

Indian Academy of Sciences

Scientific Values: Ethical Guidelines and Procedures

1. Preamble

Professional societies and institutions evolve codes of conduct to be followed by their members in the course of their professional work, based on general ethical principles such as honesty and fairness. The credibility of any institution rests on the observance of such values by its members. Beyond general ethics, additional issues often arise in specific professions owing to the way in which they impact society.

The present document has two main aims. First, it sets out basic ethical guidelines that the Indian Academy of Sciences (Academy) expects its Fellows to follow in their scientific activities, but are of more general applicability. These include conducting research and publishing results, carrying out peer review and editorial work, teaching and mentoring students and trainees, interacting with colleagues and collaborators, developing and handling technology, and interacting with the press and public. Each of these activities requires due sensitivity and attention to ethics, the neglect of which could have serious implications. Secondly, it lays down procedures to be followed by the Academy if a complaint of misconduct is made to it against a member of its Fellowship.

This document also discusses briefly the ethical issues in science administration. These include management of departments, institutions, programmes and projects, as well as broader committee work and policy-making. In all these areas, the ethical standards of the leadership are inevitably reflected in the performance and reputation of the institution and the impact of its work. Any compromise on ethical principles could have a detrimental influence on the integrity of the system and could lead to unfair and unprofessional decisions. It also vitiates the scientific atmosphere and creates a negative perception of the scientific community as a whole.

2. Conduct of research

2.1 Data collection

While conducting research, whether independently or jointly, it is necessary to ensure that data collected (including raw data) are reliable, properly recorded and dated, and carefully stored. Fabrication and falsification of data, even data that may be perceived to be of relatively lower importance to the research outcome, clearly constitute scientific misconduct. The procedure followed should be described in sufficient detail to permit independent verification. Selective use of data without scientifically valid reasons is unacceptable.

2.2 Sharing of facilities

Transparent and fair procedures should be implemented in each institution for the sharing of equipment and facilities. The precise sharing protocol would depend on the details of the situation. In particular, when equipment is procured through an institution or grant on the basis that it will be shared with others, this promise must be kept.

2.3 Experiments involving humans or animals

Guidelines and protocols announced by the various national agencies for experiments involving humans or animals should be scrupulously followed. For instance, in the use of animals, the guidelines of The Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA; <http://cpcsea.nic.in>), Ministry of Environment, Forests and Climate Change, Government of India, should be followed. In experiments involving humans (usage and/or transfer of human biological material, clinical trials) or related areas (such as stem cell research and therapy), guidelines from the Indian Council of Medical Research (ICMR; http://icmr.nic.in/About_Us/Guidelines.html) should be applied. In clinical research which may lead to new diagnostic methods and to new drugs, guidelines laid down by the Central Drugs Standard Control Organisation (CDSCO; <http://cdsco.nic.in>), Ministry of Health and Family Welfare, Government of India, should be adhered to. Similar guidelines for other areas should be followed wherever applicable.

2.4 Safety and the environment

Care should be taken to ensure that the research activity of the scientist does not endanger other people or the environment. Researchers are expected to incorporate safety and environmental concerns into their research practices. Environmental guidelines, regulations and laws must be followed and appropriate prescribed licenses/permits and clearances obtained for the handling, storage

and disposal of hazardous material. The Principal Investigator (PI) should endeavour to get his/her team members to undergo appropriate training to maintain safety and environmental standards, and also to advise their institution about any safety measures that need to be put in place.

3. Publication

3.1 Authorship

The authorship of scientific publications is a very important issue since it is the way in which scientists receive credit for their contributions. All listed authors of a publication should have contributed significantly to it. It is inappropriate to offer 'guest authorship' to anyone who has not made a significant contribution. Likewise, it is wrong to exclude from authorship anyone who deserves to be an author. It is unethical to include anyone as an author of a paper without their knowledge and clear consent. The order of authorship is very important. In this matter, conventions vary in different fields, and in general, one should be consistent with the conventions in the field and the criteria laid down by the journal to which the work is submitted.

3.2 Plagiarism

The Oxford English Dictionary defines plagiarism as 'the practice of taking someone else's work or ideas and passing them off as one's own'. In the context of scientific research, it can involve unattributed lifting of textual material or scientific ideas or actual research results. The most extreme example would be a deliberate attempt to pass off someone else's entire research project as one's own. However, it can also involve (deliberate or unintentional) incorporation of some ideas or results of other researchers, without proper attribution, within one's own research publication. Though the degree of severity can vary, plagiarism always amounts to ethical misconduct.

Use of someone else's work in one's own is not by itself unethical. A limited amount of textual material in someone else's paper can be copied if it is clearly marked as a quote (typically by enclosing it within quotation marks) and the source is explicitly cited where the quote starts or ends. Alternatively, text may be paraphrased with a general indication of where the concepts originated. Occasional re-ordering or substituting of words is not sufficient to count as paraphrasing: the recommended procedure is to read and understand the source material, and then to put it away and express the idea in one's own words. Besides textual material,

incorporation of ideas, figures, graphs, etc. from other sources in a manner that conveys a false impression that they are original amounts to plagiarism.

Taking one's own published results and reproducing them in another published work as if they were new is 'self-plagiarism'. 'Duplicate publication' – submitting the same research results to two or more journals and treating them as separate publications – is also a form of self-plagiarism and must be avoided. Plagiarism is an issue not only for publications in journals but also for reports, textbooks, monographs and grant proposals. The above considerations apply equally in all these cases.

3.3 Responsibility of referees

Scientists who are asked to review a manuscript or a research proposal have the responsibility to ensure they do not misuse their advance access to the information and ideas in these documents. The use of such advance access to publish a competing work, or to carry out research that pre-empts a proposed project is unethical.

3.4 Peer review

Academy Fellows often act as referees in review of manuscripts submitted for publication as well as project proposals submitted for financial support. This exercise should be carried out with the maximum possible objectivity. It is essential to avoid personal bias and/or conflicts of interest.

4. Interaction with the public

Scientists must ensure that statements made in public are dependable, balanced and professional. When speaking to the press or public, it is essential to avoid making exaggerated or false claims.

5. Education and training

5.1 Teaching and assessment

Recruitment, selection and assessment of students should always involve a just and fair procedure that is explicitly spelt out in advance. When assessments involve interviews, subjective academic judgments are involved. However, care must be taken to avoid considerations unrelated to the student's merit, as well as conflicts of interest.

Teachers should aim for quality in their course content and teaching methodology. Sensitive student-related issues, including records and communications, should be shared only out of academic necessity and only with the appropriate persons. The dignity of the classroom or laboratory environment should be maintained at all times.

5.2 Research supervision

The training and mentoring of students in a research programme is expected to inculcate sound ethical values in them. The process must communicate the virtues of honest, professional and fair scientific practice. Not only should the training continuously expose the student to sound ethical practices, but specific ethical training should also be imparted to them.

In research projects there is usually a PI or a set of co-PIs who lead the project. The PIs should ensure supervision and appropriate mentoring of young researchers, including students and postdoctoral fellows.

5.3 Direct ethical training to students

The Academy emphasizes the need for direct training of students as a way to generate an ethical atmosphere in research institutions. A number of methods may be employed, including special formal courses, discussions and workshops, formation of local ethics committees, and generating articles on ethical issues.

6. Science administration

Heads of institutions, departments and governmental committees are expected to manifest the highest standards of fairness and balance. Some of the areas which impact the conduct of science in India, and where heads and/or committees make the basic recommendations, are concerned with recruitment, assessment and promotions, project grants, performance awards, and science policy. Each of them is briefly discussed below.

6.1 Bias and discrimination

Academic communities are enriched by the presence of people of different ethnicities, socioeconomic strata, genders, ages, affiliations, backgrounds and sexual orientations. There must be no direct or indirect bias or discrimination against any individual based on these categories. Committees should make every effort to ensure that such biases do not enter into their decisions, and should

be aware of the National Science Policy (Department of Science and Technology, Government of India, 2003; http://www.dst.gov.in/st_policy.htm) in this regard. There should also be no bias against hiring spouses in the same institution.

The Academy should aim for the full and equal participation of women in all academic activities. It is every Fellow's responsibility to foster a gender-neutral and supportive environment to achieve this goal.

6.2 Recruitment and assessment

The calibre of its members sets the scientific standards of an institution. Striving for excellence is essential. The selection of committee members known for fairness and balance, rather than pliability, is important. These guidelines are equally applicable to promotions.

6.3 Project grants and awards

Project proposals, as well as selection of candidates for awards and fellowships, are usually evaluated by committees with the help of peer review. These discussions necessarily involve a certain degree of subjectivity. However, it is important that the highest ethical standards are observed by committee members as well as referees. Both positive and negative bias, due to one's personal position, role or involvement, are inappropriate.

6.4 Policy issues

The Government of India may seek the opinion of scientists on important policy issues. Some typical examples are GM crops, stem cell research, human cloning, and climate issues. It is important that scientists provide honest and well-thought-out views that are manifestly free of commercial, social and political pressures.

6.5 Conflict of interest

Whenever an Academy Fellow is involved in assessment, evaluation or selection of a candidate for a position, award, grant or fellowship, presence of any potential conflict of interest must be brought to the attention of the relevant Committee and/or its Chair. Such conflicts tend to arise when, for example, the candidate is a present or former student, guide, collaborator, or a member of the family of the concerned Fellow. In addition to spontaneously highlighting the existence of a conflict, it will in some cases be appropriate for the Fellow, in consultation with the Chair of the relevant Committee, to

recuse himself/herself (i.e. not participate) from that particular evaluation.

7. Role of whistle-blowers

Individuals who report unethical practices may find themselves in a difficult or sensitive position. A negative impact on their career is one among many possible risks following from their activity. Therefore it is important to safeguard the confidentiality of complaints, as well as the interests of whistle-blowers against any unfair retaliatory measures taken.

8. Ethics in technology-related issues

There are a number of Academy Fellows who are engaged in applied research, involving technology development and commercialization. These areas have their own characteristic ethical issues, having to do with sustainable development, technology acquisition, sale and transfer of technology, sharing of intellectual property rights, industrial safety, and other matters such as environmental loading. Existing ethical guidelines in specific areas should be identified and followed. One should also be sensitive to areas like dual-use technologies for which ethical guidelines are still being debated.

9. Regulatory mechanism

It is recognized that incidents involving misconduct are best handled locally by the institution where the person under cloud of misconduct is employed. However, many types of misconduct, such as plagiarism, are of special importance as they have an adverse effect on the credibility of the entire scientific community. In cases involving misconduct by a member of the Academy's Fellowship, the Academy may be approached.

The mechanism is as follows:

(i) Any complaint to the Academy of ethical misconduct against a Fellow should be addressed to the President of the Academy. In general, it should be signed by the complainant (who need not be a Fellow of the Academy) and should include a contact address. It should be accompanied by appropriate documents authenticating the complaint. The complainant is expected not to publicize the matter until a final decision is taken by the Academy. In exceptional cases, when the facts of the case are directly verifiable, or because of extra sensitivity of the complaint, an unsigned complaint may also be investigated.

(ii) On receipt of the complaint, the President will decide if the complaint is prima facie deserving of further processing, and in that case, if the complaint is signed, the President will obtain a declaration from the complainant that he/she takes responsibility that the complaint is based on authentic information. The complainant should be informed that in case the complaint is eventually found to have been filed with mala fide intentions there may be consequences, including exposure of the complainant's identity.

(iii) The President will then pass on all the documents, after suppressing the complainant's identity, to the Academy's Panel on Scientific Values for a complete investigation.

(iv) The Panel will contact the Fellow against whom allegations have been received and obtain his/her response to the allegations. Should the Panel feel it is necessary, it can have personal discussions with the Fellow concerned.

(v) The Panel may invite any expert who can assist in the investigation through his/her specialized knowledge.

(vi) On completion of its investigation, the Panel will submit a report to the President for discussion in the Council. This should ideally be done within three months of receiving the documents from the President, though some cases may take much longer to investigate. If the Panel finds the allegations to be substantiated, it can suggest possible penalties in its report.

(vii) The Council will decide on the actual action to be taken against the Fellow.

(viii) If the Panel concludes that the allegation was made with mala fide intention, the President may disclose the name of the complainant to the Panel, which in turn will obtain the person's explanation in writing and also in person, if necessary. In this case too, the Panel will submit its report to the Council with appropriate recommendations.