Trustworthy Research—
An Editorial Introduction

Guest Editor: Caroline Whitbeck

For several decades ending in the early *1980s*, the subject of research integrity received little sustained attention within the research community. That a researcher would commit a major breach of trust seemed almost unthinkable. The literature on the subject was minuscule. Although the American Association for the Advancement of Science did form its Committee on Scientific Freedom and Responsibility, the report that John Edsall wrote for this committee in *1975* stood virtually alone as a statement on research ethics.[1] Although he and a few other stalwarts had been raising a variety of ethical issues since the 1950s, their efforts did not immediately lead others to take up the subject. Rosemary Chalk's valuable collection, *Science, Technology and Society: Papers from SCIENCE, 1949-1988,*[2] shows the surprising neglect of research conduct in those forty years, especially prior to 1980. Research conduct is barely mentioned except in the section on research misconduct, and that section is a mere six pages long and contains nothing written before 1981.

Many researchers, of course, maintained high ethical standards for themselves and took great care to pass these ideals on to their students.[3] Nonetheless, the larger community of research scientists formulated few statements of ethical norms for their work. Despite two articles in *Science* that argued the need for an ethical code for scientists,[4] little was done by professional societies to address the need for guidelines for research conduct until the mid-1980s or later. For example, it was not until *1991* that the American Physical Society issued their first statement of ethical guidelines,[5] (and those guidelines dealt exclusively with matters of research ethics.)

In contrast, most engineering societies and at least one scientific society, the American Chemical Society (ACS), issued codes and guidelines for professional responsibility for a half century and more.[6] Those statements had set forth norms of professional responsibility for public health and safety. Health care professionals such as nurses, physicians, and physical therapists had all established ethical norms for practice and to varying degrees educated new practitioners about their responsibilities.

Only now is the larger research community actively developing a basic vocabulary with which to discuss the ethical aspects of research conduct. The

Caroline Whitbeck is a philosopher of science, technology and medicine and is Senior Lecturer in the Mechanical Engineering Department at the Massachusetts Institute of Technology. She is guest editor for this special issue of *Science and Engineering Ethics* on "Trustworthy Research".
Address for correspondence: Dr. Caroline Whitbeck, 3-137C, Massachusetts Institute of Technology, Cambridge MA 02139, USA; E-mail: whitbeck@mit.edu

legacy of silence is very apparent to those of us who have been attempting to develop the conversation on research integrity. In discussions at a variety of universities and institutions, I have often found that researchers are surprised to learn, presumably for the first time, just what their colleagues think and do. In his paper for this journal, Professor Edsall discusses several instances in which astute researchers have been at a loss for what to do when confronted with misconduct and have responded in odd ways, such as refusing to let perpetrators of fabrication or falsification participate in retracting their papers. The absence of norms for coping with such breaches of trust was symptomatic of the neglect of research ethics in the decades leading to the 1980s. During this period, hardly any universities and other research institutions established policies for investigating charges of wrongdoing. Flagrant or repeated instances of plagiarism or of fabrication or falsification of data or experiments were either ignored or mishandled.[7]

Recognition of the gross mishandling of cases like those Professor Edsall describes came in the 1980s, when the government began mandating procedures for handling charges of serious wrongdoing. This second period of discussion ran into the 1990s. The attention to serious wrongdoing, commonly called "research misconduct" was much needed, but unfortunately, the discussion quickly became polarized.

Some said that research was riddled with "fraud." Others countered that the charges of fraud in science were exaggerated and that the attention to research misconduct was part of a campaign to discredit science and drastically reduce public support for it. About all that could be generally agreed on was that institutions needed better ways to handle charges of wrongdoing. Better ways of handling such charges were certainly needed, for many reasons, not the least of which was to create a process that is fair, protects innocent parties, and is likely to bring the truth to light.[7]

This second period extended into the early 1990s. Although a few institutions did establish guidelines for the conduct of research in this period, legalism so dominated the discussion of research conduct that ethical concerns were often distorted. Emphasis fell on legal and quasi-legal procedures for handling allegations of fabrication, falsification, and plagiarism. Those raising subtler issues of trust and trustworthiness were largely ignored, and many otherwise sensible people forgot what they knew about ethics. For example, some people with a generally good command of English claimed that we do not have a definition of "plagiarism." Plagiarism has a clear definition, of course; it is the representation of another's work or ideas as one's own. All that is wanting is a specification of the evidentiary standards to be used in legal or quasi-legal proceedings. Others immediately took the raising of any ethical questions in research to raise questions of "fraud." The assumption that the only ethical issue worth discussing are matters of fraud, or at least serious misconduct, has been quite persistent during the past decade. This persistence was brought home again recently when, in 1994, I was part of a working group developing guidelines for a professional society on certain aspects of research conduct. A renowned scientist who was part of the group objected to the use of the word "ethics" in part of our deliberations on the grounds that our deliberations did not raise the issue of *fraud*, as though fraud were the only ethical issue.

Because legalism so dominated the discussion in this second period, even observations about the relationship of instances of outright misconduct to other

ethical aspects of a situation were often ignored. Foremost among these was that falsification, fabrication and plagiarism tend to occur in research environments where a host of other offenses, disputes and dereliction of duties—poor mentoring, harassment, disagreements about authorship and ownership of data, or failure to share data—have gone unresolved.[8] "Fabrication, falsification and plagiarism" occupied the center stage, alone.

We have recently entered a third period in which the vocabulary for research integrity has expanded to include "trust," and "trustworthiness". Although the question of ethical behavior in research arose in the last century as well,[9] in those days research was often a more solitary endeavor. The complexity of today's research enterprise has created such a vast network of cooperative endeavors that trust relationships have a new importance. Trust introduces a simplicity that is necessary for such cooperative endeavors: it endows certain expectations with assurance.[10] To consider all the possible disappointments, defections, and betrayals by those on whom we rely, all the possible consequences of those failings, and all the preventive measures we could devise takes too much time and energy. Trust reduces this burden.

What ensures that researchers are not merely trusted but trustworthy? The philosophical inquiries of Bernard Williams and of Annette Baier contribute to our understanding of this question. Williams argues that the search for abstract solutions is vain and directs attention back to the question of how specific people in specific circumstances can be motivated to be trustworthy.[11] Baier has illuminated many of the features of trust and gone further to inquire into criteria for the moral soundness of trust.

The concept of trust entails both confidence and reliance. As Baier points out, we may have confidence in events, people, or circumstances, or at least in our beliefs and predictions about them, but if we do not in some way rely on them, our confidence alone does not amount to trust.[12] Our reliance is a source of risk, and risk differentiates trusting in something from merely being confident about it. If we are in full control of an outcome or otherwise immune from disappointment, we have no need to take the risk of trusting others. We may, of course, continue to rely on other people or on circumstances simply because we lack other options. We are fortunate if we need to be reliant only when we have a good basis for confidence.

Baier has broken new ground in examining when, ethically speaking, one ought to trust. She illuminates the strong relationship that trust has to truth, and offers as a test of the moral soundness of trust relationships, that they thrive rather than wither when the basis for confidence is revealed. Trust relationships fail this test when, for example, one party feigns trustworthiness or behaves reliably only because the other party dominates. Baier draws attention to the ethical mistake of putting the preservation of dependable behavior ahead of concern for its morality.

Recent work on the interplay between trust and truth in the history of science complements this work in philosophical ethics. Steven Shapin and Simon Schaffer's *Leviathan and the Air Pump*, Shapin's *A Social History of Truth*, and Gerald Holton's "On Doing One's Damnedest: The Evolution of Trust in Scientific Findings" all argue that assessments of truth in science have turned on the credibility of people.[13] Shapin and Schaffer's social histories emphasize how the civility of the English aristocracy undergirded the legitimacy that social authority conferred on seventeenth century scientific discourse. In this period, a report of findings was in large measure credible to the scientific community because of the social standing of the observer. A scientist's claims gained credence first on the basis of his credibility

as a gentleman, one whose honor, whose very identity, was founded on his good name. At the same time devotion to the pursuit of truth required a willingness to break the customary rules of civility by contradicting even those of higher rank.

The work of both Holton and Shapin illuminate the process by which trust necessary for research was established and extended in the physical sciences. Trust in the veracity of certain people and their testimony was established first, and then on the basis of that trust in people, a system of review was set up by the scientific community to establish the trustworthiness of findings. Holton traces the increasing complexity of cooperation, and hence of trust, among physicists in the first half of the twentieth century and draws attention to the development of trust in each other's research findings that arose from this experience of successful cooperation.

The picture that both Holton and Shapin give us of trust in results stemming from a prior trust in people is in marked contrast to the unreflective assumption that quite apart from the trustworthiness of people, the mechanisms of science will ensure the trustworthiness of results.

Shapin concludes that "The very power of science to hold knowledge as collective property *and* focus doubt on bits of currently accepted knowledge is founded upon a degree and a quality of trust that, arguably, is unparalleled elsewhere in our culture."[14] He holds that researchers have long engaged in arguing vociferously over facts and theories, but those debates largely assumed that those engaged in the debate are all credible—that is, honorable. The skepticism that is familiar to researchers as an established part of scientific review is directed toward exposing mistakes, but not wrong-doing.

It is, therefore, not surprising that in the period prior to 1980, researchers thought about one another's trustworthiness only when their trust was disappointed or betrayed. With little experience in discussing research ethics, researchers lacked a basis for agreeing about appropriate criteria for establishing trust, about the seriousness of particular betrayals of trust, and what they could do to prevent or limit betrayal in the future. It is altogether not surprising that when it became clear that the ethical aspects of research conduct had been neglected, attention focused first on the most flagrant acts of wrongdoing. The subtler and more complex questions of trustworthiness have only very recently received attention and discussion in the research community.[15]

The topic of this issue of *Science and Engineering Ethics* takes recognition of the importance of questions of trust and trustworthiness as its point of departure. The present situation is one in which many researchers have experienced some disillusionment or betrayal. Reestablishing trust is difficult. To ask for some basis for believing that the same disappointments will not recur is only reasonable. Without new grounds for assurance, the attempt to rekindle one's previous uncritical, naive, or unconscious trust is simply denial.[16] To reestablish trust on a sound basis requires understanding the betrayal or defection and its causes, and then having good reason to believe that the causes have been eliminated or brought under control.

The papers in this issue illuminate the present situation in scientific research and the events that led up to it. They richly illustrate ethical and methodological distinctions that are important for understanding the norms and practices in research today, where deficiencies exist in those norms and practices, and practical possibilities for strengthening or reestablishing the well-founded and morally sound trust that research requires.

John Edsall, arguably the scientist who has provided the most sustained moral

leadership on questions of research ethics in recent decades, has authored the first paper, "On the Hazards of Whistleblowers and on Some Problems of Young Biomedical Scientists in Our Time." He first discusses responses to evidence of misconduct from the 1960s to the present, reflecting how the general unpreparedness of the scientific community to come to grips with research misconduct (or other unwelcome events) frequently led to ill treatment of the person who first raised the issue. The cases of misconduct he considers are primarily those involving the fabrication or falsification of data or experiments. Edsall then goes on to consider conditions that today create greater pressure to distort experimental findings, at least for researchers in certain fields. His candid and insightful account of cases—several of which he witnessed at close range— emphasize two observations: first, the great danger to those who report misconduct when the research community is unprepared to accept such reports,[17] and second, the difficulty that astute researchers have had in coming to terms with wrongdoing in research. In his comments on John Edsall's paper Sheldon Krimsky both illuminates the moral leadership that Professor Edsall has demonstrated and expands upon the hazards to complainants. Leon Trilling, in his comments to John Edsall's paper expands upon the character of pressures on today's researchers.

"How Are Scientific Corrections Made?" by Nelson Kiang, like John Edsall's contribution, draws on the author's extensive personal experience, both as a researcher and as someone who has helped universities and government agencies review charges of misconduct. Like Edsall, Kiang, too, focuses on trust and trustworthiness of experimental results, although he also mentions instances of misappropriation of ideas or data. Kiang exposes the simplistic nature of the belief that science provides mechanisms that readily correct mistakes in primary data collections, and clarifies several types of mistake and moral failing that lead to unreliable results. He draws attention to common practices that encourage untrustworthy conduct, including journal practices that discourage correction and, therefore, implicitly encourage researchers to attempt a "lucky guess." Kiang also suggests practical controls for limiting abuses and self-deception.

In his comments on "How Are Scientific Corrections Made?" Robert Guertin, drawing on examples from his own field of experimental physics, discusses factors that make replication of results practically impossible or at least very difficult. In contrast to Shapin's account of the historical separation of skepticism about results from skepticism about a researcher's ethics, Guertin suggests that today healthy skepticism about results stems in part from the expectation that certain ethical as well as methodological standards are often breached.

In "Policies and Perspectives on Authorship," Mary Rose and Karla Fischer take up the second major topic in research ethics, fair credit. They explore norms and perspectives on questions of authorship and credit. They draw on cases and previous empirical studies (and outline a study of their own) to illuminate both questions of expectations (trust) regarding credit, and questions of what credit is deserved or earned (fairness and trustworthiness). They discuss gift authorship, plagiarism and the subtler abuses in assignment of credit. Rose and Fischer also examine guidelines and policies on authorship and credit and means of enforcement of these norms in preventing misunderstandings and abuses.

"Trust and the Collection, Selection, Analysis and Interpretation of Data: A Scientist's View," by Stephanie J. Bird and David E. Housman returns to the topic of the integrity of research findings but considers more common situations rather than those in which there is evidence of misconduct. Their paper brings out the

multi-layered trust relationships that undergird scientific research and the complex and difficult judgments that a researcher must make about data and its interpretation.

Eleanor G. Shore in "Effectiveness of Research Guidelines in the Prevention of Scientific Misconduct" examines the role of institutional guidelines on research practice in establishing consistent standards and educating researchers. The guidelines that Shore discusses are not expected to prevent all research misconduct, but rather to improve the conduct of research, generally, and lessen the incidence of lesser but common ethical lapses due to a single-minded concern for "expediency."

"The Ombudsman for Research Practice: A Proposal for a New Position and an Invitation to Comment," by Ruth Fischbach and Diane Gilbert explores the possibilities for another institutional support for conscientious research practice; one that might be especially helpful to students and trainees, who are the most vulnerable to reprisal when charges of wrongdoing arise.

In "Truth and Trustworthiness in Research," I provide an overview of considerations of trust and trustworthiness and the relation of truth to trustworthiness. I draw on examples of recent breaches of standards of research conduct to argue that "fraud" in the strict sense is a tiny proportion of misconduct cases. Reckless research practice is a more common betrayal of trust. Furthermore, I argue that intentional deception need not be a more serious betrayal of trust than negligent or recklessness violations of standards. Finally I examine the question of the moral soundness of trust relationships among researchers focusing on the supervisor-supervisee relationship.

Tyson Browning's contribution to the Educational Forum: "Reaching for the 'Low Hanging Fruit': The Pressure for Results in Scientific Research—A Graduate Student's Perspective" exemplifies how graduate students may conduct their own examinations of what they experience as ethically significant problems, and develop their ability to raise issues, discover norms, learn from experienced practitioners and find resolutions. The specific problem he explores is that of coping with pressure from research sponsors for results that the researcher may see as quite preliminary. He discovers in his interviews the importance of establishing mutual expectations with research sponsors in order to meet other professional responsibilities, including the responsibility to advance knowledge in one's field.

The goal of this issue is to advance the conversation about the ethics of research practices, to supply important distinctions illustrated with cases and examples drawn form actual practice. In so doing, the papers in this issue draw attention to the interconnections among the ethical issues and to possible means for strengthening the morally sound and well-founded trust on which the research enterprise depends.

C. Whitbeck

NOTES AND REFERENCES

1   Edsall, John T. (1975) *Scientific Freedom and Responsibility*. American Association for the Advancement of Science, Washington D.C. It is notable that Edsall joined the committee only after he had written the report.

2   Chalk, Rosemary (1988) *Science, Technology and Society: Papers from SCIENCE, 1949-1988*, American Association for the Advancement of Science, Washington D.C.

3   See for example the account of a mentor—Thomas E. Duffy—that Susan M. Fitzpatrick gave recently in the *Chronicle of Higher Education* (April 6,1994) B3. That this mentoring warrants a letter to the editor bespeaks the author's concern that it is endangered, an impression that I confirmed in private communication, October, 1994.

4   Pigman, Ward and Carmichael, Emmett B. (1950) "An Ethical Code for Scientists," and Cranberg, Lawrence (1963) "Ethical Code for Scientists?," reprinted in: Chalk, R. (1988) *Science, Technology and Society: Papers from SCIENCE, 1949-1988*, AAAS.

5   The American Physical Society Guidelines for Professional Conduct adopted by Council, November, 1991 available from the American Physical Society, College Park, Maryland.

6   Initially these concerned the responsibility for public safety and more recently for the environment. However even the National Society of Professional Engineers and ACS did not address matters of research ethics until the 1980's. The ACS *Ethical Guidelines to the Publication of Chemical Research*, were a model statement of ethical norms for authors, reviewers and editors when they were first issued in 1985, and their 1989 and 1994 revisions continue to be a model for other societies. Physicists who do basic research have, as a group, been less willing to consider the social implications of their work claiming that they were only increasing knowledge. What someone else did with that knowledge was another problem, "the end-use problem" which many held was not their concern.

7   Mazur, Allan. (1989) "The Experience of Universities in Handling Allegations of Fraud or Misconduct in Research.". In: Chalk, R. ed. *Project on Scientific Fraud and Misconduct: Report on Workshop Number Two*. AAAS, Washington D.C., pp. 67-94.

8   See for example, "Progress Report of the Committee on Academic Responsibility," August 12, 1991 published as a supplement to *MIT Tech Talk and Fostering Academic Integrity, Report of the Committee on Academic Responsibility*, MIT April 15,1992, p. 14.

9   Babbage, Charles, *Reflections on the Decline of Science in England and on Some of Its Causes*, first published in 1830, republished in 1969 in London.

10   Luhmann, Niklas (1979) *Trust and Power*, John Wiley & Sons, New York, and Luhmann, Niklas (1988) "Familiarity, Confidence, Trust: Problems and Alternatives." In: Gambetta, Diego, ed. *Trust.: Making and Breaking Cooperative Relations*, Basil Blackwell, Oxford, pp. 94-108.

11   Williams, Bernard. 1988. "Formal Structures and Social Reality." In: Gambetta, Diego, ed. *Trust.: Making and Breaking Cooperative Relations*, Basil Blackwell, Oxford, pp. 3-13.

12   Baier, Annette (1986) "Trust and Antitrust." *Ethics* 96: 232-260. Reprinted in *Moral Prejudices* (1994) Harvard University Press, Cambridge MA, pp. 95-129.

13   Shapin, Steven (1994) *The Social History of Truth*. The University of Chicago Press, Chicago; Shapin, Steven and Schaffer, Simon (1985) *Leviathan and the Air Pump: Hobbes, Boyle, and the Experimental Life*. Princeton University Press, Princeton, N.J; Holton, Gerald (1994) "On Doing One's Damnedest: the Evolution of Trust in Scientific Findings." chapter 7 in Holton's *Einstein, History, and Other Passions*. American Institute of Physics, New York.

14   Shapin, S. (1994) 417.

15   See for example, Alberts, Bruce and Shine, Kenneth (1994) "Scientists and the Integrity of Research." *Science* 266 (December 9): 1660-1661.

16   Ekman, Paul (1991) *Telling Lies: Clues to Deceit, in the Marketplace, Politics, and Marriage*. Norton, New York.

17   John Edsall presented some of this account in the oral presentation for the symposium of Boston Colloquium for the Philosophy of Science at which these papers were first presented and elaborated them in personal conversation, August, 1995. He also makes clear that when such naive trust was shattered, some researchers reacted in an extreme way by refusing to let the perpetrator participate in the retraction and preferred to think of the matter solely as a gross aberration in the perpetrator rather than as evidence of a need for better transmission of ethical standards to trainees.