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ALLEA – ALL European Academies
P.O.Box 19121, 1000 GC Amsterdam, The Netherlands
Tel. +31-(0)20-5510754
Fax +31-(0)20-6204941
E-mail: secretariat@allea.org
Internet: www.allea.org

Royal Netherlands Academy of Arts and Sciences (KNAW)
P.O.Box 19121, NL - 1000 GC Amsterdam
Tel:+31-(0)20-5510700
Fax: +31-(0)20-6204941
E-mail: [knaw@bureau.knaw.nl](mailto:kaw@bureau.knaw.nl)
Internet: <http://www.knaw.nl>

Nederlandse Organisatie voor Wetenschappelijk Onderzoek (NWO)
P.O. Box 93138, NL - 2509 AC Den Haag
Tel.:+31-(0)70-3440640
Fax: +31-(0)70-3850971
E-mail: nwo@nwo.nl
Internet: <http://www.nwo.nl>

Association of Universities in The Netherlands (VSNU)
P.O.Box 19270, NL - 3501 DG Utrecht
Tel.: +31-(0)30-2363888
Fax: +31-(0)30-2333540
E-mail: post@vsnu.nl
Internet: <http://www.vsnu.nl>

Memorandum on Scientific Integrity

Colophon

ALLEA - is the Federation of 48 Academies of Arts and Sciences in 38 European countries

ALLEA - advises her member academies, acts as a platform for her members and offers advises in the fields of science and science policy

ALLEA - strongly supports ethic ways of dealing with science, science policy and public policy in general.

ALLEA – ALL European Academies
P.O. Box 19121
1000 CG Amsterdam, The Netherlands
Tel. +31 - 20 - 5510754
Fax +31 - 20 - 6204941
E-mail secretariat@Allea.org
URL <http://www.Allea.org>

ALLEA
President
Prof.dr. Pieter J.D. Drenth

Staff
Dr. Johannes J.F. Schroots, Executive Director
Maarten G. Langemeijer, MA, Executive Secretary

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Foreword

At the 2000 ALLEA General Assembly meeting in Prague the then chairman of the Standing Committee Science and Ethics, prof. Drenth, reported on the results of a modest survey among the ALLEA-members on scientific misconduct, and the role of Academies/ALLEA in dealing with, or preventing such misconduct.

Distinctions were made between three types of misconduct: Fraud (fabrication, falsification, selective use of data); Deceit (questionable methodology, negligence in sampling, inaccurate rendition); and Infringement of intellectual property rights (pinching ideas, plagiarism), as described by Drenth (1999).

In the survey four questions were asked: Is scientific misconduct a serious and growing problem in your country? Is there a formal procedure or protocol to deal with these problems in your country (role of Academy?)? Is there a need for a prescriptive code of ethical conduct, or good manners in science? What is a possible role of ALLEA in these matters?

The reactions varied, but in general scientific misconduct was seen as a case for growing concern. Often no official procedure or protocol existed, but cases were handled by the leadership of the institute in question. Sometimes academies were involved in an advisory or evaluative capacity. The general reaction on the question on the need for a code of conduct was affirmative; in certain cases such a code was already available. Almost all ALLEA-members (except one or two who did not acknowledge the problem as a universal, but rather as a country specific matter) welcomed the idea of ALLEA taking some initiative or role in the further development or promotion of a 'code for good manners in science' in Europe.

As said, various academies indicated to have developed already such a prescriptive set of rules, e.g. the *Code of science* in Estonia, *Good manners in science* in Poland, *Memorandum on scientific integrity* in the Netherlands, *Scientists's code of ethics* in Latvia. Well known is the NAS publication *On being a scientist*. In 1998 the Deutsche Forschungs Gemeinschaft issued *Proposals for safeguarding good scientific practice* as a reaction on a disturbing case of collective fraud. In December 2000 the European Science Foundation issued a policy briefing on this issue under the

title *Good scientific practice in research and scholarship*, in which it was recommended among others that:

- National academies should draw up national codes of good scientific practice in research and scholarship where these do not yet exist; and
- National academies should initiate discussions on the most appropriate national approach to procedures for investigating allegations of scientific misconduct, whether by means of an independent national body, formal procedures in each university and research institution, or by other means.

In this vein the Royal Netherlands Academy of Arts and Sciences (KNAW) has taken some measures to work out this responsibility. First, it has published a brochure presenting the basic rules of good conduct and practices for scientists, and discussing some dilemmas and temptations they may encounter in their daily scientific work. Secondly, it has issued, in close cooperation with the Netherlands Research Council (NWO) and the Association of Universities in the Netherlands (VSNU), a Memorandum on Scientific Integrity in which among others the rules of proper scientific conduct are elucidated, and the creation of a National Committee on Scientific Integrity is announced. The memorandum has been translated and stripped of the Dutch specificities, and is attached to this letter.

In this Memorandum it is defended that an important instrument for promoting and maintaining scientific integrity is a National Committee on Scientific Integrity (NCSI, in Dutch: LOWI), to be appointed by and operating under the auspices of the National Academy of Arts and Sciences. The NCSI is not meant to be an 'ombudsman', neither a general bureau of complaints, or a 'higher court of appeal'. It remains an organ with an advisory function vis-à-vis the Boards of universities or Directors of research institutes, in which hands the primary responsibility for dealing with cases of misconduct lies, and who have to set up their own procedures to deal with complaints regarding the infringements of scientific integrity. In principle, the NCSI will consider complaints after they have been dealt with by the institution where the alleged infringement has taken place, and it only deals with cases which have been submitted by one of the interested parties, the complainant, the accused or the executive board of the relevant institute. Should the NCSI decide that the case was dealt with in an insufficient or careless manner, it will advise the institution to recommence the procedure. In certain cases, however, the NCSI may decide, even though

the case has been properly dealt with in according with the formal criteria, that there are grounds for re-examination of the decision of the institution. It will then advise the institution to do so, notifying all relevant parties in the case. For more details on responsibilities, procedures, and sanctions we refer to the text of the Memorandum which is enclosed.

The Standing Committee on Science and Ethics of ALLEA is of the opinion that the ideas worked out in this Memorandum are certainly worthwhile to consider by ALLEA's Member Academies. The Committee especially appreciates the procedure followed by the Netherlands' Academy in seeking close cooperation and approval by the National Research Council and the Association of Universities. Of course, the implementation of this proposal will depend on the position and the power of the different Academies within their countries, but the SCSE would recommend to the Member Academies to take careful notice of the Memorandum, and to see whether this may be one of the avenues for the implementation of the aspirations agreed upon at the Prague General Assembly (2000), and the recommendations made by the ESF, as stated above.

Gérard Toulouse
ALLEA Standing Committee
on Science and Ethics (Chair)

Pieter JD Drenth
President ALLEA

1. Introduction

This memorandum is intended for staff at universities and research institutes* who either carry out scientific research or are involved in it. The memorandum intends to promote the application of general standards of scientific conduct to that research. In particular, it focuses on the way in which infringements of those standards should be dealt with.

The memorandum first deals with a number of general standards applying to scientific conduct. It then deals with various infringements of those standards. It goes on to discuss ways in which infringements of scientific integrity can be prevented and indicates the factors, which may play a role. An outline set of regulations for dealing with alleged infringements of scientific integrity is presented. The memorandum concludes with a few remarks on sanctions, which may be imposed by the employer in cases of proven scientific misconduct.

2. Professional scientific conduct

Scientific research is very diversified in nature and the topics it deals with are extremely varied. Similarly, research methods differ greatly from one another. Scientists working within different disciplines often follow different traditions and apply different codes of conduct. It is therefore impossible to give a detailed factual and normative description of scientific research, which is applicable to all disciplines. However, there are a number of general principles, which must be complied with in all branches of science. These relate to the normative aspects of research and generally accepted rules of con-

* Institutes financed through public funding; in The Netherlands primarily institutions affiliated with the Royal Netherlands Academy of Arts and Sciences (KNAW) or the National Research Council (NWO).

duct relating to it. They constitute the basic principles of what can be termed professional scientific conduct.

Scientific research is based on mutual trust on the part of researchers that each of them will carry out his or her research carefully and publish relevant information. It is impossible to provide a complete report of all research results; results do however have to be selected in such a way as to give a realistic picture of the findings and not hamper replication or further research. Other researchers must have the opportunity to evaluate results, for example in order to determine their value for subsequent research or to determine what the applications may be. The methods used to obtain the results must be described in such a way that others can determine their validity and are in a position to repeat the research or to extend it.

Scientific research exists by virtue of shared knowledge. Keeping research results secret hampers the growth of scientific knowledge. In the case of contract research, it may be necessary for the results to be kept confidential for a short period but ultimately they must be published in publicly accessible literature. In day-to-day practice competition is important for individual researchers. The rivalry which this produces may however be at odds with the necessary openness about methods and results needed for research to progress.

Scientific statements are based on 'objective' observation and logical reasoning. In this sense, science can be said to be value-free. However, the practical application of the results of research is definitely not value-free, given that it can have far-reaching effects outside the scientific field. When research results are of public interest because of the possible consequences for society, caution is needed, particularly in contacts with people other than fellow scientists, in order not to arouse unjustified expectations. Scientific researchers are sometimes employed by clients or sponsors or have some other form of relationship with them, a factor which may be at odds with the aim or the objectivity of the research. Possible conflicts of interest should be made known at an early stage.

3. Ways in which scientific integrity may be infringed

Scientific integrity may be infringed before the research is carried out (when acquiring grants or research assignments or when drawing up plans for research), while the research is being carried out, or when presenting or publishing the results.

Three categories of infringements of scientific integrity may be distinguished. Firstly, scientific misconduct arises if research results are falsified or if their presentation involves a degree of manipulation. A second form of an infringement of scientific integrity can be characterized as 'misleading'. It may be implied that empirical data are available even though that is not the case, techniques of analysis or statistical methods may be deliberately applied incorrectly, or samples may be chosen in a way that has an unacceptable influence on the results of the research or which does not allow overall conclusions to be drawn. The third category involves the theft of intellectual property. This may involve copying sections of articles or books or presenting the discoveries or ideas of others without mentioning the source and as if the author had produced or developed them himself.

The following types of conduct are examples of infringement of scientific integrity:

- acquiring or attempting to acquire grants by deception (pretending to possess certain expertise, deliberately misrepresenting previous results, arousing false expectations);
- falsifying results of literature studies, observation or experiment;
- selective presentation of results, specifically omitting unwanted ones;
- presenting fictitious data as the result of observation or experiment;
- deliberately applying statistical methods incorrectly in order to arrive at conclusions which are not justified by the data;

- inaccurately interpreting or deliberately misinterpreting the results or conclusions of research;
- plagiarising the results or publications of others; reproducing texts or results from others without acknowledgement;
- encouraging the incorrect interpretation of research results by the media through insufficient rigorous conduct;
- acting discourteously to colleagues and subordinates in order to influence the results of research;
- deliberately presenting the results and research records of others in an incorrect or tendentious manner;
- presenting oneself as an author or co-author without having contributed to any significant extent to the design or performance of the research concerned or the interpretation and writing up of its methods and findings;
- omitting the names of co-authors who have made a significant contribution to research, or including the names of persons who did not contribute to it or who only did so to an insignificant extent;
- carelessness in carrying out research, or in giving instructions for research, or omitting actions which would allow inaccuracies to be identified;
- disregarding rules of conduct which have been established for dealing with confidential data; copying test designs or software without permission.

The way in which patients and test subjects are to be dealt with during clinical scientific studies is supervised by the medical ethics committees of hospitals (including university hospitals). This issue does not fall within the remit of this memorandum or of the National Committee for Scientific Integrity (NCSI) which is to be set up (see below). This memorandum also does not deal with the treatment of animal and human test subjects during experimental research or with the protection of privacy in research in the social sciences.

4. Prevention

Everything possible should be done to ensure that researchers observe the basic principles of professional scientific conduct.

Training

The training provided for undergraduates, PhD students and other young researchers should pay serious attention to standards for scientific research. This involves attention to both basic principles and the implications for the practical course of events when carrying out scientific research.

Consciousness raising

The likelihood that scientific research will be carried out properly increases the more researchers are aware of the dilemmas facing them when carrying out research and of the temptation to make choices that are in conflict with what is considered to be sound scientific work.

Protocols

Creativity does not allow itself to be bounded by protocols. Leeway for researchers to display creativity is a necessary prerequisite for carrying out research. But, when dealing with the actual testing of ideas or the correct performance of experiments or observations, the availability of clear guidelines can improve the quality of the research. Familiarity with the rules and guidelines can ensure that general principles of proper research are actually observed. The integrity of scientific research will be promoted if there are clear procedures for dealing with complaints regarding alleged misconduct and by ensuring that procedures are followed, with respect for the rights and obligations of both the complainant (the person making an allegation of scientific misconduct) and the respondent (the person against whom an allegation is made).

5. Responsibilities

All those involved in scientific research bear responsibility for ensuring that it is carried out according to the applicable rules and for preventing abuses.

The researcher

Researchers are themselves responsible for the scrupulousness and precision with which their research is carried out. This applies to literature studies, to the design and performance of experiments or observations, and to reporting. The responsibility of researchers also extends to the supporting work of technical and administrative assistants. Reporting should attempt to be comprehensive, meaning that relevant results are described and that it is made clear and justified which results have been omitted.

The research coordinator

Research takes place within a context of collegial rivalry. Such rivalry can lead to pressure being brought to bear on individual researchers. Although a certain amount of pressure to perform can have a favourable influence on the progress and results of the work, excessive pressure may lead to the competitive element becoming more significant than collaboration and to scientific misconduct. Research coordinators must ensure that scientific competition provides a positive incentive for research.

Leadership of university/research institute

The management of organisations where research takes place is responsible for training young researchers, with standards of professional conduct being one of the issues addressed, and for promoting discussion of the dilemmas and temptations which can be expected in scientific practice.

The executive boards of the universities or institutes ensure that serious suspicions regarding the occurrence of infringements of scientific integrity are dealt with. They appoint one or more research integrity officers within their organisation to whom a suspected case of misconduct can be reported in confidence. The executive boards are also responsible for a procedure being put in place at their organisation setting out how such complaints are to be dealt with. Guarantees must be in place for protecting the rights and reputation of both the complainant and the person who is the subject of the complaint.

The deans of faculties and the directors of research institutes and research schools must ensure the proper implementation of the procedures and regulations, which have been put in place. The research integrity officer reports to the executive board of the university or institute, on his/her findings in cases of supposed infringements of scientific integrity, which have been notified to him/her. The board will then determine whether or not such an infringement has in fact taken place or whether further investigation is necessary. It is also the board that is responsible for imposing sanctions on researchers who are found to have engaged in scientific misconduct.

National Committee for Scientific Integrity (NCSI) in The Netherlands

The Royal Netherlands Academy of Sciences (KNAW), together with the Netherlands Research Council (NWO) and the Association of Universities in the Netherlands (VSNU), will set up a National Committee for Scientific Integrity (NCSI). Both the complainant and the respondent will be able to request NCSI to assess the manner in which the relevant institution has dealt with a complaint regarding scientific integrity and on the actual content of the institution's ruling. The three organisations will ensure that NCSI deals quickly and effectively with cases which are brought to its attention. NCSI findings will have the status of an advice. NCSI will provide its advice to the board of the institution where the case concerned has taken

place, with a copy being sent to all those concerned. The board of the institution where the complaint was submitted in the first instance will be, as employer the sole body responsible for the manner in which it is dealt with.

6. Notification of alleged cases of infringement of scientific integrity

When a violation of the principles of sound scientific conduct is suspected, the following procedure should be observed. The universities or research institutes are responsible for appointing one or more research integrity officers to whom alleged cases of improper scientific conduct within their own organisation can be reported. They must also ensure that the staff and students of the institution are sufficiently acquainted with the procedure for reporting suspected cases of scientific misconduct to the research integrity officer.

The institution must put in place a procedure that allows for both the complainant and the respondent to be heard. Anonymous complaints cannot be dealt with; 'whistleblowers' must be properly protected. The interests of the accused must also be protected in order to prevent damage to their reputation as a result of rumour. To this end the procedure must be fast and confidentiality must be ensured. Differences of scientific opinion must be aired in the usual media for scientific research; such differences of opinion are not grounds for complaints about scientific misconduct.

The university or research institute must determine whether a research integrity officer is appointed for the institution or organisation as a whole or for each separate department.

The research integrity officer will be required to produce a clear and unambiguous statement on alleged cases of infringement of scientific integrity; this will take the form of an advisory document submitted to the executive board. A research integrity officer may

not be a member of the executive board, a dean of a faculty or the director of a research school or research institute. The advice submitted may contain an evaluation of the complaint. It may also suggest that an ad-hoc committee should be set up to investigate the complaint further. The research integrity officer will notify those concerned of their right to request an opinion from NCSI after the executive board has given its ruling on the basis of the advice provided by the research integrity officer or by an ad-hoc committee.

7. National Committee for Scientific Integrity (NCSI)

KNAW, NWO and VSNU have determined that it is advisable for a National Committee for Scientific Integrity (NCSI) to be set up. NCSI can play a role, on the basis of voluntary commitment by the organisations and research institutes, in dealing with disputes relating to the scientific integrity. Universities and research institutes are responsible and competent to deal independently with complaints of infringement of scientific integrity. In order to promote concern for scientific integrity and the equal treatment of complaints, it is nevertheless important that the latter can be submitted to a national body. NCSI can also play a role as an intermediary if more than one institution or research organisation is involved in a complaint. Setting up NCSI can also have a preventative effect. NCSI will also indicate to the general public that institutions and research organisations are willing and able to deal openly with cases of the infringement of scientific integrity, whether or not they are well-founded.

NCSI will consist of a core committee of three persons appointed by the executive board of KNAW in consultation with NWO and VSNU. Three substitutes will also be appointed in the same manner to replace any member of the committee in cases where the alleged scientific misconduct has taken place at an institution where he or she works. Two additional members will be appointed should the core committee determine that the actual facts of a case should be inves-

tigated further. NCSI will act autonomously. Its tasks, powers and composition will be set out in a system of regulations drawn up by KNAW in consultation with NWO and VSNU.

NCSI will provide advice to the executive board of the university concerned, or to the research institute, on complaints regarding the infringement of scientific integrity. NCSI will consider complaints after they have been dealt with by the institution where the alleged infringement has taken place. It will only deal with cases which have been submitted to it by an interested party, namely the complainant or respondent, or the executive board of the relevant institution. The executive board of a university or research institute can also request NCSI's opinion on a case which is still under decision.

As has been stated earlier, universities, and research institutes have the responsibility and the authority to set up their own effective internal procedure to deal with complaints regarding the infringement of scientific integrity. In the first instance, NCSI will determine formally whether a complaint has been properly dealt with. In order to do so, it must satisfy itself that the complaint was dealt with by the institution concerned in such a way as to guarantee confidentiality and that both the complainant and the respondent were given sufficient opportunity to be heard. The complaint must also have been dealt with both carefully and speedily. Speed and care in dealing with complaints are both necessary in order to prevent reputations being damaged as a result of rumours. NCSI will also determine whether the report of an infringement was dealt with in accordance with the procedure put in place by the institution concerned. Should NCSI conclude that the case was dealt with in an inadequate or not sufficiently careful manner, it will advise the institution to recommence the procedure.

Should NCSI decide that, formally seen, a case has been properly dealt with, there may still be grounds (among others a reasoned objection by one of the parties involved) for a re-examination of the decision by the institution, taking into account the facts of the case.

As was mentioned above, in such cases two extra experts in the relevant scientific discipline will be added to the NCSI core committee. NCSI will have the right to hear persons and bodies and will have access to all the relevant information. NCSI will present its decision to the executive board of the institution concerned, with copies being sent to all concerned. NCSI's decision will have the status of an advice.

8. Sanctions

Should scientific misconduct be determined, various sanctions are available ranging from a reprimand to dismissal. The imposition of sanctions is subject to the civil service and labour legislation which applies to the employer-employee relationship within institutes and research organisations. Any sanctions imposed must therefore be permitted by the relevant legislation. This memorandum sets out the views of a large proportion of the scientific community on the way in which infringements of scientific integrity should be dealt with, but these views do not have the force of law.

Taking the necessary measures is the responsibility of the executive board of the institution at which an infringement of scientific integrity has taken place. Even if NCSI has been brought in, responsibility for imposing any sanctions remains with the executive board of the university or the organisation concerned; consequently, no further appeal to NCSI is possible in this respect.

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