

**JOHNS HOPKINS UNIVERSITY
WHITING SCHOOL OF ENGINEERING
RULES AND GUIDELINES FOR
RESPONSIBLE CONDUCT OF RESEARCH**

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1. Introduction

This document is addressed to all faculty, postdoctoral fellows, students, and other research personnel in the Whiting School. Everyone engaged in research in the Whiting School should become familiar with its contents.

The distinction the Whiting School of Engineering has achieved as a center for engineering research is the result of a dedication to the highest standards of scientific integrity and professional conduct. In the past, the atmosphere of truthfulness, accountability, and free exchange of ideas characteristic of the Whiting School was sufficient to ensure responsible conduct of research. However, the greater complexity of regulations governing research make it increasingly likely that some researchers may not be fully aware of government regulations and established norms. The purpose of this document is (1) to set forth principles and practices which should be known and followed by researchers in the Whiting School; (2) to ensure that all researchers in the Whiting School are informed of institutional and governmental regulations that affect their work; and (3) to establish procedures to protect against fraudulent research, or unjustified charges thereof, with the least possible hindrance to scientific investigation.

2. Guidance for Academic Staff

General expectations for the conduct of Academic Staff and many specific requirements governing the conduct of research are set forth in the following documents:

WSE Policy on Conflict of Commitment and Conflict of Interest
WSE Rules and Guidelines for Responsible Conduct of Research
WSE Procedures for Dealing with Issues of Professional Misconduct
WSE Procedures for Dealing with Issues of Research Misconduct
WSE Grievance Procedure for Faculty, Fellows, and the Student Body
Honor in Science (Published by Sigma Xi)
Use of Experimental Animals at the Johns Hopkins Medical Institutions and University

All Academic Staff should have copies of these documents and should be familiar with their contents. These policies are available from the office of the Associate Dean for Research and from its website (<http://www.wse.jhu.edu/adr/policies>)

As teachers and researchers, Academic Staff should be informed about ethical issues in research. Because these issues rarely have been part of their formal training, both current and new Academic Staff should devote some effort and time to their study. They thus will be better able to inculcate in their students a clear understanding of the principles of academic integrity. Academic Staff also serve as role models and the manner in which they conduct their own research must be above reproach. Discussion of research ethics should be a regular part of department and center meetings.

3. Supervision of Students, Postdoctoral Fellows, and Other Personnel

Academic Staff are responsible for the supervision of their students, postdoctoral fellows, and other research personnel. The complexity of scientific methods and the need for careful experimental design, caution in interpreting possibly ambiguous data, and advanced statistical analysis all require that Academic Staff assume an active role of guidance and supervision. Academic Staff should be prepared to give additional attention to a student or an employee who arrives in a research unit without substantial experience in laboratory science.

3.1 Rules

Responsibility for supervision of each student, postdoctoral fellow, or other (non-faculty) member of a research unit must be assigned to a specific Academic Staff member. For particular research projects, supervision should be carried out by the responsible investigator; overall supervision of each student or postdoctoral fellow must be assigned to a faculty advisor. (Please see the Homewood Academic Council's rules regarding which Academic Staff may supervise students.)

As a part of their orientation, departments must provide each new graduate student with a copy of this policy and also "Procedures for Dealing with Issues of Professional Misconduct" and "Procedures for Dealing with Issues of Research Misconduct." At the time of registration these documents also must be given to all postdoctoral fellows.

Academic Staff should familiarize students and other research personnel with relevant governmental and institutional requirements regarding safety procedures and for conduct of studies involving healthy volunteers or patients, animals, radioactive or other hazardous substances, and recombinant DNA.

3.2 Recommendations

The ratio of students and other research personnel to Academic Staff should be small enough that close interaction is possible for scientific interchange as well as supervision of the research at all stages.

The degree of supervision by Academic Staff should take into account the experience and skill of students and other research personnel. Academic Staff should help students and other research personnel develop not only good research practices and technical expertise, but also good research ethics.

Academic Staff should supervise the design of experiments and the processes of acquiring, recording, examining, interpreting, and storing data. The editing of manuscripts alone does not constitute adequate supervision.

Academic Staff should have realistic expectations regarding the performance of students and other research personnel and should inform them of these expectations.

Collegial discussions among all Academic Staff, students, and research personnel constituting a research unit should be held regularly both to contribute to the scientific efforts of the members of the group and to provide informal peer review.

Academic Staff should be alert to behavioral changes in students or other research personnel that may indicate inordinate personal or academic stresses or substance abuse. Stresses are particularly likely to occur at times of transition or as deadlines approach. Since the care with which research activities are conducted may be adversely affected by stress, a student or employee may need closer supervision at such times. Academic Staff are encouraged to refer students to the Counseling Center and employees to the Faculty and Staff Assistance Program (FASAP) for additional assistance.

4. Data Gathering, Storage, and Retention

The retention of accurately recorded results is of utmost importance for the progress of scientific research. Original laboratory data must be retrievable not only to answer scientific questions but also to respond to questions that may arise about the propriety of research conduct. Errors may be mistakenly characterized as misconduct when the primary experimental results are unavailable. Moreover, a common denominator in most cases of alleged research fraud has been the absence of a complete set of verifiable data. The rules and recommendations in this section are designed to ensure that all research data are recorded appropriately and that access to them will be available when necessary.

While what constitutes "original" or "primary" data may differ from laboratory to laboratory depending on the technology used, in every instance an investigator is expected to maintain an accurate record of experimental data that is as close to the original form of the data as is practical. When the "original" data are so voluminous or are collected and/or modified in atypical ways (for example, in the case of data collected by computer), individual investigators should seek concurrence of their department chair or center director in deciding what aspect of their research will constitute primary data, bearing in mind the possible future need to support reported findings.

The University is aware that scientific investigation may be impeded if undue conditions are placed on the ability of departing investigators to retain custody of original data generated in the course of work performed here. Nevertheless, there are pragmatic reasons for preserving the University's ready access to original data. For example, access to original data may be necessary if the University is to render the most effective assistance in rebutting unjustified claims of fraud made against its researchers. Then the University is responsible for promoting the collective reputation for integrity of its researchers with public and private granting agencies. The inability to produce original data tends to place the integrity of research in question. Moreover, original data always is considered the best evidence for purposes of avoiding questions of admissibility in administrative or judicial proceedings.

4.1 Rules

Custody of all original data must be retained by the unit in which they are generated. An investigator who moves to another institution must submit to the department director a written request to remove original data from the University. This request must contain an itemized description of the data and must specify where the data will be located in the future. In granting such requests, the department director must remind the researcher that legally the data are the property of the University, that any inventions made here must be disclosed to the appropriate patent office of The Johns Hopkins University, and that original data must be made available for review if questions of scientific misconduct should arise. In all cases where it is practical, a copy of the original data should be left with the University if the original data is transferred to another institution. If the department chair or center director does not approve the removal of data, an appeal may be made to the Dean.

To date, no governmental regulations prescribe the length of time researchers must maintain original data. Until governmental regulations appear on this issue, the Whiting School requires that original data be retained for at least three years from the date of publication. Beyond that, where questions have been raised regarding the validity of the published data, investigators must preserve original data until such questions have been resolved to the satisfaction of the Whiting School and any involved government agencies. The head of each research unit must decide whether to preserve original data for a given number of additional years or for the life of the unit.

4.2 Recommendations

Original experimental results should be kept in an orderly fashion in such a way that they are accessible and can be easily reviewed by peers. Records should identify when experiments were done and by whom.

Machine print-outs or other primary data (e.g. autoradiograms) should be affixed to or referenced from the laboratory notebook.

5. Authorship

A gradual diffusion of responsibility for multi-authored or collaborative studies has led in recent years to the publication of papers for which no single author was prepared to take full responsibility. Therefore two safeguards are critical in the publication of accurate scientific reports: a) the active participation of each coauthor in verifying any part of a manuscript that falls within his or her specialty area and b) the designation of one author who is responsible for obtaining coauthor verification.

5.1 Rule

The practice of permitting "honorary authorship" is unacceptable and should be actively discouraged by primary investigators and heads of departments and research units.

5.2 Recommendations

Criteria for authorship of a manuscript should be determined and announced by each department or research unit. Authorship should be given generously, but only to those who have contributed significantly to the research, are prepared to stand behind their findings, and have reviewed the entire manuscript.

Any faculty member, postdoctoral fellow, or student who submits a manuscript should ensure that all named authors consent to authorship prior to submission of the manuscript. Each named author should be given a copy of the manuscript at the time it is submitted.

The lead author is responsible for obtaining coauthor verification. The lead author should prepare a copy of the title page of the manuscript, with a statement added to the effect that everyone listed as an author has contributed to the paper significantly, has reviewed the manuscript, and stands behind the parts within his or her own area of expertise. Each listed author should sign or affirm this statement in writing (e.g., via email). These statements should be kept in the files of the department or center for same period as original data is retained.

All publications should credit research findings appropriately by citing relevant observations of others, as well as by recognizing the work and input of all contributors in their own environments.

6. Publication Practices

Certain practices make it difficult for reviewer and reader to follow a complete experimental sequence. Among these are the premature publication of data without adequate tests of reproducibility or assessment of significance, the publication of fragments of a study, and the submission of multiple similar abstracts or manuscripts differing only slightly in content. In such circumstances, if any of the work is questioned, it is difficult to determine whether the research was done accurately, the methods were described properly, the statistical analyses were adequate, or appropriate conclusions were drawn. Investigators should review each proposed manuscript with these principles in mind.

6.1 Recommendations

Published papers should credit sponsors of the work and any acknowledgment requirements in grant and contract documents should be adhered to scrupulously since they are contractual obligations. Moreover, it is important that reviewers and readers be informed of the sponsorship of research projects in order that they may be alert to possible bias in the research arising from a sponsor's financial interest in the results.

7. Laboratory Guidelines

Because each research unit addresses different scientific problems with different tools and methods, particular units may need to develop their own specific rules or guidelines regarding laboratory safety, publications, intellectual property, and the prevention of academic misconduct. The Whiting School encourages the use of such rules or guidelines, which should be provided to all new investigators when they start work in the unit.

7.1 Rule

Any rules or guidelines must be reviewed by the Associate Dean for Research to ensure their compliance with existing University policies.

8. Reporting Research or Professional Misconduct

The trust and good faith traditionally associated with The Johns Hopkins University Whiting School of Engineering will flourish only if every member of this community bears responsibility for upholding the highest standards of integrity. Should research or professional misconduct occur, early identification and intervention are in the best interests of everyone. Steps to be taken by anyone who suspects that another's research conduct has been improper are detailed in the Whiting School's Procedures for Dealing with Issues of Professional Misconduct and Procedures for Dealing with Issues of Research Misconduct. The institution recognizes the risks to persons who report apparent scientific misconduct and has made every effort to protect them as well as those who might be accused in error.

8.1 Rule

It is a professional obligation of faculty, students, or fellows to inform superiors if they have reservations about the integrity of the work of another member of this academic community.

Adapted from “Rules and Guidelines for Responsible Conduct of Research”
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