the original publication should always be referenced. At the same time, the reuse of previously published texts of one's own publications must be avoided or explicitly indicated as such. In particular, unnecessary self-citations, superfluous references, and unnecessarily long lists of references (bibliographies) should be refrained from to avoid influencing bibliometric indicators. References to the research

data and materials should be included in the publication so they can be used for any meta-analyses.

Research funds are to be used by the scientists and researchers in line with the research objective.

Researchers do not unduly prevent or delay the work of other researchers. They point out non-compliance with standards by other researchers and inadequate responses on the part of institutions if there are sufficient grounds. It should be ensured that there is a way to provide anonymous information. At the same time, any intentionally false allegations of research misconduct must be punished accordingly.

Guidelines for research ethics during the research process

Researchers are recommended to consider already during the planning stage of a project whether the methods, findings, or technologies developed by them could be misused for other purposes in order to be able to take any appropriate precautionary measures beforehand, if necessary (see Section 4.8). In the initial stage, researchers should refrain from making any premature claims about potential results because these can raise unfounded hopes and expectations. This runs contrary to the principles of research integrity and research ethics.

In advance of the project and before applying for research funding, researchers must above all determine if the planned project involves any aspects that are ethically and/or legally relevant, such as negative consequences for participants and test subjects, animals, the animate and inanimate environment, society, or future generations.

In cases of doubt, researchers can contact the appropriate advisory body of their research institution or funding agency. If there are ethically and/or legally relevant aspects to the research (risks associated with participation, minors are involved, or the methodical and conscious deception of participants, e.g., the Milgram experiment), it is recommended to obtain the appropriate reviews and approvals from the relevant ethics committee before beginning work on the project.

If the planned study is to be carried out on or with people, it is also necessary to obtain the informed consent of the study participants. They must be informed of the aim of the research and the potential risks and benefits in an understandable manner. This also applies for all disciplines, from the life sciences to the natural and technical sciences to the

humanities and social sciences to arts-based research. This therefore ensures that the cooperation of participants or test subjects is voluntary and well-considered.

The research project is carried out to the best of the researchers' knowledge and belief. In general, the dignity and the welfare of people and animals must be respected and protected and unnecessary burdens on and risks to society and the environment must be avoided. If during the course of a study it becomes apparent that the study is having unforeseen negative consequences on people, animals, and the animate and inanimate environment, the study should be stopped where necessary, based on a consideration of the gravity of the adverse effects. At the same time, measures should be taken for dealing with these consequences.

Ethics dumping can be an issue in international collaboration. This is the case if unethical research practices from a high-income environment are exported to a resource-poor environment. This concerns, on the one hand, deliberate exploitation, for instance, if researchers carry out their work in resource-poor countries because the research work is forbidden in their own environment. On the other hand, there is exploitation due to inadequate knowledge or insufficient ethical awareness. A lack of appropriate oversight mechanisms on site can further exacerbate the problem.

In all stages of research, advisors, principal investigators, and the research management should take responsibility for creating an open and inclusive research culture. They should refrain from any actions or measures that would encourage researchers to disregard the standards mentioned here regarding research integrity and research ethics.

2.3 Responsibility and duty of care of research institutions

Responsible research institutions should take a variety of measures to develop a culture of research integrity and research ethics. This could be done by incorporating them into internal guidelines, promoting communication and training, as well as by improving competences on all levels and providing sufficient resources.

Research institutions should ensure a working environment that promotes research integrity and research ethics and compliance with them. This would mean that researchers can work in a safe, inclusive, and open environment, which enables them to express their concerns and discuss mistakes without fear of consequences.

To offer an environment favourable to research, research institutions must promote an institutional awareness of research ethics and integrity and provide the appropriate competences. In general, teaching and training activities should focus strongly on ethical aspects of research and demonstrate research integrity. Research institutions should also offer education and training for all those involved in research and support participation in such courses.

To ensure a culture conducive to research, it would be beneficial for the research institutions to provide their employees with the relevant regulations, guidelines, and protocols on research integrity and research ethics. This should also apply to guidelines concerning the disclosure of sources of funding and conflicts of interest. The aim is to improve the researchers' competence regarding what constitutes good research practice and ethics in their disciplines and at their institutions. Research institutions are recommended to provide the necessary financial resources and to take action when these guidelines are not followed and when violations occur.

Measures for enhancing research integrity

Research institutions should ensure that researchers at the beginning of their careers are provided with qualified advisors (see Section 4.7). Research institutions must ensure fair and transparent procedures for applications, appointments, promotions, and remuneration. Performance-based assessments should be done responsibly on the basis of clear and transparent criteria which not only pertain to the quantity of research results but provide a comprehensive picture of the researchers' work (see Section 4.3).

To ensure an open, safe, and inclusive research culture, it is necessary that researchers discuss the standards for good research practice, mutually agree to adhere to these standards, and are prepared to report any reasonable suspicions of violations of these standards to the appropriate committee or responsible person. In this regard, anonymous tips should also be allowed if they are justified accordingly.

With regard to the publication and dissemination of research results, research institutions should ensure that contracts with the clients and funding organisations contain fair agreements about the rights, access, publication, and reuse of data and research materials and that the research results are disseminated to a broad public in a scrupulous way (see Sections 4.2 and 4.5).

Finally, it is recommended that research institutions establish research integrity committees that investigate suspected cases of research misconduct. The research institutions should make the names of the members of this committee and their contact details generally available. It is suggested that research institutions ensure that ombudspersons and research integrity committees are independent and free from directives and that there are no conflicts of interest.

Measures for enhancing research ethics

Research institutions should create structures that support researchers in recognising and fulfilling their obligations to third parties (participants, test subjects, animals, the environment, and society). These include, for instance, measures for research ethics training and competence development. The primary way institutions can protect research participants is by requiring research projects to undergo an ethics review by the relevant ethics committees.

Not only study participants, but researchers can be exposed to mental, physical, or social risks. Research institutions should also take appropriate precautions and safeguards. The training and supervision of junior scientists and researchers is particularly important here.

Ethics committees play a key role in ensuring that research ethics standards are observed. Freed from directives, these bodies conduct critical reviews, primarily of applied research on or with people. This not only applies to biomedical research but to all projects whose research includes people and their data. Research institutions are recommended to establish ethics committees, provide them with adequate administrative and financial support, and to post the procedures and guidelines of these committees on their institution's website (see Sections 3.1 and 3.3).

3 Ethics committees and research integrity committees

Research institutions should be interested in creating an environment in which good research practice is taken for granted and researchers enjoy a great deal of trust. A key component in building trust is a clear commitment to supporting good research practice and raising ethical sensitivity as well as the institutionalisation of research integrity committees and ethics committees. The establishment of such committees is also recommended for reasons of research practice. The awarding of funding is increasingly dependent on the existence of such bodies at the research institutions where the research will be conducted.

To give expression to the great importance of these committees for the respective research institution, they should occupy as prominent and as independent a position as possible within the organisation. It is recommended for universities to regulate the establishment and duties of these committees by means of their statutes.

3.1 Guidance for establishing committees

In the composition of committees, it must be ensured that they consist of scientists and researchers with relevant expertise in the respective field and legal as well as ethical knowledge (in ethics committees). In addition, they may include experts with specific expertise or experience in a particular field. It should also be possible for members of the committees to receive continuing training and further education on new developments and relevant regulations and guidelines.

If the research institution is too small to establish such committees, or if the institutional ethics committee lacks the competence to review a research topic, it is recommended to make arrangements with larger institutions or to create joint committees with other institutions. In the case of an investigation of research misconduct, the Austrian Agency for Research Integrity (ÖAWI) can be used as the national contact point.

Information on how to contact the ethics committee, the ombudspersons, and the research integrity committee should be easy to find and published on the institution's

website. It is also recommended to post general information on the investigation procedure on the website.

It is recommended for the persons involved in conducting the investigations to develop guidelines for avoiding conflicts of interest. Independent external experts can be consulted. Any conflicts of interest should be disclosed, and persons with conflicts of interest should not be involved in the deliberation and decision-making process.

Committee members and ombudspersons must be able to work independently, free from directives, and without outside influence. The research institutions should ensure appropriate protection from wrongful lawsuits or libel, for instance, by taking out legal protection insurance.

The decisions of the committees should be communicated promptly to the parties concerned. It is generally recommended to document and publish all investigated research projects or cases of research misconduct including the decisions, while maintaining data privacy at all times.

3.2 The duties of research integrity committees

If there is a suspected violation of the guidelines for good research practice, this should be reported within the research institution to the relevant research integrity committee or responsible person. It is recommended to also appoint a neutral person as ombudsperson with whom researchers can consult before reporting the suspicion to the research integrity committee.

Research misconduct occurs when researchers intentionally, knowingly, or recklessly violate the guidelines for good research practice. Researchers act intentionally when they consider a violation of the standards for good research practice possible and accept that possibility when conducting research. Researchers act knowingly when they consider a violation of the standards for good research practice not merely possible, but certain. Finally, researchers act recklessly when they show a blatant disregard for due diligence in a given research context and therefore fail to recognise that they are grossly violating the standards for good research practice.

The most common types of violations, which must always be dealt with on a case-by-case basis, include:

- the fabrication of data, for instance, the fabrication of research results (measurements, observations, statistics);
- the falsification of data, for instance, by manipulating the research process, altering or selectively omitting data that contradict the research proposition, or the misleading interpretation of data with a view to obtaining a desired result;
- plagiarism (for its definition, see Universities Act Section 51 para. 2 no. 31); plagiarism occurs when researchers present the content or ideas of others as their own in texts. This encompasses, in particular, the appropriation and use of text passages, theories, hypotheses, insights, or data through direct, paraphrased, or translated rendering without identifying and citing the source and author(s). This also includes the use (including publication) of others' research ideas or plans that came to the researchers' attention in a confidential context (for instance, in the course of a peer review or other review procedure);
- the unjustified refusal to provide access to primary and original data including information on how such data was obtained, or the disposal of such data before the applicable retention periods have passed;
- obstructing the research activities of other scientists and researchers as well as other unfair attempts to undermine the scientific or scholarly reputation of other researchers; in particular, this includes anonymous, non-specific, and unjustified allegations of violations of the standards for good research practice;
- sabotaging research activities; in particular, damaging or destroying experiments, equipment, documents, hardware, software, chemicals, or other materials that other researchers require to carry out their research;
- providing inaccurate information in grant proposals;
- creating disadvantages to the career advancement of junior scientists and researchers who have reported potential research misconduct;
- research misconduct can also include involvement in other persons' violations of the standards for good research practice, for instance, active involvement in the misconduct of others, co-authorship of publications based on falsified data or otherwise generated through violations of the standards for good research practice, or neglect of supervising obligations.

This list is by no means complete but merely serves as a guide and it should be updated regularly. Other forms of noncompliance with guidelines for good research practice can

fall under the category of unacceptable and/or questionable research practices, which must always be evaluated on a case-by-case basis.

Critical comments expressed in academic debate or mistakes made in good faith, on the other hand, do not represent instances of research misconduct.

If the committee members and the ombudspersons are informed of a suspected case of research misconduct, they should endeavour to make an initial assessment of the matter. This means that they should check whether there is sufficient evidence to open an investigation or whether further information or documents are required.

It is also recommended to determine whether the suspected case could actually concern a violation against the standards for good research practice, and whether it has already been investigated by another institution. The person suspected of misconduct should be asked to make a statement as soon as possible. It must also be determined if other research institutions (based on contractual agreements) or publishers must be informed.

Fairness, confidentiality, transparency (regarding the processes and guidelines), and thus the protection of all participants must be ensured during hearings with the persons involved and throughout the investigation. This also applies for the time after the completion of the investigation. It is also important to ensure proper documentation of the statements of all those involved.

The final opinion of the committee should serve as the basis for the conclusion of the investigation. The investigation must end with the committee's clear and justified statement on whether the specific case concerns research misconduct or a violation against the guidelines of good research practice.

3.3 The duties of ethics committees[1]

The ethics committees already established or those to be established at research institutions play an essential role in compliance with the legal and ethical requirements regarding research. Ethics committees are protected by law in Austria for biomedical research on and with people. In terms of research on and with animals or other ethical

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[1]   See also the "Ethikkommissionen in Österreich" forum, http://www.ethikkommissionen.at/ (Effective: 8 September 2020).

aspects of research, institutions are increasingly starting to establish relevant ethics committees or boards as well. Their primary duty is to carry out plausibility checks of planned studies and prevent people, animals, and the environment from being harmed by research. Biological safety committees are also protected by law and are intended to protect people and animals (as well as the environment) when dealing with genetically modified organisms. All these committees are responsible for the proper conduct of research and foster the public's trust in research. At the same time, they must also fulfil their commitment to the scientists and researchers by providing them with support and safety in carrying out their research and protection from unjustified attacks.

The research ethics reviews carried out by an ethics committee can be relevant in all fields of research. The legal and ethical competences of ethics commissions must cover the entire research portfolio of the respective institution.

The main duties of ethics committees are 1) to conduct an ethical review of research protocols and their supporting documents, and 2) to prepare reviews and opinions on research projects which involve legally or ethically relevant issues. This concerns research projects on and with people, on human embryos and foetuses, on identifiable human cells or tissues, or with personal data. This includes, in particular, studies that could threaten the physical or mental integrity, the right to privacy, other subjective rights, or the prevailing interests of test subjects.

Research on and with animals that goes beyond mere observation or medical care is also ethically and legally relevant. This is particularly the case where research involves the manipulation of animals or the killing of an animal for the purpose of organ or tissue removal, or the creation and use of transgenic animals.

In addition, ethics committees should deal with research projects with a high potential for negative effects on the environment, health, and safety; use by the military (dual use); or misuse of results and research objects (for instance, highly infectious viruses and bacteria) (see Section 4.8).

The ethics committee's review of research projects is based on several basic criteria which include, for instance, autonomy, non-maleficence, and justice (see Section **Fehler! Verweisquelle konnte nicht gefunden werden.**). The general rule is that research projects should minimise potential risks as much as possible. To achieve this goal, test subjects, for example, must be given appropriate consent forms and specific measures must be taken

for vulnerable groups of persons. Other criteria include fair procedures for the selection of participants (for instance, for clinical studies) and a consideration of the potential effects of the research on the groups or communities from which the test subjects are drawn.

Specifically, the responsible ethics committee assesses whether the protection of the rights, safety, and welfare of the study subjects and compliance with the laws on animal welfare and animal testing have been adequately ensured when implementing the research project. Ethics committees therefore investigate, for instance, the selection of test subjects or the obtaining of their consent for participation in the study. The relevant federal ministry is responsible for the approval of animal testing projects carried out in higher education. Proposals from the non-university sector (for example, from industrial research) fall under the authority of the federal state authorities.

The key legislation that is relevant for ethics committees and their members includes the following: the Universities Act 2002 (UG 02), as amended by Federal Law Gazette I no. 3/2019; the Research and Technology Funding Act (FTFG), as amended by Federal Law Gazette I no. 61/2018; EU Regulation 2016/679 of the European Parliament and the European Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and the free movement of such data and repealing Directive 95/46/EG (General Data Protection Regulation); and the Federal Act on the Equalisation of Persons with Disabilities (Bundes-Behindertengleichstellungsgesetz (BGStG)), as amended by Federal Law Gazette II no. 59/2014. Further legislation that is relevant for ethic committees include the federal law on the manufacture and marketing of medicinal products (Austrian Medicinal Products Act), as amended by Federal Law Gazette I no. 23/2020; the federal act on the protection of monuments due to their historical, artistic, or other cultural importance (Monument Protection Act (DMSG)), as amended by Federal Law Gazette I no. 92/2013; the federal act that regulates the work with genetically modified organisms, the release and marketing of genetically modified organisms, and the use of genetic analysis and genetic therapy on people (Genetic Technology Act), as amended by Federal Law Gazette I no. 59/2018; the federal act on hospitals and sanatoriums (KAKuG), as amended by Federal Law Gazette I no. 3/2020; individual hospitals acts of the federal states; the federal act on medical devices (Medical Devices Act – MPG), as amended by Federal Law Gazette I no. 23/2020; the federal act on the protection of animals (Animal Protection Act (TSchG)), as amended by Federal Law Gazette I no. 86/2018, or the federal act on the experimentation on living animals (Animal Protection Act 2012 (TVG 2012)), as amended by Federal Law Gazette I no. 31/2018; and

the constitutional provisions relating to sustainability, animal protection, and comprehensive environmental protection.

As research ethics obligations sometimes go beyond the legal requirements in exceptional cases, the guidelines and principles of national and international funding institutions as well as national and international professional societies, umbrella organisations, or committees could be relevant in certain research projects carried out as part of international collaborations.

3.4 Sanctions and publication in cases of research misconduct

The committees described above cannot impose any sanctions but only assess the severity of the violation. Sanctions are the responsibility of the management of the research institution. In the case of research misconduct, both in terms of research integrity and research ethics, these sanctions can be imposed differently depending on the type of institution (research institution, funding agency, or publisher) and should be proportional to the severity of the violation. Furthermore, it is recommended that international research teams discuss which guidelines for good research practice and research ethics shall apply in their project.

Possible sanctions of funding agencies could consist, for instance, in the revoking of funding approvals or grants, in stricter reviews in the case of future funding applications, in a temporary ban from submitting project proposals, in bans from the role of reviewer or similar roles, and could extend up to the obligation to repay grant money (see also, the FWF procedure).

Research institutions have the possibility to impose administrative and academic sanctions (e.g., revocation of academic degrees). The sanctions or follow-up action that research institutions can impose include, for instance, the suspension of research activities or the restriction of supervision activities. An international comparison has shown that, in severe cases, sanctions such as restrictions on the possibility to acquire external funding, to submit publications, or to attend conferences can be imposed. If academic publishers are involved, they must be informed in the case of gross violations so they can issue sanctions, retractions, or corrigenda, if necessary.

Apart from potential sanctions, other measures such as supervisions, additional training and education, or mediations may be appropriate. Systemic problems (e.g., in specific institutes, research groups) should always be considered, addressed, or investigated, with the aim of avoiding these in future and improving the research culture at the institute or within the group.

The guidelines should also include a description of whether and how investigations of research misconduct are communicated so consistency and fairness can be ensured throughout the entire process. It must be clear whether and how the beginning of an investigation or a final opinion will be announced or published. They should also clearly indicate if anonymised summaries are to be included, for instance, in annual reports or posted on the website.

If a case has already attracted public interest, it is recommended that the institution communicate about it in an open and transparent manner and notify the people involved beforehand.

4 Fields of action for good research practice and research ethics

The following will take a closer look at some key fields of action which, in the authors' view, are indispensable for the implementation of good research practice and research ethics. Research institutions should establish specific rules for these fields of action.

These fields of action are subject to dynamic developments, meaning that their focuses can shift, or new fields of action may arise. Therefore, the fields of action must be constantly monitored and further developed.

4.1 Proper preparation of research data

The quality of a study's results depends largely on how the study is planned and, more specifically, on how a frequently abstract research question is operationalised. Particular care must be taken when planning the study that the choice of research data and similar research materials does not lead to biased results. Precise documentation of a high-quality study design ensures the reproducibility and thus the credibility of research results.

The overall aim is the general validity of a scientific or scholarly statement. However, it is recommended and usually necessary to define inclusion/exclusion criteria. These can delimit the sphere of validity of the statements, but they must not influence the correctness of the study and must be documented as well.

The analysis of research data and materials should be done with a specific purpose and goal in mind and their information content should be used optimally. The analyses must observe the relevant ethical and professional standards. The presentations and the interpretations of the results must be published without bias and manipulation.

Research data management is particularly important for quality assurance. This begins with the definition of and the plan for the research data in paper-based or electronic form. An integrated plausibility check makes a significant contribution to ensuring data quality.

Following the completion of a study, the research data and materials should be safeguarded in a way that prevents subsequent manipulation. In addition, it should be ensured that the original data are still available in a machine-readable format, whenever possible, even after an extended period of time. As part of this storage, the corresponding metadata should also be archived in a sustainable and accessible manner. The legal provisions, especially the General Data Protection Regulation, must be observed when dealing with personal data (for instance, qualitative interviews).

It is recommended that the institutions provide the appropriate infrastructure to ensure good data management. Such data management allows for the permanent storage and management of research data and materials and the corresponding metadata, regardless of whether these are published or not. The Austrian Agency for Research Integrity recommends ten years as an appropriate retention period.

The research institutions draw up rules on the copyright and exploitation rights to the research data and materials.

It should also be ensured that the data are accessible in accordance with the FAIR Principles (Findable, Accessible, Interoperable, Re-usable) and the necessary confidentiality is maintained. The research institutions should provide information on the form in which the research data and materials must be available (see for this the next section on Open Science).

4.2 Facilitation of Open Access and Open Science

Researchers and research institutions should act in accordance with the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities and create the conditions to enable open access to research publications and research results on the internet. A further aim should be to provide open access to the entire research cycle as far as possible. This new form of research practice known as international Open Science or Open Research should make research results more reproducible and available to a broad audience. The fundamental principle and aim of Open Science is to provide open access to scientific and scholarly research results.

Several guidelines need to be observed to achieve open access: one important requirement is that publishers establish documented standards for quality control and

research integrity. The publications (including the underlying research data and materials as well as the corresponding metadata) in the form of journal articles, monographs, anthologies, proceedings, or similar publications are made available on a permanent and open basis under an open license for easy reuse.

It must therefore be ensured that the authors or their institutions can retain the copyright to the publications. This ongoing change in the academic publishing world is intended to provide the greatest possible transparency on contractual arrangements and costs with the service providers of scholarly publications (i.e., primarily academic publishing houses).

In addition to publications, research data and materials including the corresponding metadata are a key component in the verifiability and reproducibility of research results (see Section **Fehler! Verweisquelle konnte nicht gefunden werden.**). Research data and materials should, at the very least, always be made freely accessible when they serve as the basis of scholarly publications and there are not any legal, ethical, or other documented reasons preventing their availability. This means that according to the FAIR Principles they must, for instance, be made open access simultaneously with the publishing of the publication; be archived in a registered repository; be able to be reused without restrictions; and be citable by a persistent identifier.

It is recommended that research institutions provide the best possible support for open access to scholarly publications and research data. Open access of publications and data should be used as a separate category of research performance and assessed positively.

4.3 Fundamental principles of research evaluations

The assessment of research performance is one of the key tasks of researchers and research institutions. They not only undertake assessments of research proposals, manuscripts intended for publication, other researchers, institutions, research programmes, or entire disciplines, but they themselves are evaluated time and again. Such assessments must observe high ethical standards. The principles listed below should serve as a guideline.

In the exercise of their responsibility, researchers proceed with assessments in an honest, transparent, and scrupulous manner; review only the areas within their scholarly expertise; and provide detailed reasons for the outcome of their assessment. The

information they acquire in the context of the assessment process may not be used by them without the explicit consent of those reviewed. Researchers also do not abuse the system to generate additional citations for no apparent reason, with the aim of increasing one's own or other researchers' publication scores (citation pushing). They refrain from making an assessment if any doubts could arise regarding their independence because of possible commercial, financial, or personal interests, or if the research question is outside their area of expertise. They also do not work for publishers (for example, predatory journals) that do not meet the necessary quality standards.

In general, the assessment of research performance should focus primarily on the quality of the research. If non-research related factors are used, these must be explained and be made transparent. The reviewers are requested to carry out evaluations in a timely, fair, and detailed manner. Confidentiality must be observed, and any conflicts of interest must be disclosed. The reviewers may not derive any benefits from the information they obtain during the exercise of their duties.

The presentation and assessment of the research performance should consider the entire spectrum of research results, including transparency about negative research results. It is important to ensure a responsible use of indicators. Finally, it should be part of the evaluation culture to disclose any financial or other forms of compensation for the review activities. At the same time, universities and other research institutions should focus more attention on the evaluation activities of researchers in their performance reviews. To this end, researchers should also document their evaluation activities.

4.4 Guidelines for consulting activities

Research consulting plays a significant role in the activities of many research institutions. Clients can include political institutions and decision-makers as well as companies and civil society institutions such as NGOs. The need for separate guidelines is reflected in the growing demand for the diverse range of research consulting activities. The principles of good research consulting outlined below should be made known to the researchers, their institutions, and the clients and be published by the research institutions before the start of the consulting activities.

In general, research consulting covers a wide range of activities of many different kinds. Therefore, it is recommended that the respective institutions define these diverse

consulting activities as precisely as possible. This includes the research institutions making it clear which groups of people in which employment relationships will fall under the guidelines to be developed.

A key principle in the development of guidelines concerns the transparency of the respective consulting activities, which requires a consideration of several dimensions. Transparency must be ensured in any case before the consulting activities begin, and it should also be considered in the process of commissioning and execution, the communication of results, the disclosure of interests and possible conflicts of interest, and dealing with attempts at manipulation.

It is furthermore recommended to state in the guidelines that researchers must commit themselves to epistemic clarity in their recommendations. This means that the recommendations must be based on clear scientific evidence and that any reservations and uncertainties about the recommendations should not be concealed.

Finally, research institutions should ensure that research consulting activities are covered by their quality assurance procedures. This includes, first, guidelines which define 1) the manner in which and 2) the project volumes from which researchers have to notify their institutions of any consulting activities. Second, researchers should receive competent advice from their institutions on potential conflicts of interest and issues of ethical tenability. The creation of clear guidelines on confidentiality and discretion are recommended for the activities of and reporting to such monitoring and advisory bodies.

4.5 Enhancement of public involvement

A substantial portion of the research in Austria is funded by the public sector. For this reason, among others, it is recommended to involve the non-scientific public in an open and transparent manner. Such involvement is also important because research results can have a wide range of implications for society and each individual.

It should be explicitly stated that involving the public does not restrict the freedom of research and that it should also be done to open new fields of research, raise awareness and support for science and research in society, and improve its integration in society. Society's trust in science and its public support are essential for the successful development of research and its funding.

Furthermore, the stronger involvement of relevant stakeholders and interested laypeople as well as patient groups can contribute to improving scientific knowledge. Another important argument for more interaction between researchers and the public is that disinformation is growing in influence due to social media. It is therefore the responsibility of researchers to counter this false information with their scholarly expertise.

The involvement of society should not begin with the communication of results but should take place earlier in the research process, in a form appropriate to the particular topic. As such, public involvement in research would not be regarded as merely the "extra credit work" of individual researchers but as something that requires institutional support and recognition.

Science communication is an instrument suited for achieving these goals. This includes, in particular, the generally understandable communication of complex scientific content for an interested non-scientific audience. Researchers and research institutions should be encouraged to use different channels to address as wide a public as possible and raise their interest in science and research while at the same time being open to feedback from this same public.

Other ways of involving the non-scientific public are participatory approaches, such as citizen science, citizens' conferences, or participatory technology assessment, which are characterised by the active inclusion of practical knowledge and/or interested citizens in the carrying out of research projects. Citizen science or other similar transdisciplinary approaches should be used especially in situations where they are a suitable method for answering research questions. In addition, efforts can be made to find new approaches for involving the public in research funding in an appropriate manner. Ideally, this would not only make science and research more transparent but also more understandable. This, in turn, helps the public to make connections between science and research and their lives.

4.6 Promotion of equal opportunities and diversity

Social diversity among researchers is associated with a productive variety of topics, approaches, subjects, methods, and opinions in science and research. As such, a social diversity of researchers and the prevention of discrimination on the basis of gender, ethnic origin, sexual orientation, religion, ideology, disability, age, or socioeconomic status can also make a contribution to the quality of research.

In addition to the gender mainstreaming measures already in place, the concept of diversity management has been established over the last few years to promote diversity and equal opportunities in the Austrian higher education and research sector and to minimise discrimination. This also corresponds with the latest extension of the Equality Act, which also includes other dimensions of diversity besides gender and thus constitutes an important legal basis for counteracting discrimination.

The Austrian University Development Plan 2019-2024 has also identified "Equality and Diversity" as one of a total of seven system goals. The main implementation goals are to achieve a balanced gender representation among all member groups of research institutions, to improve social inclusion, and to establish a diversity-oriented culture of equality at research institutions.

Currently, career opportunities for men and women are still unequal in science and research. According to the SHE Figures Report of the European Commission, women in Europe face greater difficulties than men in advancing to the highest academic positions. According to this report, Austria also still lags behind in the share of female researchers compared to the EU average.

One reason for this is that the hiring and promotion decisions are sometimes based on subtle practices of institutional discrimination: seemingly neutral rules and criteria which have different impacts on different groups are used to maintain the existing (gender) ratios. Although research excellence is touted publicly as the deciding factor, certain biases in the evaluation practices can disadvantage women and other groups in science and research.

Continuous awareness raising is required to recognise and fight implicit biases. Over the last few years, some things have already changed for the better at Austrian universities, especially in terms of equality and gender justice. This primarily concerns the development of gender competence.

4.7 Support for students and junior researchers

As is already common practice, all research institutions are encouraged to establish guidelines for good research practice as an important part of the education of students and the promotion of junior researchers. At the same time, teachers are urged to observe

the guidelines for good research practice in the supervision of students and the promotion of junior researchers. In general, quality and supervision standards should be used to create an environment at the institutions which promotes responsible research practice.

These include, for instance, curricular priorities throughout the course of a student's studies based on the fundamental principles mentioned at the beginning such as independence, honesty, scrupulousness, transparency, and fairness, as well as the overarching principle of the responsibility to teach good research practice and research ethics.

It is recommended to incorporate these priorities into central modules of the study programmes (introduction to research work, bachelor seminars, etc.) and to establish them as a "constant companion" in the teaching and training curricula. Specific characteristics of the respective research field should be taken into consideration and specific cases from research practice should be examined and discussed.

Appropriate funding structures should be offered, as far as possible, to junior scientists and researchers, especially as junior researchers are faced with particularly high expectations and pressure to succeed in a system increasingly oriented towards competition. It is therefore recommended to develop principles for the supervision of junior researchers early on and oblige the heads of the individual research work units to observe them.

It is particularly important in connection with situations of dependency that research institutions create contact points for suspected cases of mental and physical abuse. These could take the form of misuse of power, bullying, sexual abuse, sexual harassment, sexualised violence, or stalking. To prevent these from occurring in the first place, it is recommended to take preventive measures and offer appropriate training courses.

The quality of education and the supervision of students and junior scientists and researchers largely depends on the integrity and expertise of the teachers and researchers. It is therefore recommended to provide these with regular training on the standards for good research practice and, if possible, require them to take part in this training.

4.8 Avoidance of the misuse of research

Research in all academic disciplines can have unexpected consequences which outweigh the positive aspects of new findings or developments. It is in the nature of things that it is very difficult to anticipate such unintended consequences. At the same time, it is important that researchers develop a sensitivity for this—especially for those areas in which the risk of misuse can be expected.

Some disciplines and topics are particularly at risk for misuse—for instance, research on highly infectious viruses and bacteria or in the field of cybersecurity. This risk of misuse can stem both from the researchers themselves as well as third parties, and it concerns the process of knowledge production in the laboratory as well as the communication of results.

There is also the potential problem of dual use in research. By this what is meant is that certain research results and the technological innovations developed by researchers can be used for both civilian and military purposes. On the other hand, contract research in the interest of public safety and national defence can sometimes be a difficult balancing act.

To prevent the undesired use or misuse of research findings, research institutions should encourage both institutional as well as individual reflection on such risks. The potential risk posed by misuse and dual use can be minimised through a variety of means. These include:

- technical and organisational measures (e.g., access restrictions or permissions);
- inclusion of external expertise (e.g., consultation with the advisory body established by the institution);
- adaptation of the research design (e.g., the selection of organisms that are classified as well researched and as largely safe);
- voluntary research restrictions such as refraining from publication, appropriate editing of the publication (communication only with a limited group of people), or a voluntary moratorium on research as a last resort.

The respective departments and disciplines must work together with the relevant funding institutions to develop subject-specific guidelines for dealing responsibly with subject-specific risks of misuse.

In addition, training and educational opportunities should be offered as well as incentives to make use of them. For instance, students should be made aware of the potential dual-use risks of research during their studies as part of suitable courses (see Section 4.7). On the institutional level, advisory bodies should be set up, for instance, as part of ethics committees or research integrity committees.

These framework conditions are designed to help researchers promptly recognise the risks of misuse and dual use throughout the entire research process. Finally, in the interests of transparency in addressing the risks of misuse and dual use, the measures taken should be documented by the persons responsible and communicated to the relevant advisory body of the respective research institution.

4.9 Careful use of resources

Acting responsibly in research also means using resources as sustainably as possible, preserving animate and inanimate nature, and thus contributing to environmental and climate protection. Many universities and other research institutions in Austria and abroad have developed guidelines and objectives on this which extend from the construction of buildings to the use of laboratory animals. It would be good if such guidelines were implemented at as many research institutions as possible.

In terms of the greenhouse gas emissions that can be traced back to research activities, work-related flights play the biggest role by far: according to estimates, they are responsible for nearly half the emissions of a research-intensive university. If the goal is to slow down carbon dioxide emissions, then reducing the number of kilometres travelled by air shows the greatest potential. On the other hand, researchers are dependent on the cooperation and exchange with international partners. And certain types of research can only be done at specific locations which can only be reached by airplane.

However, there are also ways in research of reducing the number of flights on the institutional and the individual level of individual researchers. These include guidelines and incentives on the part of research institutions such as the provision of technical equipment for video conferences, for example. On the other hand, measures should be taken so that frequent travel—for instance, the number of conferences attended—is not necessary for academic success. Therefore, evidence of environmentally friendly

behaviour in general and sustainable travel could be viewed positively as part of evaluations on the individual and institutional level.

5 Annotated guides

The memorandum of the German Alliance of Research Organisations, for instance, provides a general reflection on the connection between the freedom of research and research ethics.

A good guide in terms of "good scientific practice" are the guidelines of the Austrian Agency for Research Integrity (ÖAWI). The European Code of Conduct for Research Integrity of the All European Academies (ALLEA) also serves as a good reference for issues of research integrity. The Montreal Statement and the OECD Practical Guide offer guidelines on good cooperation with international research partners. The Global Code of Conduct provides valuable information on how to avoid undercutting ethical standards. In terms of the sharing of genetic resources, the Nagoya Protocol is the main reference (documents relating to Section 2).

The How to complete your ethics self-assessment guidance of the Horizon 2020 Programme serves as a guide for identifying ethically and legally relevant research. A position paper of the German Data Forum (RatSWD) provides an overview specifically for the social and economic sciences. An overview on the proper treatment of vulnerable groups is provided, for instance, by the Research involving refugees, asylum seekers & migrants guidelines of the European Commission (relating to Sections 2 and 3).

The FAIR Principles serve as a guide for the handling of research data, and the Practical Guide to the International Alignment of Research Data Management of Science Europe provides assistance on the topic of research data management (Section **Fehler! Verweisquelle konnte nicht gefunden werden.**).

The principles of Plan S are a good guide on the open access of publications, and the principles of the Association of European Research Libraries (LIBER) can be of assistance in negotiating with publishing houses. Open access should not be limited to merely scholarly publications and similar research results but should also include teaching materials. In this regard, the Recommendations for OER Integration in Austrian Higher Education (fnm-austria) can serve as a guide (Section 4.2). Practical recommendations and specific visions of open scholarly communication are provided by the twelve Vienna Principles developed by Open Access Network Austria (Section 4.2).

The Hong Kong Principles for Assessing Researchers, the Position Statement and Recommendations on Research Assessment Processes of Science Europe, and the guidelines of the Committee of Publication Ethics all provide information on the balanced assessment of research performance. The standards of The Metric Tide, the San Francisco Declaration on Research Assessment (DORA) or the Leiden Manifesto serve as a guide for the responsible use of indicators (Section 4.3).

Good guides in terms of science communication are, for instance, Wissenschaft im Dialog and the EU Guide to Science Communication. The Österreich forscht platform and the Zentrum für Citizen Science serve as a guide and provide best practice models and a criteria catalogue for citizen science projects (Section 4.5).

Specific information and tips on developing gender competence are provided by The Recommendations of the University Conference on the Broadening of Gender Competence in Higher Education Processes (only available in German) (Section 4.6).

The comprehensive ALLEA document "Ethics Education in Science" serves as a good guide and provides useful suggestions on how to design university courses and continuing education in terms of good research practice and research ethics. Useful information on the supervision of junior scientists and researchers, especially at the doctoral level, is provided, for instance, by the Salzburg II Recommendations of the European University Association as well as the Principles for Innovative Doctoral Training of the European Commission (Section 4.7).

The Recommendations for Handling Security-Relevant Research of the German Research Foundation (DFG) and the Leopoldina offer guidelines on handling the misuse of research findings. The European Commission provides brief overviews on the topics of misuse of research and dual use (Section 4.8).

One of the internationally recognised pilot projects on the reduction of flights and thus carbon dioxide emissions is that of ETH Zürich. Other recommendations are provided by the German Sustainability Governance at Higher Education Institutions initiative. And the guidelines of the National Centre for the Replacement, Refinement & Reduction of Animals in Research are recommended for the sustainable use of animals in experiments (Section 4.9).

List of abbreviations

BMBWF   Austrian Federal Ministry of Education, Science and Research

FWF   Austrian Science Fund

IHS   Institute for Advanced Studies

uniko   Universities Austria