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Ethics and Values

02.2 APS GUIDELINES FOR PROFESSIONAL CONDUCT

(Adopted by Council on November 10, 2002)

(Original version adopted by Council on 3 November 1991.)

The Constitution of the American Physical Society states that the objective of the Society shall be the advancement and diffusion of the knowledge of physics. It is the purpose of this statement to advance that objective by presenting ethical guidelines for Society members.

Each physicist is a citizen of the community of science. Each shares responsibility for the welfare of this community. Science is best advanced when there is mutual trust, based upon honest behavior, throughout the community. Acts of deception, or any other acts that deliberately compromise the advancement of science, are unacceptable. Honesty must be regarded as the cornerstone of ethics in science. Professional integrity in the formulation, conduct, and reporting of physics activities reflects not only on the reputations of individual physicists and their organizations, but also on the image and credibility of the physics profession as perceived by scientific colleagues, government and the public. It is important that the tradition of ethical behavior be carefully maintained and transmitted with enthusiasm to future generations.

The following are the minimal standards of ethical behavior relating to several critical aspects of the physics profession. Physicists have an individual and a collective responsibility to ensure that there is no compromise with these guidelines.

Research Results

The results of research should be recorded and maintained in a form that allows analysis and review. Research data should be immediately available to scientific collaborators. Following publication, the data should be retained for a reasonable period in order to be available promptly and completely to responsible scientists. Exceptions may be appropriate in certain circumstances in order to preserve privacy, to assure patent protection, or for similar reasons.

Fabrication of data or selective reporting of data with the intent to mislead or deceive is an egregious departure from the expected norms of scientific conduct, as is the theft of data or research results from others.

Publication and Authorship Practices

Authorship should be limited to those who have made a significant contribution to the concept, design, execution or interpretation of the research study. All those who have made significant contributions should be offered the opportunity to be listed as authors. Other individuals who have contributed to the study should be acknowledged, but not identified as authors. The sources of financial support for the project should be disclosed.

Plagiarism constitutes unethical scientific behavior and is never acceptable. Proper acknowledgement of the work of others used in a research project must always be given. Further, it is the obligation of each author to provide prompt retractions or corrections of errors in published works.

Peer Review

Peer review provides advice concerning research proposals, the publication of research results and career advancement of colleagues. It is an essential component of the scientific process.

Peer review can serve its intended function only if the members of the scientific community are prepared to provide thorough, fair and objective evaluations based on requisite expertise. Although peer review can be difficult and time-consuming, scientists have an obligation to participate in the process.

Privileged information or ideas that are obtained through peer review must be kept confidential and not used for competitive gain.

Reviewers should disclose conflicts of interest resulting from direct competitive, collaborative, or other relationships with any of the authors, and avoid cases in which such conflicts preclude an objective evaluation.

Conflict of Interest

There are many professional activities of physicists that have the potential for a conflict of interest. Any professional relationship or action that may result in a conflict of interest must be fully disclosed. When objectivity and effectiveness cannot be maintained, the activity should be avoided or discontinued.

It should be recognized that honest error is an integral part of the scientific enterprise. It is not unethical to be wrong, provided that errors are promptly acknowledged and corrected when they are detected.

Supplementary Guidelines on Responsibilities of Coauthors and Collaborators

(Adopted by Council on November 10, 2002)

(This statement includes language from the "Report of the Investigation Committee on the Possibility of Scientific Misconduct in the Work of Hendrick Schoen and Coauthors," M. Beasley, S. Datta, H. Kogelnik, H. Kroemer, D. Monroe, September 25, 2002 - internal Bell Laboratories report, Bell Labs, Lucent Technologies. The language is used with the permission of Bell Labs.)

All collaborators share some degree of responsibility for any paper they coauthor. Some coauthors have responsibility for the entire paper as an accurate, verifiable, report of the research. These include, for example, coauthors who are accountable for the integrity of the critical data reported in the paper, carry out the analysis, write the manuscript, present major findings at conferences, or provide scientific leadership for junior colleagues.

This document includes supplementary guidelines on:

- [Responsibilities of Coauthors and Collaborators](#)
- [Research Results](#)
- [References in Publications](#)

See also:

- [Ethics Case Studies](#)
- [Statement on Treatment of Subordinates](#)
- [Report from the Task Force on Ethics Education](#)

Coauthors who make specific, limited, contributions to a paper are responsible for them, but may have only limited responsibility for other results. While not all coauthors may be familiar with all aspects of the research presented in their paper, all collaborations should have in place an appropriate process for reviewing and ensuring the accuracy and validity of the reported results, and all coauthors should be aware of this process.

Every coauthor should have the opportunity to review the manuscript before its submission. All coauthors have an obligation to provide prompt retractions or correction of errors in published works. Any individual unwilling or unable to accept appropriate responsibility for a paper should not be a coauthor.

Supplementary Guideline on Research Results

(Adopted by Council on 10 November 2002)

Collaborations are expected to have a process to archive and verify the research record; to facilitate internal communication and allow all authors to be fully aware of the entire work; and respond to questions concerning the joint work and enable other responsible scientists to share the data. All members of a collaboration should be familiar with, and understand, the process.

Supplementary Guideline on References in Publications

(Adopted by Council, 30 April 2004)

Authors have an obligation to their colleagues and the physics community to include a set of references that communicates the precedents, sources, and context of the reported work. Proper referencing gives credit to those whose research has informed or led to the work in question, helps to avoid duplication of effort, and increases the value of a paper by guiding the reader to related materials. It is the responsibility of authors to have surveyed prior work in the area and to include relevant references.

Proper and complete referencing is an essential part of any physics research publication. Deliberate omission of a pertinent author or reference is unethical and unacceptable.

Other Professional Conduct Statements of interest include:

[American Chemical Society](#)

[American Mathematical Society](#)

[Association for Computing Machinery](#)

[Institute for Electrical and Electronic Engineers](#)

Other organizations with which many physicists are familiar such as the Sigma Xi, National Academies of Science and Engineering, and American Association for the Advancement of Science have publications ("The Responsible Researcher: Paths and Pitfall," from Sigma Xi which can be ordered at www.sigmaxi.org/programs/ethics/publications.shtml, and "On Being a Scientist: Responsible Conduct in Research," from the National Academy Press available at stills.nap.edu/html/obas) or programs (for AAAS, at www.aaas.org/spp/sfri) on this subject. An online compilation for "engineers, scientists, and science and engineering students with resources useful for understanding and addressing ethically significant problems that arise in their work," can be found at The On Line Ethics Center for Engineering and Science (www.onlineethics.org).

An awareness of the ethical dilemmas that can occur in a professional career, and of the resources for understanding and resolving such problems, can help in avoiding ethical lapses or limit the damage that can arise from them. Students and mentors are especially reminded that an understanding of the ethical expectations of the physics community is an important part of a physics education.

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About APS

The American Physical Society (APS) is a non-profit membership organization working to advance the knowledge of physics.