

Philosophy & Ethics

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INTEGRITY IN RESEARCH

Integrity characterizes both individual researchers and the institutions in which they work. **For individuals, it is an aspect of moral character and experience. For institutions, it is a matter of creating an environment that promotes, responsible conduct by embracing standards of excellence, trustworthiness, and lawfulness that inform institutional practices.**

For the individual scientist, integrity embodies **above all a commitment to intellectual honesty and personal responsibility for one's actions and to a range of practices that characterize responsible research conduct.**

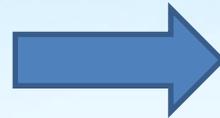
These practices include:

- ❑ **Intellectual honesty in proposing, performing, and reporting research**
- ❑ Accuracy in representing contributions to research proposals and reports
- ❑ **Fairness in peer review;**

- ❑ Collegiality in scientific interactions, including communications and sharing of resources;
- ❑ **Transparency in conflicts of interest or potential conflicts of interest**
- ❑ Protection of human subjects in the conduct of research;
- ❑ **Humane care of animals in the conduct of research**
- ❑ Adherence to the mutual responsibilities between investigators and their research teams.

Individual scientists work within complex organizational structures.

Factors that promote responsible conduct can exert their influences at the level of the individual; **at the level of the work group (e.g., the research group); and at the level of the research institution itself.** These different organizational levels are interdependent in the conduct of research. **Institutions seeking to create an environment that promotes responsible conduct by individual scientists and that fosters integrity must establish and continuously monitor structures, processes, policies, and procedures**



- ❑ Provide leadership in support of responsible conduct of research;
- ❑ **Encourage respect for everyone involved in the research enterprise**
- ❑ Promote productive interactions between trainees and mentors;
- ❑ **Advocate adherence to the rules regarding all aspects of the conduct of research, especially research involving human subjects and animals**
- ❑ Anticipate, reveal, and manage individual and institutional conflicts of interest;

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- ❑ Arrange timely and thorough inquiries and investigations of allegations of scientific misconduct and apply appropriate administrative sanctions;
 - ❑ **Offer educational opportunities pertaining to integrity in the conduct of research.**
 - ❑ Monitor and evaluate the institutional environment supporting integrity in the conduct of research and use this knowledge for continuous quality improvement.



Leadership by individuals of high personal integrity helps to foster an environment in which scientists can openly discuss responsible research practices in the face of conflicting pressures.

All those involved in the research enterprise should acknowledge that integrity is a key dimension of the essence of being a scientist and not a set of externally imposed regulatory constraints.

Intellectual Honesty in Proposing, Performing, and Reporting Research

- **Intellectual honesty in proposing, performing, and reporting research refers to honesty with respect to the meaning of one's research.** It is expected that researchers present proposals and data honestly and communicate their best understanding of the work in writing and verbally.

Accuracy in Representing Contributions to Research Proposals and Reports

- **Accuracy in representing one's contributions to research proposals and reports requires the assignment of credit.** It is expected that researchers will not report the work of others as if it were their own. This is plagiarism. Furthermore, they should be honest with respect to the contributions of colleagues and collaborators.

Fairness in Peer Review

- **Fairness in peer review means that researchers should agree to be peer reviewers only when they can be impartial in their judgments and only when have revealed their conflicts of interest.** Peer review functions to maintain the excellence of published scientific work and ensure a merit-based system of support for research.

A delicate balance pervades the peer-review system, because the best reviewers are precisely those individuals who have the most to gain from “insider information”:

they are doing similar work and they will be unable to “strike” from memory and thought what they learn through the review process.

Investigators serving as peer reviewers should treat submitted manuscripts and grant applications fairly and confidentially and avoid using them inappropriately.

Collegiality in Scientific Interactions, Including Communications and Sharing of Resources

- Collegiality in scientific interactions, including communications and sharing of resources requires that investigators report research findings **to the scientific community in a full, open, and timely fashion.** At the same time, it should be recognized that the scientific community is highly competitive. The investigator who first reports new and important findings gets credited with the discovery.

Transparency in Conflicts of Interest or Potential Conflicts of Interest

- A conflict of interest in research exists when the individual has interests in the outcome of the research that may lead to a **personal advantage** and that might therefore, in actuality or appearance, compromise the integrity of the research.
- The most compelling example is **competition between financial reward and the integrity of the research process**. **Religious, political, or social beliefs** can also be undisclosed sources of **research bias**.

Protection of Human Subjects in the Conduct of Research

- The protection of individuals who volunteer to participate in research is essential to integrity in research.

The ethical principles underlying such research have been elaborated on in international codes and have been integrated into national regulatory frameworks (in the United States, 45 C.F.R. § 46, 2001). Elements included in such frameworks pertain to the quality and importance of the science, its risks and benefits, fairness in the selection of subjects, and, **above all, the voluntary participation and informed consent of subjects.**

Adherence to the Mutual Responsibilities Between Investigators and Their Research Teams

- **Adherence to the mutual responsibilities between investigators and members of their research teams refers to both scientific and interpersonal interactions.**
- The research team might include other faculty members, colleagues (including co investigators), and trainees (undergraduate students, graduate and medical students, postdoctoral fellows), as well as employed staff (e.g., technicians, statisticians, study coordinators, nurses, animal handlers,

and administrative personnel). The head of the research team should encourage all members of the team to achieve their career goals.

The interpersonal interactions should reflect mutual respect among members of the team, fairness in assignment of responsibilities and effort, open and frequent communication, and accountability. In this regard, scientists should also conduct disputes professionally

Mentoring and Advising

- ***Mentor* is often used interchangeably with *faculty adviser*.** However, a mentor is more than a supervisor or an adviser (Bird, 2001; Swazey and Anderson, 1998). **An investigator or research adviser may or may not be a mentor.** Some advisers may be accomplished researchers but do not have the time, training, or ability to be good mentors (NAS, 2000).

For a trainee, “a mentoring relationship is a close, individualized relationship that develops over time between a graduate student (or other trainee) **and a faculty member (or others) that includes both caring and guidance**” (University of Michigan, 1999).



A successful mentoring relationship is based on mutual respect, trust, understanding, and empathy (NAS, 1997). Mentoring relationships can extend throughout all phases of a science career, and, as such, they are sometimes referred to as mentor-protégé or mentor-apprentice relationships, rather than mentor-trainee relationships.



Furthermore, institutional leaders have the responsibility to ensure that such programs are carried out, with appropriate delegation of responsibility and accountability and with adequate resources.

SUPPORT OF INTEGRITY BY THE RESEARCH INSTITUTION

- The individual investigator and the laboratory or research unit carry out their functions in institutions that are responsible for the management and support of the research carried out within their domains. **The institutions, in turn, are regulated by government and other bodies that impose rules and responsibilities**

Provide Leadership in Support of Responsible Conduct of Research

- It takes the leadership of an institution to promulgate a culture of responsible research. This involves the development of a vision for the research enterprise and a strategic plan.



It is the responsibility of the institution leadership to develop programs to orient new researchers to institutional policies, rules, and guidelines; to sponsor opportunities for dialogue about new and emerging issues; and to sponsor continuing education about new policies and regulations as they are developed..

Encourage Respect for Everyone Involved in the Research Enterprise

- An environment that fosters competence and honest interactions among all participants in the investigative process.

Support System

- Within the research institution, there can be multiple smaller units (**e.g., departments, divisions within a department, research groups within a division**). Within these institutional subunits, there will always be power differences between members of the group.

Promote Productive Interactions Between Trainees and Mentors

- Mentors play a special role in the development of new scientists. A mentor must consider the student's core interests and needs in preference to his or her own. Trainees and mentors are codependent and, at times, competitive. Trainees depend on their mentors for scientific education and training, for support, and, eventually, for career guidance and references.

Anticipate, Reveal, and Manage Individual and Institutional Conflicts of Interest

- Research institutions must conduct their work in a manner that earns public trust. To do so, they must be sensitive to any conflict of interest that might affect or appear to affect their decisions and behavior in ways that could compromise their roles as trustworthy sources of information and policy advice or their obligations to ensure the protection of human research subjects.

Institutional Responsibility for Investigator Conflicts of Interest

- The policy on conflicts of interest should apply to individuals who are directly involved in the conduct, design, and review of research, including faculty, trainees, students, and administrators, and should clearly state their disclosure responsibilities.

Offer Educational Opportunities Pertaining to Integrity in the Conduct of Research

- Research institutions should provide students, faculty, and staff with educational opportunities related to the responsible conduct of research.

Monitor and Evaluate the Institutional Environment Supporting Integrity in the Conduct of Research and Use This Knowledge for Continuous Quality Improvement

- The main thrust of this report reflects the need for continuing attention toward sustaining and improving a culture of integrity in research. This requires diligent oversight by institutional management to ensure that the practices associated with integrity described above are carried out.



**THANKING
YOU**