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CADMUS

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The CADMUS Journal

The acronym of the South-East European Division of The World Academy of Art and Science – SEED – prompted us to initiate a journal devoted to seed ideas - to leadership in thought that leads to action. Cadmus (or Kadmos in Greek and Phoenician mythology) was a son of King Agenor and Queen Telephassa of Tyre, and brother of Cilix, Phoenix and Europa. Cadmus is credited with introducing the original alphabet – the Phoenician alphabet, with "the invention" of agriculture, and with founding the city of Thebes. His marriage with Harmonia represents the symbolic coupling of Eastern learning and Western love of beauty. The youngest son of Cadmus and Harmonia is Illyrius. The city of Zagreb, which is the formal seat of SEED, was once a part of Illyria, a region including what is today referred to as the Western Balkans and even more. Cadmus will be a journal for fresh thinking and new perspectives that integrate knowledge from all fields of science, art and humanities to address real-life issues, inform policy and decision-making, and enhance our collective response to the challenges and opportunities facing the world today.

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Promoting Leadership in Thought that Leads to Action
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Research Integrity:
A Vital Condition for Science & Scholarship

Pieter J. D. Drenth, Past President and Honorary President, All European Academies (ALLEA); Fellow, World Academy of Art & Science; Chairman of the Working Group 'Code of Conduct' of the ESF Member Organisation Forum on Research Integrity

Abstract

Research misconduct is a serious threat to science and to society. A variety of Codes of Conduct for research integrity have been developed in Europe by universities, academies of sciences and funding organisations, but this has resulted in a patchwork of codes and procedures, which hampers international collaborative research. ALLEA and ESF have taken the initiative to achieve more international harmonisation by developing a European Code of Conduct for Research Integrity. This paper presents a description of this Code, including the principles of scientific integrity, the violations of these principles, suggestions for good practices, and recommendations on how to deal with allegations of misconduct. This Code is a canon for self-regulation. Hopefully, it will establish standards across Europe that can eventually be held valid and implemented world-wide.

1. Misconduct in Science and Scholarship

During the last few decades an increasing number of unacceptable cases of misconduct in science and scholarship have been reported in the press. This is certainly due to the fact that the world of scientific and scholarly research has become more transparent and subject to critical control by the public press. But one cannot help thinking that there is an increasing prevalence of various forms of misconduct. Scientists are under mounting pressure to perform and to publish. Output scores, citation and h-indices are becoming increasingly important factors for appointments, tenure decisions, promotions and funding. The commercialisation of science, the harder competition for restricted funds, more opportunities through internet and an inadequate peer-review system for complex research projects have given rise to a climate in which scientists are too easily tempted to engage in unacceptable behaviour and to commit infringements upon the norms of proper and responsible research.

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Hard data on the exact prevalence of scientific misconduct are not so easy to get; reports and surveys are probably quite inaccurate. Scientists, and certainly the leadership of universities and research institutes exercise a natural reserve when it comes to exposing research misconduct. They are inclined to defend their profession, tend to keep the dirty laundry indoors, want to protect individuals, or are afraid to become the subject of public vilification. Moreover, given the far reaching consequences, one must be very sure of their facts when making charges. It could even lead to costly legal procedures, as Deyo et al. have shown in a case in which the pharmaceutical industry lobby applied undue pressure on researchers who intended to publish data that it found unwelcome.[1] It should also be recognised that the definition of various forms of misconduct is not always clear and unequivocal, and that the demarcation line between unacceptable and still acceptable behaviour is often vague and debatable. Nevertheless, some empirical data have become available lately, leading to the conclusion that major research misconduct may occur rather infrequently (Steneck, the principal advisor of the Office of Research Integrity (ORI) in the USA estimates between .1 % and 1% of funded research projects), but that in absolute terms it is given the scale of present day research, anything but a rare phenomenon. Steneck's estimate implies between 150 and 1500 cases per annum in the USA and between 100 and 1000 cases per annum in Europe. In addition, the fear expressed by some (among others the Presidents of European Academies in a modest survey that I conducted in 2000) who noticed far more small-scale fiddling with results and tampering with data does not seem unfounded.

Besides its reservations for reasons described above, the scientific world has also underestimated or scaled down the extension of research misconduct. Serious misbehaviour was seen as very exceptional and imputed to particular, probably even disturbed, researchers. Cases discussed in the press were considered anecdotal and blown up incidents. Science cherished the hope that self-regulation and the peer-review system would keep things under control. It was only fairly recently that the scientific world has come to the conclusion that such optimism is not justified, and that we deal with a serious development that could potentially undermine the very foundation of science and scholarship.

The effects of research misconduct are harmful indeed. Of course, in the first place, for science itself, incorrect theories are not disproved, false insights are not invalidated and deceptions continue. Individuals or the society at large may also suffer. Wrong applications may be defended, wrong treatments or drugs may be recommended and wrong decisions may be taken. In the third place trust in science will be subverted. As a result of disclosed cases of misconduct the general public will lose confidence in science as a useful source of information and a dependable base for decision making.

Therefore, given its occurrence and its injurious effects research misconduct is a serious threat for science itself as well as for the society at large. A proper and well accepted definition of (forms of) misconduct, reliable means of identification, and effective corrective actions deserve a high priority on the agenda of research institutes, universities, academies and funding organs. Besides, international scientific collaboration has increased sharply during the last decades, not in the least stimulated by electronic communication means and internet. Universities and research institutes as well as national funding organisations vigorously stimulate such international collaboration, and many international funding bodies (e.g. Framework Programmes of the European Commission) accept this as a mandatory condition.

> *It became evident that we need an international approach and agreement on norms and standards for scientific integrity and on ways of dealing with recurring misconduct.*

Of course, the requirements of scientific integrity apply equally strongly in international collaborative research. And it will be clear that a common agreement on norms, rules and standards within the collaborating parties is a prerequisite for the furthering of research integrity and for proper dealing with cases (allegations) of misconduct. And that is a serious difficulty. Many countries lack a coherent and generally accepted policy and approach in this field. Definitions, standards, procedures of dealing with allegations, and sanctions often differ between countries. Codes and rules of good practice vary or are even non-existent. It became evident that we need an international approach and agreement on norms and standards for scientific integrity and on ways of dealing with recurring misconduct. Supra-national scientific organisations, such as All European Academies (ALLEA), the European Federation of National Academies of Sciences and Humanities and the European Science Foundation (ESF), and also international learned societies with individual members, such as Academia Europaea and the World Academy of Art and Science (WAAS) should see the importance of this challenge and take up this gauntlet.

2. Coordination Initiatives

Codes of Conduct for research integrity are and have been developed by universities, research institutes, academies of sciences, funding organisations and national governments. As indicated above, however, this has resulted in a patchwork of codes and procedures, which is most inconvenient in (international) collaborative research. A number of initiatives to achieve more international harmonisation have been taken in recent years.

First of all, a series of World Conferences on research integrity may be mentioned. This first conference (*Research Integrity: fostering responsible research)* took place in Lisbon on Sept. 17-19, 2007. The second world conference in Singapore (July 21-24, 2010) resulted in the *Singapore Statement on Research Integrity,* emphasising four principles (honesty, accountability, professional courtesy, and good stewardship) and fourteen responsibilities (integrity and good practices). The third conference is planned for the year 2013 in Montreal, Canada.

The second initiative took place at the European level and resulted in a *European Code of Conduct* that will be discussed in the next section in some more detail.

As a follow up of the Lisbon Conference, ALLEA and ESF decided to combine forces and to prepare a project 'European Coordinated Approach to Research Integrity (ECARI)'. Objectives of this project were to share information and experiences, to provide a vehicle for benchmarking best practices, to stimulate the development of appropriate structures, and to encourage the development of common approaches across Europe. Within the framework of this project ESF, together with the Spanish National Research Council CSIC, organised a workshop on research integrity (*From Principles to Practice*, Madrid, Nov. 17-18, 2008), and started a Member Organisation Forum on Research Integrity with the objectives 'to serve

as a platform for the exchange of information on attempts and initiatives to ensure research integrity and to prevent misconduct, and to encourage organisations which do not yet have appropriate structures to initiate debates in their respective communities on adequate models'. The following four working groups were created with the task each to address one particular aspect of the problem area in question:

- WG 1 'Raising awareness and sharing information' (chair: Sonia Ftacnikova (SK)). The task of this working group was to develop and implement activities to continue raising awareness and sharing information on good practices to promote and safeguard research integrity.
- WG 2 'Code of Conduct' (chair: Pieter Drenth (NL)). This working group was to develop a Code of Conduct which defines core values to be pursued and norms to be complied with in responsible research, and which could be used as a template for national or institutional codes of conduct in Europe.
- WG 3 'Setting up national structures' (chair: Maura Hiney (IE)). This working group had to analyse and make proposals for setting up national and institutional structures to promote good research practices and deal with research misconduct.
- WG 4 'Research on scientific integrity' (chair: Livia Puljak (HR)). This working group had to develop and promote research programmes to map out what is already known and to better understand research misconduct (occurrences, contributing factors, effectiveness of various measures, etc.).

Each of the four working groups produced an interim report. Their insights and conclusions were integrated in a final report *Fostering Research Integrity in Europe* that appeared in March 2011 (www.esf.org). An executive summary had already been published earlier (June 2010) under the same title. The report hopes to offer a comprehensive strategy for promoting and safeguarding integrity in scientific and scholarly research and practice nationally and in the wider European context.

3. The European Code of Conduct

The Code of Conduct proposed by Working Group 2 emerged from a series of discussions both within WG2 and ALLEA on the basis of a preliminary discussion paper.[2] Evaluation and feedback were given by ALLEA's Standing Committee on Science and Ethics and by representatives of ALLEA's Member Academies at a special meeting in Berne (June 29-30, 2009). Each subsequent version was discussed and commented on by WG2. Pursuing this dual path of consultation and feedback the final proposal of the ESF Member Organisation Forum has also met with the general approval of the European National Academies associated in ALLEA. This is an important achievement, since in the further promotion and implementation of this code both the national funding organisations (strongly represented in ESF) and the national academies have to play an important role.

We present a few elements from the European CoC below. [*, 3]

*The full text of the Code can be found in the ESF publication (www.esf.org).

3.1 Principles

The Code starts with the formulation of 8 principles of scientific integrity. These principles have a fundamental and universal character. They apply to all countries and all disciplines and should be observed in pure research as well as applied settings. They include:

(1) *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 one's own or other's research results.

(2) *Reliability* in performing research (meticulous, no carelessness, no inattention), and in communication of the results (fair and full and unbiased reporting).

(3) *Objectivity:* founding interpretations and conclusions on facts and data capable of proof, transparency in the collection, analysis and interpretation of data, and general verifiability of the scientific reasoning.

(4) *Impartiality* and *independence* from commissioning or interested parties, from ideological or political pressure groups, and from economic or financial interests.

(5) *Open communication* in discussing the work with other scientists, in contributing to public knowledge through publication of the findings, in honest communication with the general public. This openness presupposes a proper storage and availability of data, and accessibility for interested colleagues.

(6) *Duty of care* for the object of research, be it a human being, animal, the environment or a product of culture. Research on human subjects should always rest on the principle of respect.

(7) *Fairness* in providing proper references and giving due credits to the work of others, in treating colleagues with integrity and honesty.

(8) *Responsibility for future science generations:* The education of young scientists and scholars requires binding standards for mentorship and supervision.

3.2 Violations

The Code continues defining and describing various forms of violation of these principles. Since the principles are universal, so are the condemnations of their violations. Here again we deal with universal basic standards. There is no room for cultural conditioning or contextualisation. These violations include the following:

(1) Fabrication: making up results and recording or reporting them as if they were real.

(2) Falsification: manipulating research processes or changing or omitting data.

(3) Plagiarism: the appropriation of other people's ideas, research results or words without giving proper credit.

(4) Minor misdemeanours (a little tampering with data, leaving out an unwelcome observation, a selective citation) may not lead to formal investigations, but are just as damaging given their probable frequency, and should be corrected by teachers and mentors.

(5) Misconduct also includes improper dealing with infringements, such as negligence, attempts to cover up misconduct, and reprisals on whistle blowers.

The first two infringements, fabrication and falsification, are the most serious. Plagiarism seems to be of a different order since it is expected to be more injurious to colleague scientists than to science as such. However, progress in present day science depends very much on open communication and discussion among fellow scientists and on a well-functioning peer-review system. And, if scientists should hesitate or refuse to take part in this open debate for fear of not being recognised or being taken advantage of, the quality of science would suffer.

The response to these violations 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, and 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 are unacceptable as well, but we prefer this not to be classified as 'research misconduct' *in stricto sensu*, since it does not affect the integrity of the research record.

3.3 Good Practices

In addition to the principles and the violations thereof, the European CoC discusses and advises on many other forms of objectionable practices in scientific research. Many of them also undermine public trust in science and have to be taken just as seriously. We may think of the following categories:

(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) *Proper research procedures*: The choice of an improper research design, carelessness in experimentation and calculations, which can lead to gross errors, may be classified under this heading, although the walls between dishonesty and incompetence are rather thin here.

(3) *Responsible research procedures*: Deviations from desired practices include insufficient care for research subjects, insufficient respect to human subjects, animals, the environment, or cultural heritage, violating protocols, ignoring the requirement of informed consent, insufficient privacy protection, and improper use of laboratory animals, or breach of trust and confidentiality.

(4) *Publication-related conduct*: including authorship practices. Unacceptable are claiming or granting undeserved authorship and denying deserved authorship, inadequate allocation of credit. Breaching publishing rules, such as repeated publications, salami-slicing of publications, insufficient acknowledgement of contributors or sponsors, or a too long delay of publication falls within this category as well.

(5) *Reviewing* and *editorial issues*: including independence and conflict of interests, personal bias and rivalry, appropriation of ideas.

As said, it is difficult to formulate universal guidelines here. Many practices are subject to different traditions and legislative regulations and may differ over countries, even over disciplines. In the European CoC we have confined ourselves to a listing of recommendations on good practices. Some of them do have universal character since they join in with rules adhered to by science publishers and formulated by the Committee on Publication Ethics (COPE). Others do not. Anyway, the regulations to be agreed on should be part of any national or institutional system of *Good Practice Rules.*

3.4 Dealing with allegations of misconduct

It is generally accepted that the primary responsibility for investigating and handling cases of misconduct lies in the hands of the leadership of the institution where the accused researcher works, i.e. university or research institute. Such institutions should be supported by a confidential standing committee, counsellor or ombudsman. In a few European countries (serious) allegations are dealt with by a national body (e.g. governmental body or Academy of Sciences). In many other countries such a national body has an advisory function or may act as a court of appeal.

Requirements for a proper procedure include a due and fair process, uniform and sufficiently rapid, and leading to proper outcomes and sanctions. The CoC lists a number of such principles for dealing with cases of misconduct, that are in line with general recommendations developed by the OECD.

In *international* collaboration, partners should agree to conduct their research according to the same standards of research integrity, as developed in the European CoC. They should bring any suspected deviation from these standards to the immediate attention of the project leader(s). Cases of suspected misdemeanour should then be investigated according to the policies and procedures of the partner with the primary responsibility for the project.

In more formal large scale collaborative projects (e.g. funded by the European Commission) one is advised to follow the recommendations of the Co-ordinating Committee of the OECD Global Science Forum (2009) that describe the procedures for investigating allegations of research misconduct. The European CoC suggests to use a boiler plate text for International Agreements (Appendix OECD report, 2009), which should then be embodied in the formal documents for the collaborative project.[4]

4. Final Remarks

It should be understood that this Code is not a body of law. It does not have a legal character but intends to be a canon for self-regulation. The scientific community is responsible for the formulation and reinforcement of the principles and virtues of scientific and scholarly research, and for proper corrective actions when scientific integrity is threatened.

In this report on the European Code of Conduct often the words ‘science’ and ‘scientific’ have been used. What is meant throughout is the broad field of science and scholarship. The Code applies to natural and life sciences, as well as to social sciences and humanities. These disciplines differ in method and content, but have a fundamental characteristic in common:

they depend on argument and evidence, based on observations of nature, or of humans and their actions and products.

The objective of the European Code of Conduct is to stimulate and further the emergence of institutional settings that enforce research integrity. The Code could be a basis for the development or improvement of national or institutional codes of ethics and could set a benchmark for proper behaviour in collaborative research. Hopefully, this Code will achieve to set standards across Europe that can, eventually, be held valid and be implemented world-wide.

Author Contact Information
Email : pjdd@xs4all.nl

Notes

1. Richard Deyo et al., "The messenger under attack – intimidation of researchers by special interest-groups," *New England Journal of Medicine,* 336 (1997): 1176-1179.
2. Pieter Drenth, "*Scientific Integrity, a discussion paper,"* KNAW/ALLEA, 2009.
3. Pieter Drenth, "Research integrity; protecting science, society and individuals," *European Review* 18, no.3 (2010): 417-426, and in Drenth, P.J.D. (2012), "The European Code of Conduct for Research Integrity," In Nicholas Steneck and Tony Mayer, Promoting Research Integrity in a Global Environment, World Scientific Publishing Co. Pte,. Ltd, chapter 22.
4. *Investigating Research Misconduct Allegations in International Collaborative Research Projects: A practical guide* (Paris*:* OECD, 2009).

At the root of the current crisis are not subprime mortgages, credit rating agencies, financial institutions or central banks. It is the Great Divorce between finance and economy, which is a subset of the widening precipice between economy and human welfare.

The Great Divorce: Finance and Economy

The Limits to Growth proved the inherent limitations of the existing industrial model of economic growth, not any inherent limits to growth itself.

Garry Jacobs & Ivo Šlaus, From Limits to Growth to Limitless Growth

Focusing on growth of the part without reference to its impact on the whole is a formula for social disease.

Economic Crisis and the Science of Economics

The idea of nuclear deterrence is a dangerous fallacy, and that the development of military systems based on nuclear weapons has been a terrible mistake, a false step that needs to be reversed.

John Scales Avery, Flaws in the Concept of Nuclear Deterrence

The first step into the direction of a world parliament would be the establishment of a Parliamentary Assembly at the United Nations.

Andreas Bummel, Social Evolution, Global Governance & a World Parliament

The evolution from physical violence to social power to authorized competence and higher values is an affirmation of the value basis of law.

Winston P. Nagan & Garry Jacobs, New Paradigm for Global Rule of Law

We propose that a new organisation be set up, perhaps called the 'World Community for Food Reserves'.

John McClintock, From European Union to World Union

A proper and well accepted definition of (forms of) misconduct, reliable means of identification, and effective corrective actions deserve a high priority on the agenda of research institutes, universities, academies and funding organs.

Pieter J. D. Drenth, Research Integrity

The clearing house should encourage thinking ahead so that law and governance can attempt to accommodate the numerous challenges of globalization, many new technologies, and the emerging Anthropocene Era.

Michael Marien, Law in Transition Biblioessay

The economics of growth must be replaced by equilibrium economics, where considerations of ecology, carrying capacity, and sustainability are given proper weight, and where the quality of life of future generations has as much importance as present profits.

John Scales Avery, Entropy & Economics

A strong and strategic knowledge system is essential for identifying, formulating, planning and implementing policy-driven actions while maintaining the necessary economic growth rate.

Jyoti Parikh, Dinoj Kumar Upadhyay & Tanu Singh,
Gender Perspectives on Climate Change & Human Security in India

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Inside This Issue

The very possession of nuclear weapons violates the fundamental human rights of the citizens of the world and must be regarded as illegal.

Winston P. Nagan, Simulated ICJ Judgment

The emerging individual is less deferential to the past and more insistent on his or her rights; less willing to conform to regimentation, more insistent on freedom and more tolerant of diversity.

Evolution from Violence to Law to Social Justice

It is more rational to argue that developing countries cannot afford unemployment and underemployment, than to suppose that they cannot afford full employment.

Jesus Felipe, Inclusive Growth

The tremendously wasteful underutilization of precious human resources and productive capacity is Greece's most serious problem and also its greatest opportunity.

Immediate Solution for the Greek Financial Crisis

The Original thinker seeks not just ideas but original ideas which are called in Philosophy Real-Ideas. Cadmus Journal refers to them as Seed-Ideas. Ideas, sooner or later, lead to action. Pregnant ideas have the dynamism to lead to action. Real-Ideas are capable of self-effectuation, as knowledge and will are integrated in them.

Ashok Natarajan, Original Thinking

Given the remarkable progress of humanity over the past two centuries, the persistence of poverty might not be so alarming, were it not for the persistent poverty of new ideas and fresh thinking on how to eliminate the recurring crises, rectify the blatant injustices and replace unsustainable patterns with a new paradigm capable of addressing the deep flaws in the current paradigm.

Great Transformations

Our global systems can be resilient if they are based not only on efficient markets that can cope with future crises, but on principles that also allow for the projection of civic will and preference onto the global level. Stability and resilience are laudable goals but they need to be achieved in all three dimensions, the financial, the economic and the social, in a participatory fashion.

Patrick M. Liedtke, Getting Risks Right

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