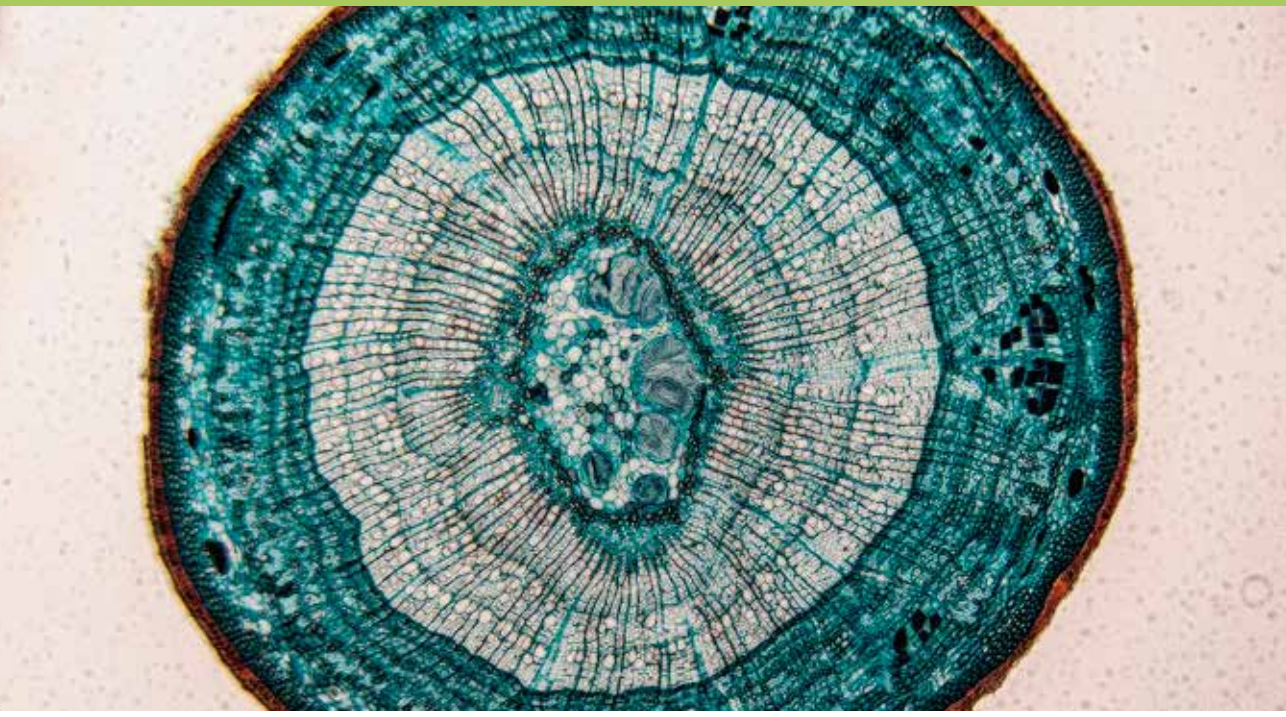
The Norwegian National
RESEARCH ETHICS
COMMITTEES

Guidelines for Research Ethics in Science and Technology



NENT • The National Committee for Research Ethics in Science and Technology

GUIDELINES FOR RESEARCH ETHICS IN SCIENCE AND TECHNOLOGY

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FOREWORD

These guidelines for research ethics were prepared by the National Committee for Research Ethics in Science and Technology (NENT) in 2007 and revised in 2015. The guidelines supplement existing international guidelines on research ethics.[1] In interdisciplinary projects that include, for example, human medicine or social sciences, the research ethics guidelines applying to these disciplines must also be observed.

Research institutions are responsible for ensuring that the guidelines are implemented and observed in their research communities and that they are routinely communicated to staff and students. The institutions should also establish procedures for preventing and dealing with scientific misconduct. They should moreover have mechanisms for addressing and resolving potential conflicts and cases of doubt relating to research ethics.

Oslo, April 2016
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[1] For an overview of international research ethics guidelines, see www.etikkom.no.

SUMMARY

Research ethics

The concept of "research ethics" refers to a broad set of standards, values, and institutional arrangements that contribute to constituting and regulating research activities. These include the duty of honesty in research as well as responsibility to colleagues, other people, animals, the environment, and society in the widest sense.

The obligations of research to society

1 Research has an independent responsibility for the role it plays in social developments.

2 Research should be compatible with sustainable development.

3 Research has a responsibility to contribute to greater global justice.

Scientific integrity, truthfulness, and accountability

4 Researchers are responsible for conducting high-quality research characterised by scientific integrity, truthfulness, and accountability, and research institutions must create conditions that promote such practice.

5 Researchers must respect the contributions of other researchers and observe standards of authorship and cooperation.

6 When involved in reviewing the work of others (articles, theses, applications, positions, etc.), researchers have a responsibility to evaluate their own qualifications and impartiality.

7 Researchers must comply with national and international rules and regulations established to safeguard ethical and safety interests.

Uncertainty, risk, and the precautionary principle

8 Researchers must clarify the degree of uncertainty in their research and evaluate the risk associated with the research findings.

9 Researchers must strive to observe the precautionary principle.

Protection of research subjects

10 Researchers must respect the requirement of freely given, informed consent.

11 Researchers must protect the privacy of their research subjects.

Protection of animals used in research

12 Researchers must proceed with due care and respect animal welfare when preparing and conducting experiments involving animals. Researchers must justify the necessity of the experiment to the responsible supervisory authorities.

13 Researchers must arrange their research in such a way that the use of the research results is not in conflict with fundamental animal welfare requirements.

The relationship between research and other knowledge-bearers and forms of knowledge

14 Researchers must acknowledge the economic and cultural value of other forms of knowledge.

15 Where relevant, researchers should engage in dialogue with other knowledge-bearers.

16 Research should involve the affected parties where relevant.

Commissioned research, openness, and conflicts of interest

17 Research institutions and the researchers involved must ensure openness and scientific quality in commissioned research.

18 Research institutions and the individual researcher must ensure openness about possible conflicts of interest.

Whistleblowing and ethical responsibility

19 When, in the course of their work, researchers become aware of matters that they consider to be in conflict with ethical principles or their social responsibility, they must have the possibility and, depending on the circumstances, the duty, to act as whistle-blower.

20 Research institutions must have independent mechanisms that can support employees in whistleblowing situations.

Dissemination of research to the general public

21 Research institutions should reward dissemination that popularises research as well as research-based participation in public debates.

22 Research institutions and researchers are both responsible for disseminating research findings.

23 Researchers should not misuse their titles to add weight to their views

Proposed scientific oath

GUIDELINES

Research ethics

These guidelines are about standards of good research practice. They provide an expression of ethical standards to which the research community is committed. Some of these guidelines are also to be found in legislation: for example, the protection of animals used in research is laid down in both these guidelines and the Animal Welfare Act. If researchers act in breach of these guidelines, they may be subject to legal sanctions, but this is because they may have broken the law, not because they have acted in conflict with the research ethics guidelines. NENT does not have the power to impose sanctions. NENT's role in following up the guidelines is to provide advice and recommendations; to contribute to strengthening awareness and the exercise of ethical judgment among researchers, and to encourage further discussion about, and development of, the guidelines.

The concept of "research ethics" refers to a diverse set of values, standards, and institutional arrangements that contribute to constituting and regulating scientific activities. The field of research ethics contains many elements. The fundamental ethos of research is the search for truth. At the same time, research ethics underscores that research has a wider social responsibility. Research ethics also concerns relations among researchers and relations between researchers and other people. In addition, research can have consequences for animals and the environment. These guidelines attempt to cover all these elements for all those who are involved in research activities. This also means that the individual provisions in these guidelines are of various kinds. Some express standards, which are also covered in the law, while others describe ideal objectives that research should strive to achieve.

The guidelines employ the concept "research". This is a reference to the responsibility of individual researchers and research institutions alike to create conditions for, and to engage in, good research practice. The guidelines also apply to student work that involves research. They apply not only to persons and institutions that conduct research, but also to other actors that influence research.

The obligations of research to society

The first three guidelines summarise the obligations of research to society:

1 Research has an independent responsibility for the role it plays in social developments.

Researchers and research institutions must contribute to the collective accumulation of knowledge and to resolving major challenges facing the global community. Research must

not be oriented in such a way that it comes into conflict with democratic developments or international conventions designed to promote peace. Research must not be in breach of rights laid down in recognised international conventions on civil, political, economic, social and cultural human rights. Where scientific and technological development can be misused to undermine the right of self-determination and human dignity and the democratic rights of individuals, researchers must strive to prevent and refrain from taking part in any such misuse of research. Researchers have an independent responsibility to ensure that research benefits society, directly or indirectly, and to minimise risk.

2 Research should be compatible with sustainable development.

Researchers and research institutions have a collective responsibility to contribute to sustainable development and the preservation of biological diversity. The concept of "sustainability" encompasses economic, social, institutional, and environmental aspects.

3 Research has a responsibility to contribute to greater global justice.

Research results and their application must be shared with society as a whole, both nationally and globally, and in particular with developing countries. Research must not be oriented in such a way as to exacerbate global injustice. The benefits, drawbacks, and risk associated with research activities and technological development should be shared fairly. As a general rule, the knowledge ensuing from research should be made available to all. Researchers have a responsibility to impart knowledge where such knowledge can make a difference in rectifying imbalances in the distribution of wealth.

Scientific integrity, truthfulness and accountability

The next guidelines concern the exercise of research ethics through good scientific practice.

4 Researchers are responsible for conducting high-quality research characterised by scientific integrity, truthfulness, and accountability, and research institutions must create conditions that promote such practice.

Scientific integrity, truthfulness, and accountability are fundamental research ethics requirements. Researchers and research institutions have an obligation to familiarise themselves with and observe research ethics guidelines that are relevant to their type of research.

Scientific integrity

Researchers are responsible for respecting the research results of others and for exercising good scientific practice. Researchers must not conceal, misrepresent or falsify anything, whether in the planning, execution or reporting of the research. Plagiarism involves presenting the ideas or research of others as one's own.

The individual researcher has an independent responsibility not to accept departures from good scientific practice, on his or her own account or that of others.[2] Researchers who discover or are made aware of errors in their research, must admit the error, correct it, and ensure that the consequences of the error are minimal.

Good citation practice

It is in the nature of research to build on research by others. Researchers who take advantage of the ideas and research by others, both published and unpublished, must acknowledge this accurately, so that it is clear what the researcher's own contribution is. Researchers must give a balanced and correct presentation of the research of others. Citations make research traceable and verifiable.

Verification

Researchers and research institutions must make data available to others for verification after a certain period. If the data are not used within this period, they should be made available to other researchers.

Within the framework of existing rules and regulations, institutions should have guidelines and procedures for preserving research data, in such a way that they can be retrieved - also after researchers have finished working at the institution.

5 Researchers must respect the contributions of other researchers and observe standards of authorship and cooperation.

Researchers must observe good publication practice. They must clarify individual responsibilities in group work as well as the rules for co-authorship. Honorary authorship is unacceptable. When several authors contribute, each authorship must be justified. Justified authorship is defined by four criteria, in accordance with the criteria drawn up by the International Committee of Medical Journal Editors (ICMJE)[3]:

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[2] The Act on ethics and integrity in research (the Research Ethics Act).

[3] http://www.icmje.org/icmje-recommendations.pdf

a) Researchers must have made a substantial contribution to the conception and design *or* the data acquisition *or* the data analysis and interpretation; *and*
b) researchers must have contributed to drafting the manuscript *or* critical revision of the intellectual content of the publication; *and*
c) researchers must have approved the final version before publication; *and*
d) researchers must be able to accept responsibility for and be accountable for the work as a whole (albeit not necessarily all technical details) unless otherwise specified.

All authors in a multidisciplinary publication must be able to account for the part or parts for which they have been responsible in the research work, and which part or parts are the responsibility of other contributors.

All those who meet criterion a) must be able to meet b) and c). Contributors who do not fulfil all the criteria must be acknowledged.

6 When involved in reviewing the work of others (articles, theses, applications, positions, etc.), researchers have a responsibility to evaluate their own qualifications and impartiality.

If they are in any doubt, researchers should not take part in the review.

When acting as peer reviewers, researchers should abide by the following rules: i) researchers must recuse themselves as reviewers if they have been in a serious conflict with the author in question or if they have a direct cooperative or competitive relationship with the author; ii) researchers must acknowledge the limitations of their expertise where necessary.

7 Researchers must comply with national and international rules and regulations established to safeguard ethical and safety interests.

Good research practice entails observing national laws and rules, both in one's home country and abroad. This also means the researcher should carefully consider whether it is ethically defensible to comply with foreign legislation and regulations, if the ethical standards are different from those in their home country.

This implies that:

a) researchers apply for the appropriate authorisations for projects where it is required
b) researchers respect national safety standards imposed on laboratories and learn and teach others to use equipment
c) researchers do not locate parts of their research in other countries for the purpose of achieving lower ethical or safety standards

d) researchers inform funding institutions of any non-conformant ethical or safety standards in the countries in which their research is conducted.

Uncertainty, risk, and the precautionary principle

Research may have far-reaching consequences for health, society, or the environment. It is therefore important that the uncertainty and risk that are often accompanying factors when research becomes practical and concrete, are not neglected, and that decision-makers who use scientific knowledge have a thorough understanding of this knowledge and the context.

8 Researchers must clarify the degree of uncertainty in their research and evaluate the risk associated with the research findings

Researchers must clarify the degree of certainty and precision that characterises their research results. They must be particularly meticulous about clarifying the relative certainty and validity range of their findings. In addition to presenting knowledge critically and in context, researchers must strive to point out any risk and uncertainty factors that may have a bearing on the interpretation and possible applications of the research findings. Communicating the relative certainty and validity of knowledge is part of a researcher's ethical responsibility and effort to achieve objectivity. Where possible, researchers should also use appropriate methods for demonstrating the uncertainty of the research. Research institutions have an obligation to teach these methods to their employees and students.

9 Researchers must strive to observe the precautionary principle

Where there is plausible, but uncertain knowledge to the effect that a technological application or a development of a research field may lead to ethically unacceptable consequences for health, society, or the environment, the researchers in the field in question must strive to contribute knowledge that is relevant for observing the precautionary principle. This means that researchers must work together with other relevant parties in observing the precautionary principle. The precautionary principle is defined here as follows: "When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, actions shall be taken to avoid or diminish that harm." This principle is important for a large part of science and technology research, and researchers have a shared responsibility for ensuring that evaluations are based on the precautionary principle and contribute to avoiding or diminishing harm.

Protection of research subjects

Research that involves research subjects raises special requirements regarding respect for the individual subject.[4]

10 Researchers must respect the requirement of freely given, informed consent

When research involves humans as research subjects, researchers must, as a general rule, obtain freely given, informed consent. General requirements regarding freely given, informed consent entail researchers ensuring that the person or persons taking part in the research

a) understand the purpose of the project and the part concerning their participation in the project
b) can evaluate their own situation
c) can make an independent decision as to whether they wish to participate, without external pressure, on the basis of information and their own preferences and values
d) can freely communicate their decision

11 Researchers must protect the privacy of their research subjects

Openness is a fundamental standard in research. At the same time, there are areas where it is necessary to safeguard the privacy of research subjects, particularly when sensitive information is collected. Information about the persons taking part in the research project, or about others with whom a researcher become acquainted during the research process, must be handled with care. The researcher must inform the participants about how the information will be protected and stored. The researcher must also provide confidentiality or anonymity for those who want it. *Confidentiality* means that all information and data are de-identified, i.e. no unauthorised persons will be able to know who has provided which data to the researcher. This procedure still allows the researcher to link data to particular individuals. *Anonymity* means that not even the researcher knows which individual has provided which data or material. As a general rule, this means that researchers must respect protection of privacy by de-identifying or anonymising personal data.

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[4] When there is question of processing personal data, the Act relating to the processing of personal data (Personal Data Act) applies. The Act on medical and health research (Health Research Act) applies to medical and health research on humans, human biological material or health data. The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH) has drawn up more detailed guidelines that concern respect for research subjects in the academic areas of social science, humanities, law and theology *(Research ethics guidelines for the social sciences, humanities, law and theology).*

Protection of animals used in research

Some science and technology research involves animals. It is accepted that animals are also moral objects that deserve respect. Animal welfare serves as a collective category for a number of ethical considerations towards animals.[5]

Research concerns animals in at least two ways: either as laboratory animals in a research process or as the actual subject of the research (especially in veterinary medicine, agriculture, and aquaculture). Ethical considerations must be applied to both. However, it is accepted that laboratory animals may be subjected to reduced animal welfare and greater risk than ordinary livestock, when the research serves an important purpose and experiments on animals are necessary to achieve that goal.

12 Researchers must proceed with due care and respect animal welfare when preparing and conducting experiments involving animals. Researchers must justify the necessity of the experiment to the responsible supervisory authorities.

This means that:

a) researchers must consider carefully all aspects of the three 'R's of experiments on animals (reduce, refine, replace)
b) researchers cooperate with the responsible supervisory authorities and wait to conduct research that involves laboratory animals until consent has been given
c) researchers cooperate with the responsible supervisory authorities and comply with current legislation and guidelines and apply best practice when using laboratory animals

13 Researchers must arrange their research in such a way that the use of the research results is not in conflict with fundamental animal welfare requirements.

Research on the breeding of livestock, whether the methods involved are traditional selective breeding or biotechnological, must not compromise animal welfare. In rare cases, periodical exemptions may be justified on the grounds that the animals fulfil an important veterinary or human medicine function.

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[5] Animal welfare interests in experiments involving animals are also regulated in the legislation in the Regulations relating to the use of animals in research (Forskrift om bruk av dyr i forsøk).

The relationship between research and other knowledge-bearers and forms of knowledge

There are a multitude of types of knowledge in all societies. Professionals as well as laypeople have different kinds of *experience-based* knowledge. Individuals and local communities may possess specific *local knowledge*. *Traditional knowledge* is another useful term, which the International Council for Science defines as a cumulative body of knowledge, know-how, practices, and representations maintained and developed by peoples with extended histories of interaction with the natural environment. The traditional knowledge of indigenous peoples is of this type, but this kind of knowledge is found in every community. These types of knowledge and their bearers should be treated with due respect and at the same time protected against unreasonable exploitation.

14 Researchers must acknowledge the economic and cultural value of other forms of knowledge.

Researchers who directly use or build their research on other kinds of knowledge, have an obligation to acknowledge both the economic and the cultural value of this knowledge. Where such research results in financial gains, a fair and equitable share of the gain should benefit the bearers of the traditional knowledge. The traditional knowledge of indigenous peoples has particularly strong protection against unreasonable exploitation through international conventions such as the Nagoya Protocol.[6]

15 Where relevant, researchers should engage in dialogue with other knowledge-bearers.

Local and traditional knowledge arise from experience. Although these forms of knowledge do not necessarily meet the usual standards for scientific knowledge, they may be an important supplement to understanding the nature, environment, and living conditions of particular populations and local communities. It is therefore important for researchers to enter into a dialogue with the bearers of this knowledge, not least in applied research, which can potentially impact local communities and their living conditions. International organisations have placed particular emphasis on the need to respect and use the traditional knowledge of indigenous peoples in environmental research. This implies that when scientific knowledge or technology is applied, researchers should be open to utilising relevant kinds of knowledge.

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[6] The following is a link to the Protocol. https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf

16 Research should involve the affected parties where relevant.

Researchers must use appropriate methods to ensure that the affected parties are involved.

Citizen participation may provide a democratic corrective to choices as to what research should focus on and be aimed at. The participation of users, citizens, and other social actors is laid down in a series of international conventions, including the Aarhus Convention.[7]

Commissioned research, openness and conflicts of interest

Openness in research and about the role of the researcher are important for ensuring research quality and the community's trust in research and research results. Extensive commissioned research and external funding of research projects may make it difficult to preserve openness because of increased conflicts of interest. In particular where there are conflicts of interest, the project manager and the research institution have a duty to ensure that the research results are made public in an objective and accountable manner. When research is commissioned by an external funder, and where the funder influences to a greater or lesser extent the contents and thematic delimitations, a number of conflicts may arise that affect the research or its communication. A standard contract has been drawn up for commissioned research, aimed primarily at the university and university college sector.[8] Commissioned research must be based on explicit contracts between the funder and the institution conducting the research, where the contracts are formulated in such a way that it is possible for the researchers carrying out the commission to abide by the research ethics guidelines.

17 Research institutions and the researchers involved must ensure openness and scientific quality in commissioned research.

This means that:

a) the research institution and the project manager have overall responsibility for the choice of method, data acquisition, interpretation of findings, and reporting
b) research must be based on the greatest possible openness
c) research findings must be made available to other researchers

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[7] http://www.unece.org/fileadmin/DAM/env/pp/documents/cep43e.pdf

[8] https://www.regjeringen.no/no/tema/forskning/artikler/standardavtale-for-forsknings-og-utredni/id673546/

d) the research institution and project manager are responsible for ensuring that the research results are made public on the expiry of an agreed, limited-time exclusive right of use by the funder
e) An exclusive right to use research should not be granted for an unlimited period of time

18 Research institutions and the individual researcher must ensure openness about possible conflicts of interest.

Researchers associated with, for example, political or religious interests, and researchers who undertake assignments for the business sector or the authorities, may create uncertainty surrounding the research results. On the other hand, openness about the different roles and other external connections researchers might have, may create a greater sense of confidence that the research results are independent and reliable.

This means that
a) researchers must disclose information about relevant economic relations
b) researchers must disclose relevant positions and other work in political, religious, or other value-based associations that could potentially influence their research
c) in the event of a potential conflict between different roles, a researcher must make it clear whether he or she is speaking as a researcher or in a different capacity

Whistleblowing and ethical responsibility

On occasion, conflicts may arise between the individual researcher and a senior or an authority. This is particularly problematic when the conflict arises because the researcher regards it as his or her ethical duty to act as a whistleblower, sometimes contrary to the advice of a superior or authority. Instances of whistleblowing may concern internal matters in the research, such as scientific integrity, or they may pertain to matters of societal significance. As whistleblowing of this kind is based on discretionary assessments, it often creates a basis for unresolved conflicts. The institution must ensure that the whistleblower's legal protection is not threatened.[9]

[9] Act relating to working environment, working hours and employment protection, etc. (Working Environment Act)

19 When, in the course of their work, researchers become aware of matters that they consider to be in conflict with ethical principles or their social responsibility, they must have the possibility and, depending on the circumstances, the duty, to act as whistleblower.

In concrete terms, this means that researchers must consider carefully
a) the possibilities for resolving the conflict internally in the organisation
b) the possible consequences of such whistleblowing for the researcher personally, the research institution and society, both if the circumstances reported are correct and if they are not correct
c) the possible consequences of failing to act as a whistleblower
d) the whistleblowing channels that best lend themselves to minimise conflict and optimise actions to remedy the damage
e) possible other motives behind the whistleblowing that may affect the researcher's own objectivity

20 Research institutions must have independent mechanisms that can support employees in whistleblowing situations.

It is important that all parties involved in a whistleblowing situation respect the fact that the process must be dealt with in a neutral manner. An independent body must investigate the conflict, and the whistleblower must be protected against unreasonable or untimely reactions.

This means that
a) research institutions must have mechanisms for taking care of both the whistleblower and the subject of the disclosure
b) research institutions must have mechanisms for conducting such an independent scrutiny of whistleblowing cases in the institution
c) these mechanisms must be known to the researchers at the institution

Dissemination of research to the general public

Since research fulfils different functions, and researchers also have a general social responsibility, research dissemination and participation in relevant societal debates should be a routine part of research activity.

Institutions have an obligation to disseminate research to society, and they should make every effort to enable researchers to contribute to this dissemination. The topic, relevance and personal attitudes will determine how much can be expected of the individual

researchers, but they should nonetheless give high priority to research dissemination other than purely academic publishing.

21 Research institutions should reward dissemination that popularises research as well as research-based participation in public debates.

This means that
a) general research dissemination will be a standard criterion in any evaluation of research communities
b) research institutions have a system where research dissemination counts among the characteristics that are rewarded when they appoint and promote researchers

22 Research institutions and researchers are both responsible for disseminating research findings.

This means that
a) research institutions should facilitate active use of a variety of appropriate means of dissemination
b) research institutions should develop procedures for assessing the relevance of research for various user groups and society as a whole
c) research institutions and individual researchers should regularly consider whether their own research is suitable for dissemination to a broader academic or non-scientific public and follow up with appropriate action

23 Researchers should not misuse their titles to add weight to their views

Researchers should contribute to the public discourse with scientific argumentation.

Such participation means that researchers use their scientific expertise as a basis for contributing to the formation of public opinion. It may be a matter of contributing information in an area that is the subject of debate, taking a reasoned position on controversial subjects, or trying to put new topics on the public agenda.

Participation in the public discourse places great demands on objectivity, reasoning, and clarity. There may be unclear transitions between participation as a scientist and participation as an ordinary citizen. When scientists take part as citizens, they should not use their title or refer to special scientific expertise.

Proposed scientific oath

The research ethics guidelines should be well known in research communities and should especially reach those who are newly recruited into the research community. The guidelines mean that the individual researcher makes a personal commitment. We therefore propose that research institutions should consider whether it might be reasonable to ask every individual to make a declaration of good research ethics practice, verbally or in writing, for example when they have completed their training as a researcher. The guidelines therefore include a proposal for such a declaration:

I acknowledge that I am a part of an international community of researchers. I will practise my activities in line with the recognised standards for good research practice. I shall conduct my research in an honest and truthful way and show respect for humans, animals, and nature. I shall use my knowledge and skills to the best of my judgement for the good of humanity and for sustainable development. I shall not allow interests based on ideology, religion, ethnicity, prejudice, or material advantages to overshadow my ethical responsibility as a researcher.

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The National Committee for Research Ethics in Science and Technology (NENT) is part of the Norwegian National Research Ethics Committees, an independent administrative agency under the Ministry of Education and Research. NENT is an impartial advisory body providing guidance and advice on research ethics, and the guidelines are important tools for promoting good scientific practice in the Norwegian research system.

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