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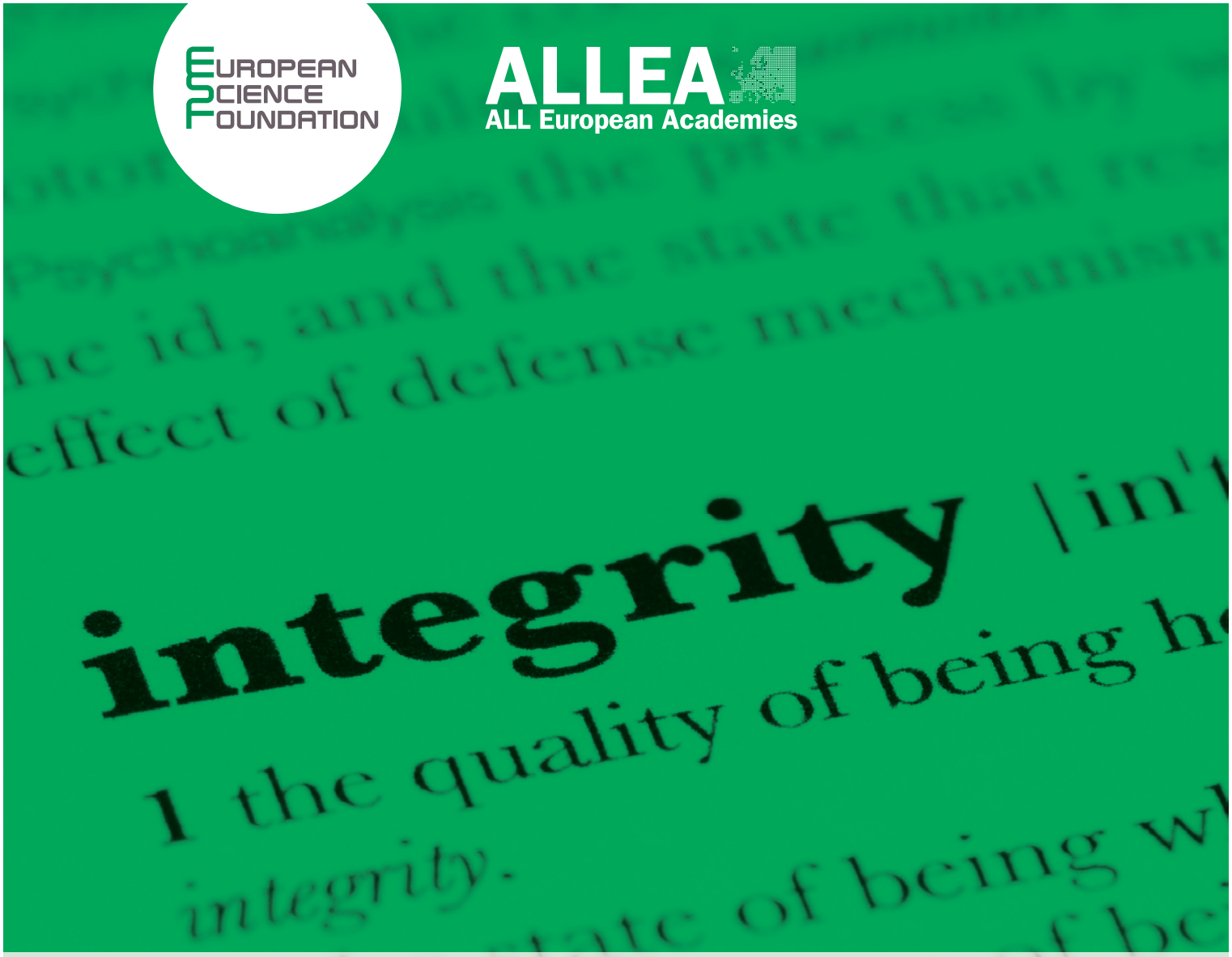


# The European Code of Conduct for Research Integrity

**European Science Foundation**

The European Science Foundation (ESF) was established in 1974 to provide a common platform for its Member Organisations to advance European research collaboration and explore new directions for research. It is an independent organisation, owned by 78 Member Organisations, which are research funding organisations and research performing organisations, academies and learned societies from 30 countries. ESF promotes collaboration in research itself, in funding of research and in science policy activities at the European level.

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ALLEA (All European Academies) is the European Federation of National Academies of Sciences and Humanities whose 53 Member Academies in 40 countries are self-governing communities of scientists and scholars. It was founded in 1994 to promote the exchange of information and experience between Academies; to offer European science and society advice from its Member Academies; and to promote excellence and high ethical standards in science and scholarship.

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# Contents


**Foreword** 3

**1. Executive Summary** 5

1.1 The Code 5

1.2 The Principles of Research Integrity 5

1.3 Misconduct 6

1.4 Good Research Practices 6

**2. The European Code of Conduct for Research Integrity** 8

2.1 The Code of Conduct 8

2.2 Background and Elucidation 9

2.3 Guidelines for Good Practice Rules 13

2.4 International Collaborative Research 15

2.5 Annexes 15

Annex I: Recommended Principles for Investigating Research Misconduct

Annex II: Boilerplate text for International Agreements, as suggested by the OECD Global Science Forum Coordinating Committee for facilitating international misconduct investigations

**3. ESF Member Organisation Forum on Research Integrity and list of members** 17

**4. ALLEA Standing Committee on Science and Ethics and list of members** 19

# Foreword

Science is expected to enlarge mankind's knowledge base, provide answers to global challenges, and guide decisions that shape our societies. Yet when science is compromised by fraudulent activities, not only the research enterprise stumbles, but also society's trust in it. Thus, researchers and leaders throughout the world should ensure that science is trustworthy to our best knowledge. This can be achieved by education, promoting a culture of integrity, and by development of and compliance with joint rules and norms.

In this remit, the European Science Foundation has fostered research integrity since its inception, but in a more explicit manner since 2000 when it published a landmark science policy briefing on recommendations on best practices, 'Good Scientific Practice in Research and Scholarship'. One of the recommendations envisages, as an important task for the National Academies, the formulation of codes of good scientific practice. At the European level ALLEA (ALL European Academies – the European Federation of 53 National Academies of Sciences and Humanities) adapted a Dutch document from the Royal Netherlands Academy into the 'Memorandum on Scientific Integrity' (2003), which has been translated into several languages and is in use in many countries today.

ESF continued to promote international debate around this topic by organising in 2007 the First World Conference on Research Integrity, together with the Office for Research Integrity of the US Public Health Service, which brought together the leading international stakeholders in the field and highlighted the need for international collaboration and consensus. In 2008, a survey was carried out on research integrity structures, 'Stewards of Integrity – Institutional Approaches to Promote and Safeguard Good Research Practice in Europe'. A dedicated debate platform was then set up, an ESF Member Organisation Forum on Research Integrity, that assembled 31 research funding and performing organisations from 22 countries, together with ALLEA. The work of this group produced the consensus document 'The European Code of Conduct for Research Integrity', launched at the Second World Conference on Research Integrity held in July 2010. The Code addresses the proper conduct and principled practice of systematic research in the medical, natural and social sciences and the humanities. It stands as a canon for self-regulation with clear recommendations, and is now on the way to being taken as a reference template for implementation throughout Europe. It is not intended to replace existing national or academic guidelines, but to represent a Europe-wide agreement on a set of principles and priorities for the research community. The Code is provided in this booklet in two forms, the Executive Summary and the full Code.

Human curiosity and science are borderless, and so must be the policies that surround them. Global research collaboration is unthinkable without a common understanding of the rules of integrity. This is why the next step is to develop an international Code of Conduct for scientists and stakeholders worldwide.

**Professor Marja Makarow**
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**Professor Jüri Engelbrecht**
*President, ALLEA*

# 1.
# Executive Summary

## 1.1 The Code

Researchers, public and private research organisations, universities and funding organisations must observe and promote the principles of integrity in scientific and scholarly research.
These principles include:

- honesty in communication;
- reliability in performing research;
- objectivity;
- impartiality and independence;
- openness and accessibility;
- duty of care;
- fairness in providing references and giving credit; and
- responsibility for the scientists and researchers of the future.

Universities, institutes and all others who employ researchers, as well as agencies and organisations funding their scientific work, have a duty to ensure a prevailing culture of research integrity. This involves clear policies and procedures, training and mentoring of researchers, and robust management methods that ensure awareness and application of high standards as well as early identification and, wherever possible, prevention of any transgression.

Fabrication, falsification and the deliberate omission of unwelcome data are all serious violations of the ethos of research. Plagiarism is a violation of the rules of responsible conduct vis-à-vis other researchers and, indirectly, harmful for science as well. Institutions that fail to deal properly with such wrongdoing are also guilty. Credible allegations should always be investigated. Minor misdemeanours should always be reprimanded and corrected.

Investigation of allegations should be consistent with national law and natural justice. It should be fair, and speedy, and lead to proper outcomes and sanctions. Confidentiality should be observed where possible, and proportionate action taken where necessary. Investigations should be carried through to a conclusion, even when the alleged defaulter has left the institution.

Partners (both individual and institutional) in international collaborations should agree beforehand to cooperate to investigate suspected deviation from research integrity, while respecting the laws and sovereignty of the states of participants. In a world of increasing transnational, cross-sectional and interdisciplinary science, the work of OECD's Global Science Forum on *Best Practices for Ensuring Scientific Integrity and Preventing Misconduct* can provide useful guidance in this respect.

## 1.2 The Principles of Research Integrity

These require *honesty* in presenting goals and intentions, in reporting methods and procedures and in conveying interpretations. Research must be *reliable* and its communication fair and full. *Objectivity* requires facts capable of proof, and transparency in the handling of data. Researchers should be *independent* and *impartial* and communication with other researchers and with the public should be *open* and honest. All researchers have a *duty of care* for the humans, animals, the environment or the objects that they study. They must show *fairness* in providing references and giving credit for the work of others and must show *responsibility for future generations* in their supervision of young scientists and scholars.

## 1.3 Misconduct

Research *misconduct* is harmful for knowledge. It could mislead other researchers, it may threaten individuals or society – for instance if it becomes the basis for unsafe drugs or unwise legislation – and, by subverting the public's *trust*, it could lead to a disregard for or undesirable restrictions being imposed on research.

Research misconduct can appear in many guises:

- *Fabrication* involves making up results and recording them as if they were real;
- *Falsification* involves manipulating research processes or changing or omitting data;
- *Plagiarism* is the appropriation of other people's material without giving proper credit;
- Other forms of misconduct include *failure to meet clear ethical and legal requirements* such as misrepresentation of interests, breach of confidentiality, lack of informed consent and abuse of research subjects or materials. Misconduct also includes *improper dealing* with infringements, such as attempts to cover up misconduct and reprisals on whistleblowers;
- *Minor misdemeanours* may not lead to formal investigations, but are just as damaging given their probable frequency, and should be corrected by teachers and mentors.

The response must be proportionate to the seriousness of the misconduct: as a rule it must be demonstrated that the misconduct was committed intentionally, knowingly or recklessly. Proof must be based on the preponderance of evidence. Research misconduct should not include honest errors or differences of opinion. Misbehaviour such as intimidation of students, misuse of funds and other behaviour that is already subject to universal legal and social penalties is unacceptable as well, but is not 'research misconduct' since it does not affect the integrity of the research record itself.

## 1.4 Good Research Practices

There are other failures to adhere to good practices – incorrect procedures, faulty data management, etc. – that may affect the public's trust in science These should be taken seriously by the research community as well. Accordingly, *data practices* should preserve original data and make it accessible to colleagues. Deviations from *research procedures* include insufficient care for human subjects, animals or cultural objects; violation of protocols; failure to obtain informed consent; breach of confidentiality, etc. It is unacceptable to claim or grant undeserved authorship or deny deserved authorship. Other *publication-related* lapses could include repeated publication, salami-slicing or insufficient acknowledgement of contributors or sponsors. Reviewers and editors too should maintain their independence, declare any conflicts of interest, and be wary of personal bias and rivalry. Unjustified claims of authorship and ghost authorship are forms of falsification. An editor or reviewer who purloins ideas commits plagiarism. It is ethically unacceptable to cause pain or stress to those who take part in research, or to expose them to hazards without informed consent.

While principles of integrity, and the violation thereof, have a universal character, some rules for good practice may be subject to cultural differences, and should be part of a set of national or institutional guidelines. These cannot easily be incorporated into a universal code of conduct. National guidelines for good research practice should, however, consider the following:

1. **Data:**
   All primary and secondary data should be stored in secure and accessible form, documented and archived for a substantial period. It should be placed at the disposal of colleagues. The freedom of researchers to work with and talk to others should be guaranteed.

2. **Procedures:**
   All research should be designed and conducted in ways that avoid negligence, haste, carelessness and inattention. Researchers should try to fulfil the promises made when they applied for funding. They should minimise impact on the environment and use resources efficiently. Clients or sponsors should be made aware of the legal and ethical obligations of the researcher, and of the importance of publication. Where legitimately required, researchers should

respect the confidentiality of data. Researchers should properly account for grants or funding received.

3. **Responsibility:**
All research subjects – human, animal or non-living – should be handled with respect and care. The health, safety or welfare of a community or collaborators should not be compromised. Researchers should be sensitive to their research subjects. Protocols that govern research into human subjects must not be violated. Animals should be used in research only after alternative approaches have proved inadequate. The expected benefits of such research must outweigh the harm or distress inflicted on an animal.

4. **Publication:**
Results should be published in an open, transparent and accurate manner, at the earliest possible time, unless intellectual property considerations justify delay. All authors, unless otherwise specified, should be fully responsible for the content of publication. Guest authorship and ghost authorship are not acceptable. The criteria for establishing the sequence of authors should be agreed by all, ideally at the start of the project. Contributions by collaborators and assistants should be acknowledged, with their permission. All authors should declare any conflict of interest. Intellectual contributions of others should be acknowledged and correctly cited. Honesty and accuracy should be maintained in communication with the public and the popular media. Financial and other support for research should be acknowledged.

5. **Editorial responsibility**:
An editor or reviewer with a potential conflict of interest should withdraw from involvement with a given publication or disclose the conflict to the readership. Reviewers should provide accurate, objective, substantiated and justifiable assessments, and maintain confidentiality. Reviewers should not, without permission, make use of material in submitted manuscripts. Reviewers who consider applications for funding, or applications by individuals for appointment or promotion or other recognition, should observe the same guidelines.

The primary responsibility for handling research misconduct is in the hands of those who employ the researchers. Such institutions should have a standing or *ad hoc* committee(s) to deal with allegations of misconduct. Academies of Sciences and other such bodies should adopt a code of conduct, with rules for handling alleged cases of misconduct, and expect members to abide by it. Researchers involved in international collaboration should agree to standards of research integrity as developed in this document and, where appropriate, adopt a formal collaboration protocol either *ab initio* or by using one drafted by the OECD Global Science Forum.

# 2. The European Code of Conduct for Research Integrity

## 2.1 The Code of Conduct

### 2.1.1 Preamble

This Code of Conduct is not a body of law, but rather a canon for self regulation. It is a basic responsibility of the scientific community to formulate the principles and virtues of scientific and scholarly research, to define its criteria for proper research behaviour, and to set its own house in order in case scientific integrity is threatened.

Science as the process of knowledge augmentation is embedded in a wider socio-ethical context, and scientists must be aware of their specific responsibility towards society and the welfare of mankind. They bear responsibility for the choice of subjects to be investigated and its consequences, for proper care and treatment concerning the objects of research, and attention and concern with respect to practical applications and use of their research results. In this Code, however, we confine ourselves to standards of integrity while *conducting* research, and do not consider this wider socio-ethical responsibility.

### 2.1.2 Code of Conduct

Science, including natural and social sciences as well as humanities, is the systematised knowledge obtained through observation and experimentation, study and thinking. Scientific research is carried out to determine the nature and principles of what is being studied. In spite of their differences in content and methods all sciences have a common characteristic: they depend on arguments and evidence, *i.e.* observations of nature or of humans and their actions and products.

Researchers, research institutes, universities, academies and funding organisations commit themselves to observe and to promote the *principles* of scientific integrity. These include: honesty in reporting and communicating, reliability in performing research, objectivity, impartiality and independence, openness and accessibility, duty of care, fairness in providing references and giving credits, and responsibility for future science generations. Research institutes, funding organisations, academies and other actors in the field of scientific research have to adhere to appropriate standards for data management and preservation of records and data and to high ethical standards in dealing with research participants.

Research employers (universities, institutes and other research performing organisations) also have a responsibility to ensure that a *culture of research integrity* prevails. This includes clear policies and procedures, training and mentoring of researchers at all stages of their careers, and robust management procedures to ensure that high standards are observed and any transgression is identified at an early stage.

Fabrication and falsification, including misrepresentation and deliberately omitting unwelcome facts or data, are among the most serious *violations* of the ethos of science. Also plagiarism is an unacceptable form of misbehaviour, and a violation against other researchers.

Institutes or organisations that fail *to deal* properly with such wrongdoing are also guilty of dereliction of duty. All allegations should be properly assessed, and credible allegations should be investigated fully, with corrective actions taken if allegations are confirmed.

*Minor* misdemeanours, reflecting only poor performance by researchers as opposed to serious misconduct – some adjustment or selecting of data or 'adaptation' of a figure – may not give cause to

a formal charge. Minor misdemeanours by students or junior researchers should however always be reprimanded and corrected by teachers or mentors. Minor misdemeanours by more experienced researchers that leads to misrepresentation may be treated more seriously, and if repeated should be considered as misconduct.

In addition to the violation of the fundamental principles of responsible science many other forms of poor and inappropriate *practices* in science research deserve attention. These include poor data practices and inadequate data management, inappropriate research procedures, including questionable procedures for obtaining informed consent, insufficient respect and care for participants in the research, improper research design and carelessness in observation and analysis, unsuitable authorship or publishing practices, and reviewing and editorial derelictions. Some of these are very serious and discreditable, *e.g.* abuse of ethical requirements and of trust in relation to the public, research subjects or other participants in the research. However, unlike the fundamental principles of scientific integrity and the violation thereof, which have a *universal* character, such practices may be subject to different national traditions, legislative regulations or institutional provisions. A required system of regulations of good practice in research should, therefore, (except for gross violations of ethical principles or the law) not be part of a universal *Code of Conduct*, but should be developed in the form of national *Good Practice Rules*, that would recognise the legitimate differences between national or institutional systems. The enclosed list of recommendations should be used as a guideline for the formulation of such national Good Practice Rules.

*Investigations* of research misconduct allegations should be consistent with national laws of the country in which the investigations are conducted. What is required is a due and fair process, that is uniform and sufficiently rapid, and leads to proper outcomes and sanctions. The investigations must be carried out in accordance with the highest standards of process integrity, uniformity within one domain of jurisdiction, and fairness to all parties. Confidentiality should be observed as much as possible, unnecessary detriment to reputations should be avoided, and a proportionate action should be taken against persons found to have committed research misconduct. Wherever possible precaution should be taken to ensure that investigations are carried through to a conclusion. They should not cease, leaving questions unresolved, merely because the defaulter has left the institution.

In *international collaboration* partners should agree to conduct their research according to the same standards of research integrity, and to bring any suspected deviation from these standards, in particular alleged research misconduct, to the immediate attention of the project leader(s) (and of the senior responsible officer in the university or institute (employer), in order for it to be investigated according to the policies and procedures of the partner with the primary responsibility, while respecting the laws and sovereignty of the States of all participating parties. In large scale, funded international projects the promotion of good practice and the handling of possible cases of misconduct, as recommended by the coordinating committee of the OECD Global Science Forum, should be followed. The boiler plate text, recommended by this committee, should be embodied in the formal documents that establish the collaborative project.

## 2.2 Background and Elucidation

In this section a more extensive elucidation of the condensed Code of Conduct, presented in chapter 1, is given. The nature of science and scholarship, the values to be fostered in scientific and scholarly research, the various discreditable forms of misconduct will be discussed, and procedures for dealing with allegations of misconduct and rules for good research practice will be recommended.

### 2.2.1 Nature of science and scholarship

In a broad sense *science* (in Latin *scientia* is knowledge) is the systematised knowledge obtained through observation and experimentation, study and thinking. It is rooted in human curiosity, the wish to understand the physical, biological and social worlds as well as the human mind and its products. Science aims at deepening our understanding and extending our knowledge beyond what is already known. The term 'science' is normally applied only to the natural and social sciences; in this document it will be applied in a broader sense, like the German word 'Wissenschaft', which applies also to the humanities. Of course, there are differences between the various disciplines, sometimes even indicated as 'cultural'[1], but in this discussion emphasis will be laid on the communalities rather than the disparities between the disciplines.

1. C.P. SNOW (1959), *The Rede lecture.* Cambridge: Cambridge University Press.
W. LEPPENIES (1985), *Die drei Kulturen; Sociologie zwischen Literatur und Wissenschaft.* München: Hanser.

Scientific *research* is carried out in order to determine the nature and principles of what is being studied. Such research is diverse and multifaceted and cannot be captured in a single factual and normative description. However, although they may differ in methods and traditions, all sciences have a fundamental characteristic in common: they depend on argument and evidence, *i.e.* observations of nature, or of humans and their actions and products.

Science is not an enterprise carried out in isolation. Research cannot be done without drawing upon the work of other scientists and scholars; and in most cases it requires collaborating with others (cf. Merton's[2] communalism). And this collaboration assumes ever more an international character. It is also the scientific community that determines appropriate methods of research and the validation of findings. The contribution of scientific research to the extension of human knowledge can, therefore, only take place if its results are presented to others in such a way that they can judge their validity (Merton's organised scepticism).

There is another connection with the outside world. Not only do social and political forces affect the directions of research, science itself also affects greatly societal developments. The impact of science, now extending to nearly all fields of knowledge and its applications, has contributed immensely to society, even though its results can be and have been misused at times. It is the responsibility of scientists and researchers to do what they can to ensure that research is for the universal well being of mankind and the good of society.

Coercion of powerful persons or institutions, religious or political pressure, economic or financial interests can corrupt science. Science should, therefore, be as 'disinterested' and independent as possible and always impartial, and should have the freedom to adhere to its own laws and criteria. At the same time we have to acknowledge that scientists operate in a value-bound context. Their paradigmatic presumptions, their choice of subjects to be studied, the way they collect their data, the impact of their discoveries on the society all refer to the ethical and social context in which science proceeds.

### 2.2.2 Science and ethics

The ethical/social values and conditions referred to in the previous section accentuate again the ethical and social responsibility of the scientist. A distinction should be made between two categories of issues: problems related to science and society, emphasising the socio-ethical *context* of research, and problems related to scientific integrity, emphasising standards when *conducting* research. There is, of course, no perfect watershed between the two categories. Some forms of misconduct may have serious consequences for the health or wellbeing of citizens, and can, therefore, be seen as unethical in the broader sense of the word, but in the light of a discussion on a Code of Conduct the distinction may be clarifying.

Any ethical questions arise when science is regarded in a wider ethical/social context. Is the subject worthy of investigation? What are the consequences of such research? Could the research result in harm for people, nature or society, or be in conflict with basic human values? Is the research sufficiently independent of interested parties? Could a university or laboratory become too dependent on sponsored contract research? Could the researcher guard against the improper or selective use and misinterpretation of their findings, or against objectionable applications of their discoveries?

This document will not deal with this wider ethical *context* of science, but focus on the second category, the responsible *conduct* of research[3].

### 2.2.3 Integrity in science and scholarship: principles

Both the definition of scientific misconduct and the specification for proper scientific practice are based upon principles of scientific integrity. These are principles that all scientific and scholarly researchers and practitioners should observe individually, among each other and toward the outside world. These principles include the following:

- *Honesty* in presenting research goals and intentions, in precise and nuanced reporting on research methods and procedures, and in conveying valid interpretations and justifiable claims with respect to possible applications of research results.
- *Reliability* in performing research (meticulous, careful and attentive to detail), and in communication of the results (fair and full and unbiased reporting).
- *Objectivity:* interpretations and conclusions must be founded on facts and data capable of proof and secondary review; there should be transparency in

2. R.K. MERTON (1973), *The sociology of science: theoretical and empirical investigations.* Chicago: Cambridge University Press. The other three Mertonian norms of science are universalism, desinterestedness and organised scepticism.

3. As was requested at the establishment of the ESF Member Organisation Forum on Research Integrity (Madrid, 2008), and reiterated at the first meeting of the Chairs of the four working groups (Amsterdam, 2009).

the collection, analysis and interpretation of data, and verifiability of the scientific reasoning.

- *Impartiality* and *independence* from commissioning or interested parties, from ideological or political pressure groups, and from economic or financial interests.
- *Open communication*, in discussing the work with other scientists, in contributing to public knowledge through publication of the findings, in honest communication to the general public. This openness presupposes a proper storage and availability of data, and accessibility for interested colleagues.
- *Duty of care* for participants in and the subjects of research, be they human beings, animals, the environment or cultural objects. Research on human subjects and animals should always rest on the principles of respect and duty of care.
- *Fairness,* in providing proper references and giving due credits to the work of others, in treating colleagues with integrity and honesty.
- *Responsibility for future science generations.* The education of young scientists and scholars requires binding standards for mentorship and supervision.

### 2.2.4 Integrity in science and scholarship: misconduct

Violating these basic norms leads to research misconduct, which is the crux of inappropriate behaviour in science. Research misconduct is damaging to *science*, because it may create false leads for other scientists or the results may not be replicable, resulting in a continuation of the deception. It is also harmful to *individuals* and *society*: fraudulent research may result in the release and use of unsafe drugs, in the production of deficient products, inadequate instruments or erroneous procedures. Furthermore, if policy or legislation is based on the results of fraudulent research, harmful consequences are not inconceivable. But damage is also done through the subversion of the public's *trust in science*. The credibility of science would decline and trust in science as a dependable source of information and advice in respect of numerous decisions, so important for the welfare of mankind and society (environment, health, security, energy), would be subverted. This could lead to undesirable restrictions on permissible research, which could further damage the pursuit of knowledge.

There is some empirical evidence[4] that there is an increasing incidence of research misconduct. Pressure to publish, commercialisation, greater competition for funds, more opportunities for instance through the internet, evaluation practices, and the current career system for scientists, may all contriute to this unfortunate development.

The two most serious violations of the ethos of science are fabrication and falsification. *Fabrication* is making up results and recording or reporting them. *Falsification* is manipulating research processes or changing or omitting data. Fabrication and falsification can also arise in the reporting of other researcher's results, in the reporting of expert opinion and in the public dissemination of science. A third category of misdemeanour is plagiarism in proposing, performing, or reviewing research, or in reporting research results. *Plagiarism* is the appropriation of another person's ideas, research results or words without giving appropriate credit. The precise wording of an idea or explanation or illustrative material (such as original figures and photographs, as well as lengthy tables) in textbooks or popular material are protected by copyright laws, but nevertheless can be subject to plagiarism. Plagiarism is of a different order since it is supposed to be more injurious to fellow scientists than to science as such. However, we have seen that openness is one of the basic integrity principles, and that progress in science depends on communication and discussion among fellow scientists and on a well functioning peer-review system. And if scientists would hesitate or even refuse to practice this openness and communication for fear of not being recognised as devisor or author the quality of science would suffer as well.

Also *improper dealing* with such infringement of principles of integrity (attempts to cover up, reprisals to whistle-blowers and violations of due process) can be classified as misconduct. In general it should be underlined that research institutes, funders, academies, universities and other actors conducting and administering research have the duty to promote good research management so that research integrity is instilled into the culture.

It is generally accepted that the primary responsibility for handling cases of misconduct is in the hands of the employers of scientists doing research. Frequently this concerns the institute or university where the accused researcher works. These institutions should have a standing committee that deals with misconduct, or establish an *ad hoc* committee in case a serious allegation is brought forward.

4. Reported by N. Steneck at the ESF-ORI first World Conference on Research Integrity, *Fostering Responsible Research*. Lisbon, Portugal, 16-19 Sept., 2007. The same increase of misconduct was generally observed by European Academy Presidents in a survey conducted in 2007, and reported by P.J.D. Drenth (*Strengths and weaknesses of current policies and practices*) at the same Lisbon conference.

Furthermore, there is a general consensus on the need for a due and fair process, that is uniform and sufficiently rapid, and leads to proper outcomes and sanctions. A coordinating committee for facilitating international research misconduct investigations of the OECD has formulated a number of overarching principles for investigating research misconduct in international collaborative projects, that can be adopted for general application. Annex I contains recommended principles that follow the main lines of the OECD recommendations.

Responses will depend on the seriousness of the research misconduct. In this respect the level of intent of the misconduct, the consequences of the behaviour, and other aggravating and mitigating factors should be considered. It has to be shown that the misconduct was committed intentionally, knowingly, or recklessly. As standard proof for the culpability of a suspected researcher 'preponderance of evidence' should be applied. It should be stipulated that research misconduct does not include honest errors or differences in opinion.

It should be recognised that the demarcation line between unacceptable and still acceptable behaviour is not always clear and beyond academic debate. Where does one draw the line between verification on a too small sample and the illustration of an argument with 'case' data? Where is the boundary between plagiarism and careless citation? Was an incorrect, but 'favourable' statistical technique truly chosen deliberately? Was a biased selection of data meant to start a scientific discussion or intended to present a full review of the evidence?

In the literature another class of misconduct is discussed, the 'questionable research practices' (QRP). Three groups of misbehaviour fall within QRP: Firstly: personal misconduct: intimidation of students, harassment, discrimination, insensitivity to social or cultural norms in doing research, misuse of funds, etc. Although we deal with undesirable and, at times, unacceptable conduct here it is not 'scientific misconduct', since it does not affect the integrity of the research record. Much of this misbehaviour is subject to generally applicable legal and social penalties that apply to everyone.

Secondly: a varied group of bad research practices, such as bad data management, incorrect research procedures, or some publication related misconduct. Bad practices are not acceptable and often harmful to the public's trust in science. They need correction indeed, but are not necessarily basic infringements of scientific integrity. The next section will deal with this category.

In the third place minor misdemeanours that may not lead to formal allegations and investigations, but are just as damaging given their probable frequency: some 'adjustment' of data, cutting a corner, omitting an unwelcome observation... It should be clear that here we deal with unacceptable violations of the principles of scientific integrity: it is falsification *in statu nascendi*. If it occurs with students or junior scientists, it should be corrected through proper supervision and mentorship. With more experienced researchers, especially if seen to be repeated, it should be treated more seriously.

It should be emphasised that the principles discussed in the previous section and the infringements defined in this section refer to *fundamental* and *universal* norms for responsible conduct in research. There is no need for cultural or regional adaptations or compromises in a Code of Conduct that encompasses these principles and infringements.

### 2.2.5 Good practices

In addition to fabrication, falsification and plagiarism many other forms of objectionable practices in scientific research deserve attention. Some of them have serious moral or legal consequences, others may create nuisance, discontent or procedural dissension. Many of them may undermine public trust in science same as basic infringements of scientific integrity, and should therefore be taken seriously by the scientific community. The following categories may be distinguished:

1. *Data practices*, including data management and storage, placing data at the disposal of colleagues who want to replicate the findings, adequate preservation of original data.
2. *Research procedures*. Deviations from desired practices include insufficient care for research subjects[5], insufficient respect to human subjects, animals, the environment, or cultural heritage; violation of protocols; failure to obtain informed consent; insufficient privacy protection; improper use of laboratory animals; or breach of trust (*e.g.* confidentiality). Improper research design, carelessness in experimentation and calculations that lead to gross errors, may also be classified under this heading, although the partition-wall between incompetence and dishonesty may be rather thin here.
3. *Publication-related* conduct, including authorship practices. It is unacceptable to claim or grant undeserved authorship and to deny deserved

5. The treatment of human subjects in research is in many countries regulated by law.

authorship, or to inadequately allocate credit. Breaching of publishing rules, such as repeated publication, salami-slicing of publication, no or a too long delay in publication, or insufficient acknowledgement of contributors or sponsors, fall within this category as well.

4. *Reviewing* and *editorial* issues, including independence and conflict of interests, personal bias and rivalry, appropriation of ideas.[6]

Again, the dividing line between acceptable and not acceptable practices is somewhat vague, and may vary over nations, regions or disciplines. But there is also a thin borderline between some violations of these practices and the serious types of misconduct, as discussed in section 2.2.4. Unjustified claimed authorship and ghost authorship are forms of falsification, purloining ideas as an editor or reviewer is plagiarism, causing pain or stress to research participants or to expose them to hazards without informed consent is certainly ethically unacceptable behaviour. But in general these 'good practices' refer to practical rules and arrangements in conducting, administering and reporting research.

Unlike the fundamental principles of scientific integrity and the violating of these principles through fabrication, falsification or plagiarism, which have a universal character, good practices as outlined above may be subject to cultural differences: definitions, traditions, legislative regulations and institutional provisions may vary over nations or regions, sometimes also over disciplines. A required system of regulations of good practices in research should, therefore, not be part of a universal Code of Conduct. It should rather be developed in the form of national or institutional *Good Practice Rules*, recognising the legitimate differences between national, disciplinary or institutional systems. Nevertheless a list of issues to be addressed in such Rules (see sub 2.3 below) should be provided, including recommendations on how to deal with them. In general such recommendations are based on general assent, but, as said, rules of procedure must allow for national differences and cannot claim catholicity.

6. A number of suggestions with respect to headings 3 and 4 in the Rules of Procedure are extracted from the excellent publication of the Committee on Publication Ethics (COPE) *Guidelines on good publication practice*. We are also grateful for the Committee's comments on an earlier version of this proposal.

## 2.3 Guidelines for Good Practice Rules

In these guidelines the following categories of good practices in scientific and scholarly research are distinguished: proper data practices, proper (technical as well as responsible) research procedures, well-considered publication-related conduct and responsible reviewing and editorial procedures.

Each country should adopt, amend or supplement these recommendations in accordance with its legislative requirements or traditions and compose an own set of Good Practice Rules. Then the scientific society will require all its members to adhere to these Rules, and will also ask its institutes and scientific organisations to require their own members to comply.

**1. Good data practices: availability and access**

- All primary and secondary data should be stored in a secure and accessible form.
- Original scientific or scholarly research data should be documented and archived for a substantial period (at least 5 years, and preferably 10 years).
- Research data should be placed at the disposal of colleagues who want to replicate the study or elaborate on its findings.
- Freedom of movement of scientists, the right to peaceably and voluntarily associate with other scientists, and the freedom of expression and communication should be guaranteed.

**2. Proper research procedures**

- All research should be designed and carried out in a careful and well considered manner; negligence, haste, carelessness, and inattention should be avoided, so as to prevent human errors.
- Researchers should try to deliver what has been promised in the application for support or funding.
- Researchers must seek to minify any harmful impact on the environment, and should be aware of the need for sustainable management of resources; this implies an efficient deployment of the (financial and other) resources, and minimisation of waste.
- Clients and/or sponsors should be alerted to the ethical and legal obligations of the researcher, and to the possible restrictions this may imply.
- Clients and/or sponsors should be made aware of the vital importance of publication of the research findings.

– Confidentiality of data or findings should be respected by the researcher when it is legitimately required by the client or employer.
– Proper account will be given to the sponsor in case a grant or co-funding was received for the research.

**3. Responsible research procedures**

– All research subjects, be they human, animal, cultural, biological, environmental or physical, should be handled with respect and care.
– The health, safety or welfare of the community, or of collaborators and others connected with the research, should not be compromised.
– Sensitivity to age, gender, culture, religion, ethnic origin and social class of research subjects should be evinced.
– Human subject protocols should not be violated: this implies complying with the requirement of informed consent on the basis of adequate and appropriate information, and to voluntary agreement to participate, treating personal information with highest possible confidentiality, avoiding unnecessary deception, and using the obtained information only for the purpose of the investigation.
– The use of animals in research is acceptable only if alternative ways to achieve the results have been investigated and have been found inadequate; any harm or distress to be inflicted on an animal must be outweighed by the realistic expected benefits and must be minimised as much as possible.

**4. Publication-related conduct**

– Researchers should publish the results and interpretations of their research in an open, honest, transparent and accurate manner.
– Researchers should strive to ensure the earliest possible publication of the results of their research, unless commercial or intellectual property considerations (*e.g.* patent application) justify delay.
– Authorship should only be based on a creative and significant contribution to the research (*i.e.* contribution to the design, data collection, data analysis, or reporting, not for general supervision of a research group or editing of text). Guest authorship (*i.e.* listing authors who do not qualify) or ghost authorship (*i.e.* omitting individuals who meet authorship criteria) are not acceptable. All authors are fully responsible for the content of the publication, unless it is specified they are responsible only for a specific part of the study and publication.
– Sequence of authors should be agreed by all authors, ideally at the start of the project or the initiation of the article/monograph, and may follow national and/or disciplinary codes. The criteria for deciding the order of authors should be agreed at the start of the project or writing.
– The work and contribution of collaborators and assistants should be acknowledged if appropriate, with their permission.
– All authors should declare any relevant conflict of interest, which may be financial, commercial, personal, academic, or political.
– Important work and intellectual contributions of others that have influenced the reported research should be appropriately acknowledged. Related work should be correctly cited. References should be restricted to (paper or electronically) printed publications and publications 'in print'.
– In communication with the general public and in popular media the same standards of honesty and accuracy should be maintained; any attempt to exaggerate the importance and practical applicability of the findings should be resisted.
– Publication of the same (or substantial parts of the same) work in different journals is acceptable only with the consent of the editors of the journals and where proper reference is made to the first publication. In the author's CV such related articles must be mentioned as one item.
– Financial or other types of support for the research and its publication should be properly mentioned and acknowledged.

**5. Reviewing and editorial issues**

– An editor or reviewer who has a relevant potential conflict of interest – which may be personal, academic, political, commercial or financial – should, ideally, withdraw from involvement in any publication decision. If the conflict is considered minor or unavoidable it should be disclosed to the readership.
– Reviewers should provide thorough, accurate, objective, and justifiable assessments in a timely manner.
– In the review of a manuscript, confidentiality must be maintained.
– Reviewers and editors shall not make any use of the data or interpretations presented in submitted manuscripts without the author's permission.
– The same standards and rules apply in the

review process with regard to projects or programmes submitted for funding, rewards or reconnaissance purposes.
– The same standards and rules apply in the review process of individuals or institutions for appointments, promotion, awards or other forms of recognition.

## 2.4 International Collaborative Research

International scientific collaboration is increasing sharply, not only because of the growth of international funding and the stimulation of modern communication technology, but also because science itself has developed into a truly collaborative and international activity. Common agreement on standards of scientific integrity, and on rules and procedures to deal with cases of misconduct, is of crucial importance in international research as well. This is the main argument for an internationally accepted Code of Conduct.

In international collaboration partners should agree to conduct their research according to the standards of research integrity as developed in this document, and to bring any suspected deviation from these standards, in particular alleged research misconduct, to the immediate attention of the project leader(s) and senior responsible officer in the university or research institute (employer). Such a case should be investigated according to the policies and procedures of the partner with the primary responsibility for the project, while respecting the laws and sovereignty of the States of all participating parties.

In formal, large scale, and often externally funded international research projects there may be questions as to which country should conduct the investigation if allegations of misconduct are raised, and how; and, even more importantly, what is to happen when the relevant national policies are at odds with each other. The Coordinating Committee of the OECD Global Science Forum, referred to sub 2.2.5, recommends the establishment of an agreement for collaborative research that addresses the promotion of responsible conduct in research and describes the procedures for the investigation of allegations of research misconduct within the project. The Committee has produced a boilerplate text for International Agreements, which should be embodied in the formal documents that establish the collaborative project. This boilerplate text is included under Annex II.

## 2.5 Annexes

### Annex I: Recommended Principles for Investigating Research Misconduct

**Integrity of the process**

- Investigations into research misconduct allegations must be fair, comprehensive and conducted expediently but without compromising accuracy, objectivity, and thoroughness.
- Those parties involved in the procedure must ensure that any interests they have which might constitute a conflict of interest are disclosed and managed.
- Detailed and confidential records will be maintained on all aspects of the procedure.

**Uniformity**

- Procedures for dealing with misconduct should be spelled out in sufficient detail so that the transparency of the process and uniformity within one domain of jurisdiction from one case to another is ensured.

**Fairness**

- Investigation of research misconduct allegations should be conducted in a manner that is fair to all parties and in accordance with relevant laws.
- Persons accused of research misconduct must be given full details of the allegation(s) in writing and allowed a fair process for responding to allegations, asking questions, presenting evidence, calling witnesses, and providing responses to information presented.
- Allow witnesses to be accompanied by or seek advice and assistance from anyone of their choosing.
- Proportionate action should be taken against persons found to have committed research misconduct.
- Any action(s) taken should be subject to appeal. Of course, there should be an authority issuing the final decision.

**Confidentiality**

- The procedure should be conducted as confidentially as possible, in order to protect those involved in the investigation. Such confidentiality should be maintained provided this does not compromise the investigation of the allegation, health and safety, or the safety of participants in research.
- Where possible any disclosure to third parties should be made on a confidential basis.

- If the organisation and/or its staff have legal obligations to inform third parties of research misconduct allegations, those obligations must be fulfilled at the appropriate time through the correct mechanisms.

**No detriment**

- Anyone accused of research misconduct is presumed innocent.
- No person should suffer any unnecessary penalty when accused of research misconduct before the allegation is proven.
- No person should suffer any penalty for making an allegation of research misconduct *in good faith*, but action should be taken against persons found to have made allegations in bad faith.



## Annex II: Boilerplate text for International Agreements, as suggested by the OECD Global Science Forum Coordinating Committee for facilitating international misconduct investigations

We, the parties, agree:

- to conduct our research according to the standards of research integrity, as defined in the 'Guidance Notes for Developing Procedures to Investigate Research Misconduct Allegations in International Collaborative Research Project' (*www.oecd.org/sti/gsf*) and other appropriate documents, including: (*specify the national codes of conduct and disciplinary or national ethical guidelines that apply*);
- that any suspected deviation from these standards, in particular alleged research misconduct, will be brought to the immediate attention of (*all designated contact point(s)*) and investigated according to the policies and procedures of (*to be filled in with the body with primary responsibility*), while respecting the laws and sovereignty of the States of all participating parties;
- to cooperate in and support any such investigations; and
- to accept (subject to any appeal process) the conclusions of any such investigation and to take appropriate actions.

# 3.
# ESF Member Organisation Forum on Research Integrity

The ESF Member Organisation Forum on Research Integrity was established in 2008 following the First World Conference on Research Integrity held in Lisbon in September 2007 for which the ESF acted as co-organiser with the US Office of Research Integrity. It was clear that there had to be substantial follow-up at the European level to the whole issue of research integrity.

This Forum was set up with the objectives to serve as a platform for the exchange of information on good practice, to support and encourage those organisations which did not yet have the appropriate support to develop such structures, to learn from others and initiate debates in their respective communities. The members of the Forum are formed by 31 research funding and performing organisations from 22 countries. Honorary President Pieter Drenth represented ALLEA in the MO Forum and led Working Group 2 (Code of Conduct).

The outcomes of this ESF Member Organisation Forum on Research Integrity and of the work of the ALLEA Standing Committee on Science and Ethics were channelled as the European input to the second World Conference on Research Integrity in Singapore in July 2010.

It was envisaged that the Forum would integrate its conclusions into a comprehensive proposal for promoting and safeguarding integrity in scientific research and practice at the national and European levels. These conclusions are published in a full report 'Fostering Research Integrity in Europe' and its Executive Report that can be found at http://www.esf.org/activities/mo-fora/research-integrity.html.

For the implementation of this proposal, an agreement in principle was reached on a division of labour between research councils, research performing organisations, Academies, and research integrity officers.

## ESF MO Forum on Research Integrity – List of members

| Member | Organisation | Country |
|---|---|---|
| Jean-Pierre Alix | National Centre for Scientific Research (CNRS) | France |
| Emilio Bossi | Swiss Academies of Arts and Sciences | Switzerland |
| Cinzia Caporale | National Research Council (CNR) | Italy |
| Tommy Dahlén | Swedish Council for Working Life and Social Research (FAS) | Sweden |
| Thomas Dantes | Max Planck Society (MPG) | Germany |
| Glyn Davies | Economic and Social Research Council (ESRC)/RCUK | United Kingdom |
| Wim de Haas | Royal Netherlands Academy of Arts and Sciences (KNAW) | The Netherlands |
| Dirk de Hen | Royal Netherlands Academy of Arts and Sciences (KNAW)/ENRIO | The Netherlands |
| Umberto Dosselli | Istituto Nazionale di Fisica Nucleare (INFN) | Italy |
| Pieter Drenth *(Chair WG 2)* | All European Academies (ALLEA) | |
| Charlotte Elverdam<br>Frej Sorento Dichmann | Danish Agency for Science, Technology and Innovation (FIST) | Denmark |
| Sonia Ftacnikova *(Chair WG 1)* | Slovak Research and Development Agency (APVV) | Slovakia |
| Pilar Goya<br>Pere Puigdomènech | Consejo Superior de Investigaciones Científicas (CSIC) | Spain |
| Saulius Grybkauskas | Research Council of Lithuania (LMT) | Lithuania |
| Michelle Hadchouel | French National Institute of Health and Medical Research (Inserm) | France |
| Maura Hiney *(Chair WG 3)* | Health Research Board (HRB) | Ireland |
| Kirsten Hüttemann | Deutsche Forschungsgemeinschaft (DFG) | Germany |
| Cihan Kiziltan | The Scientific and Technological Research Council of Turkey (TÜBITAK) | Turkey |
| Elisabeth Kokkelkoren | Fund for Scientific Research (FRS-FNRS) | Belgium |
| Tomas Kopriva | Czech Science Foundation (GAČR) | Czech Republic |
| Pavel Kratochvil | Academy of Sciences of the Czech Republic (ASCR) | Czech Republic |
| Milda Naujokaite | Lithuanian State Science and Studies Foundation | Lithuania |
| Livia Puljak *(Chair WG 4)* | National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia | Croatia |
| Claire Ribrault | École Normale Supérieure | France |
| Markus Roethlisberger | Swiss National Science Foundation (SNF) | Switzerland |
| Asael Rouby<br>Frank Bingen | National Research Fund (FNR) | Luxembourg |
| Michèle Salathé | Swiss Academies of Arts and Sciences | Switzerland |
| Aki Salo | Academy of Finland | Finland |
| Jan Stålhammar | Swedish Research Council (VR) | Sweden |
| Krista Varantola<br>Eero Vuorio | Delegation of the Finnish Academies of Science and Letters | Finland |
| Ulrike Varga | Austrian Science Fund (FWF) | Austria |
| Evie Vereecke | Research Foundation Flanders (FWO) | Belgium |
| Torkild Vinther<br>Gro Elisabeth Maehle Helgesen | Research Council of Norway | Norway |

| | |
|---|---|
| Alan Donnelly | European University Association (EUA) |
| Rüdiger Klein | All European Academies (ALLEA) |
| Laura Marin | European Science Foundation (ESF) |

Forum Working Groups:
**WG 1:** raising awareness and sharing information • **WG 2:** code of conduct •
**WG 3:** check list for setting up national structures • **WG 4:** research on research integrity

# 4.
# ALLEA Standing Committee on Science and Ethics

ALLEA has been working on the issue of scientific and research integrity since the mid-1990's. The issue was first broached by Pieter Drenth during the ALLEA Conference on 'European Scientists between Freedom and Responsibility' in 1996. Ever since, and especially in response to the recommendations contained in the ESF Science Policy Briefing 'Good Scientific Practice' (2000) which allotted a specific role to the Academies in formulating codes of good scientific practices, the ALLEA Standing Committee on Science and Ethics has been devoting attention to the topic of trust in science. In 2003, ALLEA published the 'Memorandum on Scientific Integrity', which was an adaptation for a European audience from a Dutch document issued by the Royal Netherlands Academy of Arts and Sciences, and which subsequently was translated into several languages. It has been in use in many countries until today.

ALLEA President (and later Honorary President) Pieter Drenth presented the Memorandum on numerous occasions also outside of Europe and in international organisations (UNESCO), and he participated in OECD's co-ordinating Committee for facilitating international research misconduct investigations (2007-2009).

More closely related to the ESF activity, ALLEA hosted chairs' and cross-working group meetings of the ESF Member Organisation Forum on Research Integrity and, in June 2009, a consultative meeting was convened with ca. 30 Member Academies that debated in detail and improved in many ways the earlier drafts and ultimately agreed on the Code of Conduct.

As a follow-up, ALLEA is engaged in awareness raising activities among the scientific and scholarly community across Europe. Beyond Europe, ALLEA convened a workshop with Asian Academies in Singapore in 2010 on 'Strengthening research integrity' in global research collaboration, and is now participating, as an European inter-academy network, in the development of global recommendations (IAP).

## Academy representatives at and contributors to ALLEA Consultative meeting on Research Integrity, Berne 2009

| Member | Organisation | Country |
|---|---|---|
| Gudar Beqiraj | Academy of Sciences of Albania | Albania |
| Jean-Noël Missa | Académie royale des Sciences, des Lettres et des Beaux-Arts de Belgique | Belgium |
| Paul van Houtte | Royal Flemisch Academie of Sciences and Arts of Belgium | Belgium |
| Zvonko Kusic | Croatian Academy | Croatia |
| Pavel Kratochvil | Academy of Sciences of the Czech Republic | Czech Republic |
| Ain-Elmar Kaasik | Estonian Academy of Sciences (ap.) | Estonia |
| Katri Mäkinen | Delegation of the Finnish Academies of Science and Letters | Finland |
| Jean-François Bach | Académie des Sciences | France |
| Tamaz Gamkrelidze | Georgian National Academy of Sciences | Georgia |
| Ludger Honnefelder | Union of the German Academies | Germany |
| László Fésüs | Hungarian Academy of Sciences | Hungary |
| Sinead Riordan | Royal Irish Academy | Ireland |
| Nathan Sharon | Israel Academy of Sciences and Humanities | Israel |
| Carlo Di Castro | Accademia Nazionale dei Lincei (ap.) | Italy |
| Rexhep Ismajli<br>Eqrem Basha | Kosova Academy of Sciences and Arts | Kosova |
| Vija Klusa | Latvian Academy of Sciences (LAS) (ap.) | Latvia |
| Perko Vukotic | Montenegrin Academy | Montenegro |
| Pieter Drenth<br>Wim de Haas | Royal Netherlands Academy of Arts and Sciences | The Netherlands |
| Andrzej Gorski | Polish Academy of Sciences | Poland |
| Canelas Pais | Academy of Sciences of Lisbon | Portugal |
| Paun Ion Otiman<br>Ionel Haiduc | Romanian Academy | Romania |
| Michael Ugrumov | Russian Academy of Sciences | Russia |
| Momcilo Spremic | Serbian Academy of Sciences and Arts | Serbia |
| Ján Bakoš | Slovak Academy of Sciences | Slovakia |
| Bengt Gustafsson | Royal Swedish Academy of Sciences | Sweden |
| Emilio Bossi<br>Michèle Salathé<br>Beat Sitter-Liver<br>Peter Suter<br>Markus Zürcher | Swiss Academies | Switzerland |
| Ismail Hakki Ulus | Turkish Academy of Sciences | Turkey |
| Rüdiger Klein | All European Academies (ALLEA) | The Netherlands |

## Core members of the Committee in 2009

| | |
|---|---|
| Ludger Honnefelder *(Chair)* | Union of the German Academies of Sciences and Humanities |
| Pieter Drenth | Royal Netherlands Academy of Arts and Sciences (Hon. President ALLEA) |
| Ene Ergma | Estonian Academy of Sciences |
| Ayse Erzan | Turkish Academy of Sciences |
| Dagfinn Føllesdal | Norwegian Academy of Science and Letters |
| Hans Galjaard | Royal Netherlands Academy of Arts and Sciences |
| Pavel Kratochvíl | Academy of Sciences of the Czech Republic |
| Ida Nicolaisen | Royal Danish Academy of Sciences and Letters |
| Beat Sitter-Liver | Swiss Academy of Humanities and Social Sciences |
| Gérard Toulouse | Académie des Sciences, France |
| Jože Trontelj | Slovenian Academy of Sciences |
| Edoardo Vesentini | Accademia Nazionale dei Lincei, Italy |
| Rüdiger Klein | All European Academies, *ex officio* |

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