



Online Ethics Center  
FOR ENGINEERING AND SCIENCE

## Topics: Overview

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### Description

The subject of this document is research ethics. The focus of "research ethics" is a very practical one: How should we as researchers act? Unfortunately, the choices we face are not always clear. And even those cases that are clear may at times be better characterized as "right vs. right" rather than "right vs. wrong." For these reasons, our obligation is not necessary to make the right decisions but to strive to make the best possible decisions. In this context, "ethics" should not be confused with ethical theory, morality, and/or simply following the rules.

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## Research

To ensure the highest quality of research, research groups should routinely review the relevant regulations, guidelines, and standards of conduct.

### **1. Keep research records sufficient to reconstruct the work done.**

Records: Research would mean little without the tangible products of researchers' efforts. The nature of those products varies widely across and within disciplines, but a basic requirement for all researchers is recordkeeping that is sufficiently accurate to reconstruct what has been done. This is important, for example, to repeat (or avoid repeating) what was already done, to verify who had contributed to the work, or even to verify that the work has in fact been done.

Ownership: Who has the right and responsibility for keeping and retaining records? Who decides how and when research products will be shared with others? In principle, the products of our scholarly efforts are owned by the University. The products of research efforts in the University are, in practice, owned by the University, though the reality of that institutional ownership is not often apparent for a variety of reasons). In practice, all rights and responsibilities are typically delegated by the institution to the head of a research group.

### **2. Mitigate or remove risks of bias and honestly report what was done and found.**

Bias: Researchers, like others, are susceptible to bias. Put simply, the risk is that researchers might intentionally or unintentionally act in ways that will distort the research record. This might occur simply because the researcher believes or wants something to be true. The desire to report research findings that will receive the acclaim of peers or that could lead to personal financial gains might also introduce bias in the research process. For these reasons, an important responsibility for every researcher is to recognize the risks of bias and to carry out strategies that will mitigate or remove those risks.

Research Misconduct: While much of how we conduct research can be seen as simply a matter of preference, some behaviors are clearly unacceptable. In particular, the federal government specifically prohibits fabrication, falsification, and plagiarism. "Fabrication" is the recording or dissemination of research products that were made up rather than based on work actually done. "Falsification" is the recording or dissemination of research products that have been intentionally misrepresented to be different than what was actually found or done. "Plagiarism" is taking credit for the "ideas, processes, results or words" of someone else. It is important to be clear that while these three items are covered under the federal definition of research misconduct, that other aspects of research conduct are governed by regulations (e.g., regarding research with animal or human subjects), and some research practices are not illegal per se but can still be inconsistent with prevailing standards of the research community.

### **3. Know and comply with relevant regulations.**

Regulations: Certain areas of research are subject to state and federal regulations. Some examples include the use of animal subjects, studies that involve human subjects, research with human embryonic stem cells, the use of agents that represent biological or environmental hazards, and research involving lasers or radiation. Typically research areas such as these require institutional review, approval, and ongoing monitoring. The existence of regulations in these areas is a sign that how we conduct research in these areas is a priority for society. These regulations also exist to protect researchers and the institution in which they work. If you are conducting research, and if you have questions about the regulations that govern any aspect of your research, then ask the head of your research group for more information.

# Researchers

Research is a social enterprise that depends on the ability of researchers to learn from, teach, and understand one another.

## **1. Encourage open inquiry, questioning, discussion, and sharing.**

Communication: When communication is limited, the risk of misunderstanding, missteps, or wasted resources increases. Conversely, nurturing an environment in which open inquiry, questioning, and discussion are encouraged decreases these risks. As in other areas of life, science is best served by asking questions of one another rather than starting with the premise that we know the answers.

Sharing: Unless there are compelling reasons or requirements not to do so, the sharing of ideas and findings, even before publication, can often benefit all parties. This open stance is helpful not only for the research itself, but also to minimize the risks of misunderstandings, confusion, or disputes that might otherwise occur in the context of research.

Peer Review: One of the principal expectations of scholars and researchers is that they will share the results of their creative efforts through publication. And the most respected publications are those that are "peer reviewed." The key to peer review is that others with similar expertise have critically examined and approved a work before it is accepted for publication or presentation. This process involves many different roles and responsibilities both for the researchers and for the peer reviewers. Researchers desire the credibility that accompanies peer acceptance of their work, but they have an obligation to minimize the risk of misrepresentation or corruption of the research record. Peer reviewers are chosen for their expertise to provide a critical and constructive review of submitted work, but they are expected to do so without taking unfair advantage of information that they have learned in confidence.

## **2. Give credit where credit is due, and accept credit only when warranted.**

Credit: It is important to academia and society for the results of research to be disseminated, but it is also important for researchers to receive appropriate credit for their contributions. Credit can take many different forms including authorship, acknowledgement, or other public forms of recognition. The simple principle of

giving credit where credit is due is the basis for several additional principles. First, it is important to ensure that others who have made significant contributions will receive appropriate credit. Second, if we have not made a sufficient contribution to warrant credit, then we should not be credited. Finally, it is essential to remember that receiving credit for work implies that we are also responsible for that work. If we are part of a project that is later found to be tainted by significant misconduct, then we will share in the responsibility for that misconduct.

### **3. Serve as a mentor to others and seek the necessary mentoring for yourself.**

Mentoring: Mentoring new researchers in the responsible conduct of research is essential for the integrity of the research enterprise. If you have research experience and insight, then you should do what you can to mentor (advise) those who are new to your area of expertise. If you do not have the requisite experience and insight, then you should seek out those who are in a position to mentor (advise) you based on their experience. It is necessary for new researchers to be explicit in seeking answers to central questions such as why and how we do research, what challenges we might face as researchers, how we can advance in our career paths with integrity, and how best to recognize and address potential obstacles due to our individual characteristics such as racial, ethnic, or gender identity. Mentoring relationships are a fundamental obligation both for those who can serve as mentors because of their experience and insight as well as for those who are in need of mentoring because they lack the requisite experience or insight.

## **Society**

In return for public support, research universities make discoveries, train scholars and educate citizens. These obligations come with ethical responsibilities, including the following.

### **1. Consider the public interest.**

Public Interest: The opportunity for researchers to conduct research in an academic setting is a privilege granted by the society in which they live. Because resources are finite, it is reasonable to ask how decisions should be made about what will and will not be done in research. The public and policymakers can be expected to

consider public benefit as a key criterion for support of research. In many fields, peer reviewers choose which of many possible projects will be funded. There is also a place for judgment by individual researchers. For example, the physicists who had to decide whether to develop the first atomic bomb, anthropologists who are concerned about the impact of their activities on a previously isolated community, or biologists who question the merits of using human embryos for the purpose of stem cell research all make difficult ethical decisions balancing the interests of science and the public.

## **2. Recognize and explain the dual potential for use of research.**

Public Policy: While the purpose of research is generally to serve the public interest, the products of research can sometimes be unintentionally or intentionally used in ways that might undermine the public interest. Therefore, because of their insights into science and how research is done, researchers have a significant role to play in public discussions about the uses of their discoveries and creations. Although researchers should certainly not be the sole arbiters about the applications of their work, they do have a role in determining how and when to release their work to peers and the public, recognizing and explaining the dual use potential of their work, and participating in conversations that may serve to shape public policy. An important corollary of this responsibility is for researchers to be mindful of the limits of their particular expertise and the risks of unconscious bias. Merely because we are engaged in research does not automatically qualify us to speak with authority and objectivity about all areas of academic pursuit.

## **3. Bridge the gap between science and the public.**

Public Understanding: The divide between the frontiers of academic inquiry and public understanding continues to grow. Low levels of scientific literacy in the general population create both ethical and practical obligations for those in the research community. From an ethical perspective, it seems only reasonable that, in return for the privilege of public support, we should be concerned about the ability of the public to understand the meaning and consequences of what we do. From a practical perspective, the academic community otherwise risks that choices about funding, regulation and application will be driven by poor rather than informed understanding. An important academic responsibility is to help bridge this gap.

# Asking Questions

If you realize that you don't know something that you should know or you observe something that doesn't make sense, it is typically best to start from the perspective of asking questions.

## **1. If in doubt, ask.**

If you are unsure about how something should be done, why things are done a particular way, or what your role should be, then your minimal obligation is to ask others who are likely to know.

## **2. If you witness misconduct, act.**

Most people would argue that there is an ethical obligation to act when faced with possible wrongdoing. And if you witness something that you believe to be misconduct, it is important to know that there are a variety of institutional and governmental policies and regulations designed to protect those who report wrongdoing. While it remains true that there are risks in reporting suspected misconduct of others, there are also risks for failing to do so. It is typically best to ask questions rather than make presumptions, to keep good records of what you have learned or done, and to begin by seeking perspective from a respected individual who knows your research area or an ombudsperson.

## **3. Learn from your experience.**

It is unrealistic to assume that all of our choices and actions will work out for the best. While we cannot expect perfection, we can expect that we will learn from experience so as to do better the next time.

## **Notes**

The Resources for Research Ethics Education site was originally developed and maintained by Dr. Michael Kalichman, Director of the Research Ethics Program at the University of California San Diego. The site was transferred to the Online Ethics Center in 2021 with the permission of the author.

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Instructor Materials

**Parent Collection**

Resources for Research Ethics Education

**Topics**

Teaching Ethics

**Discipline(s)**

Research Ethics