

Ethics and the Responsible Conduct of Research in the Chemical Community: The Unique Role and Challenges of the News Media

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Journalists who cover scientific research, including chemistry research, have an obligation to report on alleged cases of research misconduct when knowledge of these surface. New Government definitions of research misconduct, beginning in the late 1990s with the Clinton Administration, have helped scientists, policymakers, as well as journalists sort out and make sense of alleged research misconduct. Journalistic reporting on research misconduct includes many challenges: gathering information from sources who are intimidated or afraid to speak, strict adherence to journalist ethics that take on a new dimension when careers, reputations, and research funding are at stake; efforts by government and institutional bureaucrats to dampen or thwart legitimate news coverage. The Internet, blogging, and social media have added still more complexity and ethical quandaries to this blend. The author, News Editor of *Chemical & Engineering News* published by the American Chemical Society, provides examples from his own career and that of colleagues. He suggests that an enhanced spirit of understanding and cooperation between journalists and members of the scientific community can lead to avenues of open discussion of research misconduct—discussions that might prevent and mitigate the very real damage caused by bad actors in science who betray themselves, their peers, and the body of modern day scientific knowledge when they make the decision to march into the darkness of dishonesty, plagiarism, or falsification.

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Editor's Note

The traditional media—newspapers, newsmagazines, television and radio—continue to be major sources of information. In addition, the media help shape our understanding of the world and our visions for and the possibilities of the future. And the converse: the written words, when preserved, are the records of the past. This is especially true within the scientific and technical milieu. I frequently access the archives of Chemical & Engineering News (C&EN), the newsmagazine of the American Chemical Society (ACS). The ACS is the world's largest scientific society (over 160,000 members), and according to Wikipedia, is "one of the leading sources of authoritative scientific information." This special issue of Accountability in Research is privileged to have an essay written by the News Editor of C&EN, William G. Schulz. Schulz has been covering ethics and RCR issues for more than 20 years, among many other assignments. A search of C&EN's archives reveals his story "ACS files 'friend of the court' Benlate brief" (December 18, 1995) on this fungicide; "NIH Peer Review System Under Scrutiny" (October 11, 1999); "Study Recommends Better Treatment of Postocs," (September 18, 2000); and many other articles of relevance to Accountability in Research during his employ as a news reporter for C&EN. Schulz' essay provides us a wonderful opportunity to hear from a science journalist, speaking his mind and sharing his experiences. Indeed, as a reviewer of Schulz' paper said, "I like the theme of what is it like to be a reporter or editor and trying to report timely facts. You are acting with the same degree of honesty and integrity as the scientists who are trying to build their careers."

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INTRODUCTION¹

Reporting misconduct in scientific research—everything from minor ethical violations, for example, failing to cite related research reports,² to outright fabrication and falsification—is a responsibility shared by all members of the scientific community as well as by science journalists. Journalists are truth seekers and information providers, whether it is in city hall, Congress, the boardroom of public companies, or the research laboratory. The watchdog function provided by journalists is a check on power whose value to U.S. democracy has been recognized since the days of the Founding Fathers.

But reporting about the responsible conduct of research (RCR), including ethical violations, is a work in progress. This article covers the important developments that were first formalized in the late 1990s during the Clinton

Administration that brought widely recognized definitions for research misconduct that have proven valuable for anyone who needs to weigh such evidence. Government funding agencies, institutions of higher learning, pure research institutions, professional scientific societies, journal publishers, journalists, and others have benefited from a new found clarity about exactly what is meant by a finding of research misconduct.

This article also focuses on the media's reporting of the developments within academe especially to prevent, identify, and mitigate the damages caused by research misconduct when it does appear and investigate the claims of research misconduct and report about those found guilty of research misconduct. Several examples of reporting on research misconduct and related issues of negligence and other ethical violations are recounted. The reporting cited has taken place within the context of the social media revolution (Jogalekar, 2015), which has had a well-known and profound impact on journalism, no matter the media platform.

I am also describing my point of view as a journalist who writes for an audience of primarily chemical scientists and other scientific professionals. But it is a point of view that applies broadly, in that scientists are not somehow apart from society. People who work in science and the public at large are all affected by betrayals of public trust, misuse of public funds, lies or falsehoods, and distortions of the body of modern day scientific knowledge on which our society is built and functions.

My writing about research misconduct and related matters in responsible conduct of research began in the mid-1990s when I first came to work for *Chemical & Engineering News*³ (*C&EN*), the newsmagazine of the American Chemical Society and where I currently serve as News Editor. This work has been encouraged by my editors and fellow journalists as well as our many thousands of readers. The subject has become a critical part of the magazine's scope of coverage. There has been much pride and frustration in these endeavors. The pride is characterized by dogged and accurate reporting that has led to the most complete and accessible coverage for our readers of many cases of research misconduct and other ethical lapses. Frustration in reporting on possible science misconduct happens because it is often difficult and even impossible to obtain the information reporters need. There can be a disconnection between what universities and government agencies know and what they are willing—and perhaps, legally able—to disclose to reporters such as myself. And then, there is the public, eager to know, and also frustrated in their attempts to understand from the news reports, the notices that the Office of Research Integrity (ORI) of the National Institutes of Health publish, the blogs, and the grapevine (Laszlo, 2012). The process can be very, very long—up to several years—between initial allegations of research misconduct and the publication of findings.

The reporting referred to in this article is known as “primary source” reporting. It is the standard for *C&EN* as well as for most every journalistically

grounded news organization. It means that reporters have gathered verifiable information from firsthand sources—people, official documents, government hearings, public board meetings, and the like. Reporters have talked with sources and double checked their veracity and known motives. Likewise, the sources of documentary evidence are carefully considered and weighed. And finally, the use of unnamed sources is employed with the greatest of caution and only in circumstances vetted by senior members of an editorial team.

RESEARCH MISCONDUCT AND QUESTIONABLE RESEARCH PRACTICES

Of course, research misconduct and ethical violations in research are probably as old as the scientific method itself. Just as there are steps to discover and validate facts, there are steps to fabricate and falsify—and distort in other ways—science. For example, when does rounding numbers up or down or excluding outliers in data to produce smoother results crossover from acceptable to unacceptable research behavior? That some scientists will choose questionable research practices and what may ultimately be determined to be research misconduct has long been recognized.

There are no easy answers to many of the questions dealing with RCR, even today. However, because so much of U. S. scientific research is funded by the federal government, it has been important for federal agencies as well as researchers to have a definition of research misconduct that would serve as both a guide and as a legal normative standard. The U.S. Federal Research Misconduct Regulation and the RCR directives or guidance have also helped public and private institutions, and others decide when research misconduct investigations are warranted. These regulations also guide the adjudication of specific cases and penalties for those found guilty. In fact, investigations of research misconduct involving the use of federal funds takes place first by the institution where the alleged misconduct occurred. Then, those investigations are validated and/or confirmed by funding agencies such as the National Institutes of Health.

Penalties for confirmed cases of research misconduct have federal and institutional consequences. Institutions can fire, limit resources, require ethics training, not give salary raises, etc. The federal government can ban individuals from receiving federal research grants and serving on review panels for a varying number of years or permanently depending on the gravity of the research misconduct. In addition, once the findings are posted in the Federal Register, the findings are retrievable on the internet by nearly everyone in the world. For journalists who write about misconduct or other ethical violations in research, the definition has helped them—and their editors—weigh editorial decision-making on whether to cover individual cases of research misconduct

and to what extent. For example, reporting might be as brief as noting that an institution has undertaken an investigation or it might involve a wholesale project in investigative reporting that coexists with or subsequent to official investigations by the government or recipients of government funding. It is also true that institutions are hesitant to inform (and may be prohibited from informing) the public or a reporter that they are investigating a case. And, as discussed above, a claim of research misconduct is not a violation until it is proven by a preponderance of evidence by the institution's investigative committee and then by a confirmed finding by, for example, the ORI.

According to some scientists, research misconduct is rare because, for example, one might tally the number of misconduct investigations underway at a given time and compare that small number with the many thousands of active research scientists around the globe. On the other hand, research misconduct may not be so rare: Pupovac and Fanelli reported in 2014, based on meta-analysis of studies, that “committed (seven studies) and witnessed (eleven studies) plagiarism yielded a pooled estimate of, respectively, 1.7% and 30%” (Pupovac and Fanelli, 2014). Seeman and House reported very high instances of authorship disputes among chemists in U.S. academic institutions (House and Seeman, 2010).

Scientists will often assert that misconduct, sooner or later, will be revealed by the self-policing nature of scientific research—that is, the idea that at some point research results that have applicability must be able to be replicated in order to be fully adopted and/or be of widespread utility. It must also be recognized, however, that some areas of research are inherently not reproducible. This is particularly true of some biological and medical research in which the complexity of living systems is not only poorly understood but nearly impossible to replicate. This does not mean that fraud is more or less likely to occur in these disciplines, but it may remain obscured longer. Authorship disputes are also not discoverable even if a study is completely reproducible!

For some scientists, it is not the applicability of any given line of research that matters most; rather it is building a publications record, especially if it is meant to impress decision makers on such matters as retention, promotion, and funding. Along with fraudulent research, this motivation can also inspire the ethical violation of dual submission or self-plagiarism as well as breaking down one excellent paper into a number of shorter publications, solely to enhance one's CV. “Slicing and dicing” the same research report and submitting it to numerous journals at the same time occurred recently in India and was reported on by *C&EN* (discussed later in this article).

In his book, *On Fact and Fraud: Cautionary Tales from the Frontlines of Science*, Caltech professor of physics and former Vice Provost David Goodstein writes as follows:

Fraud, or misconduct, means dishonest professional behavior, characterized by the intent to deceive—the very antithesis of ethical behavior in science. When

you read a scientific paper, you are free to agree or disagree with its conclusions, but you must always be confident that you can trust its account of the procedures that were used and the results produced by those procedures. (Goodstein, 2010)

THE NEWSMEDIA

Obtaining Information: Difficulties and Responsibilities

Writing and reporting about the responsible conduct of research as well as alleged research misconduct and misconduct investigations have increasingly become endeavors that require investigative reporting. Investigative reporting can be thought of as any in-depth reporting project that includes interviewing numerous sources, perhaps multiple times, and probing them deeply for information; pursuit and examination of documentary evidence; and data gathering that, when properly analyzed, will also reveal truths or verify reporting hypotheses.

For sources or for the subjects of an investigative reporting project, the work of the reporter or reporting team can often seem threatening. And perhaps it is. After all, the reputations of people and institutions are on the line, criminal behavior may be involved, and sensitive areas of scientific research may be under fire as to veracity and legitimacy. Privacy of individuals under investigation for misconduct or other illegal and unprofessional behavior is also a concern, and they are afforded legal protection in the workplace, at least in the U.S.

Obtaining information or confirmation of previously obtained information is often hard or impossible to obtain. This reporter was blasted at a professional scientific society meeting for merely asking a question—albeit a tough one—of one presenter whose research is funded by the federal government. A suggestion that reporters should heel and provide only the information scientists themselves agree on and deem to be accurate is folly when researchers themselves hold a wide variety of opinions and/or reactions and/or interpretations to facts and events.

Not surprisingly, institutions often decline to speak about research misconduct investigations they have underway. Likewise, they forbid their employees from speaking out during investigations and often, even after the completion of an investigation. Documentary evidence often must be obtained through public-records procedures such as filing Freedom of Information Act Requests (FOIA), which compel government agencies to release documents of public interest that are not classified or a threat to national security. For privacy reasons, agencies may black out some names and personal data, for example, names, addresses, phone numbers, and e-mail addresses for witnesses who have provided the government with information.

These circumstances, then, may necessitate the use of anonymous or unnamed sources—individuals who will only speak with a reporter if his or her identity is kept confidential. It is a tool with which reporters can leverage a source's legitimate fear of reprisal with an equal desire to make public facts or truths to which they have direct access or knowledge. Like most news organizations, *C&EN* maintains strict rules about granting anonymity, including that at least two senior editors and the reporter know the identity of the source and have carefully deliberated the worth of the information received vs. the source's motivations and self-interest and need for protection as a whistleblower. It is a decision that can only be made on a case-by-case basis.

Actions taken to protect the integrity of internal investigations and the privacy of individuals can be virtuous and necessary; however, they often conflict with a journalist's duty to readers and/or viewers and/or audience. Secrecy can also be a tactic to permanently hide information and prevent discussion by the community or wider public.

The editorial policy committee of the Council of Science Editors, in a "White Paper on Promoting Integrity in Scientific Journal Publications, 2012 Update," had this to say about the media and research misconduct:

Most editors respond to such inquiries with a statement that they do not discuss such cases Regardless of how an editor chooses to respond, it is a good idea to request that the reporter forward their questions in writing to allow time to carefully prepare a response. Remember that the response may be quoted in subsequent news articles. (Council of Science Editors, 2009)

While this policy may not sit well with all journalists—for example, many would balk at providing written questions in advance of an interview—it does leave room for speaking with and including the press in inquiries about research misconduct. And while the relationship of the scientific community with the media should probably always contain a healthy tension and skepticism on both sides, scientists would do well to recognize that fair and unbiased reporting is done with the intent to inform—not to "get" or destroy any one person. On the same hand, journalists must take the utmost care to verify facts and weigh information given to them by sources for the very reason that careers and reputations in science may be at stake.

Some journalists hope that people in the scientific community will recognize responsible journalists and perhaps try to find ways to speak out about misconduct that does not place them, as source, in legal jeopardy or unfairly disparage persons accused of misconduct. Research misconduct investigations are always confidential until an official finding is made and investigative reports issued. The ORI, for example, will only talk after a case is closed with a finding. Institutions also refrain from commenting or releasing information during the investigative process, and often they choose to not disclose even the fact of ongoing investigation. There are times when suspicions or allegations

of misconduct will be reported in advance of investigations or investigative findings. Also, it can be just as important to report that an investigation has concluded and that misconduct was *not* the finding. So in that sense, it really is a problem when an institution will divulge nothing even when it would be a conclusion of no wrongdoing.

Confidentiality precludes any idea that someone is or is not trusted. Furthermore, if a whistleblower talks to a journalist during the investigative process, they lose their rights of protection that are enforced by ORI. As a reporter I would not encourage someone to illegally give me information or otherwise harm themselves. However, as a reporter, it would be unethical of me not to accept important material of any kind leaked by a source and at least consider reporting on that information—a major consideration being the motives a source might have in giving me information. In other words, only the source can decide what legal risks he or she might want to take.

Some Consequences of Reporting on RCR

Journalistic investigations of specific instances of research misconduct cases can be one-off news events or situations that, because they unfold over multiple years, require sustained and serial coverage. Reporting on the outcome of a research misconduct allegation and investigation can sometimes come many years after complaints have first been made. Nonetheless, responsible and thorough reporting about research misconduct by trained journalists can help both scientists and the public understand better aberrant, perhaps even criminal, behavior by people entrusted with public or private funds to produce honest scientific work.

Perhaps researchers will be better able to spot “slippery slopes” in their own thinking about research results and data. It is known that many ethical lapses begin as small attempts to make sense of data and other research results. Perhaps the stigma against calling into question too-good-to-be-true research results will fade and open debate and discussion about such work will become more acceptable. Perhaps graduate students and mentors will develop a heightened awareness of research ethics and incorporate that into their own science careers. Sometimes, ethics is not so much about research results but the safe conduct of research by investigators (Kemsley, 2014a; Torrice and Kemsley, 2014).

Journalists who write about research misconduct have contributed to the understanding of this and other types of ethical wrongdoing in science. Importantly, they have given voice to graduate students and junior researchers and other members of research teams who would otherwise fear the professional consequences of speaking out about unethical research practices and misconduct that they have observed. This is a constant feature of research misconduct investigations carried out by journalists and institutional authorities.

Some research on RCR indicates that responsible news coverage and discussion of misconduct cases may be of benefit to researchers who have otherwise limited experience with these issues. In the past, before the now-required training in RCR, a researcher's experiences may have been limited to what they have personally experienced and their own role models plus what they could read in the media. Reflecting on a survey they conducted about responsible conduct in research—specifically, allocation of credit for published research—House and Seeman note as follows:

(1) that researchers are influenced most by their graduate and post-graduate school experiences and (2) that their mentors—their professors—“do what seems to be the right thing” in making decisions. Taking these influences together suggests continuity in individualistic styles of giving, or not giving, credit by chemistry faculty. This individualism is consistent with the significant degree of autonomy possessed by tenured faculty in major academic institutions. (House and Seeman, 2010, p. 251)

Without doubt, information reported by *C&EN* has helped inform subsequent investigations of misconduct as well as measures that would prevent similar fraud from taking place again or at least with much less frequency. Specifically, when journalists file FOIA requests, they take bureaucratic steps to get government information that might otherwise be left undiscovered.

MISCONDUCT IN SCIENTIFIC RESEARCH

Misconduct in research typically involves one of three activities: fabrication, falsification, or plagiarism. In this section, recent examples of each of these types of violations which received considerable media coverage will be discussed.

Research Misconduct and Falsification or Fabrication

A very high profile case of research misconduct that included falsification of data was reported on widely by *C&EN* and other media (Noyori and Richmond, 2012; Rubin, 2011; Schulz, 2011a;b). It highlights some of the difficulties encountered as we tried to examine the outcome of an investigation where there was a finding of research misconduct. The case concerned research conducted by doctoral candidate Bengu Sezen at Columbia University starting sometime around 2000. Sezen was awarded a Ph.D. degree by Columbia in 2005, but it was not until 2011 and the public release of official investigation documents that the massive nature of her fraud was revealed and her doctoral degree revoked (Schulz, 2011a, Schulz 2011b).

Neither Columbia University nor officials at the National Institutes of Health, which funded some of Sezen's research, would comment to *C&EN* or any other news media, to my knowledge, on the case. Moreover, both

institutions were slow to release any relevant documents. *C&EN* and other publications finally obtained the investigation reports through FOIA requests and only then were the massive nature of the fraud and specific details of how it worked revealed.

In the Sezen case, *C&EN* reported such details of the investigation. Specifically, the perpetrator had the ability to access scientific equipment using the passwords of fellow students and thus obliterate her trail of misdeeds. Further, Sezen's doctoral committee of distinguished academics failed to examine the laboratory notebooks she lied about maintaining. Had any member of her doctoral committee asked to see the notebooks detailing her experiments and data, the fraud may have been revealed. Both the lack of security of scientific instruments and the failure to be thorough in reviewing a doctoral candidate's thesis have no doubt been highly embarrassing to Columbia University. However, *C&EN*'s reporting and that of other news organizations may very well help other institutions spot similar vulnerabilities that can be corrected. It also throws light on our higher education system and whether there are systems in place for oversight on faculty behavior. What can and should an institution do to encourage faculty to be more "hands-on" in the conduct of research within a group setting, and what can and should an institution do when there is insufficient supervision by faculty? It would have been great if faculty and administrators at Columbia would have talked about some of these issues, even in a general sense, but they did not.

Plagiarism

The next case involves the chemist Armando Córdova. *C&EN* described how he had been accused and then investigated for "stealing" the ideas of other scientists, i.e., plagiarism. According to the *C&EN*,

Córdova's case reveals that the scientific community is often unprepared to deal with misconduct, particularly when the violations fall short of scientific fraud. Although ethical guidelines themselves seem clear, what to do about ethics violations is another matter. Most people familiar with the Córdova case who talked to *C&EN* could not specify what they think should happen to him as a result of his actions. (Schulz, 2007)

Whatever the magnitude of the ethics violations by Córdova, in a larger context, *C&EN* coverage prompted conversation in the chemistry community about ethical behavior in research. One chemist/philosopher had to say as follows:

Whatever one's view of Córdova, his case has presented an opportunity for discussing scientific ethics in the chemistry community. But "talking about ethics is like talking about what happens in people's bedrooms—no one does it," says chemist Janet D. Stemwedel, an assistant professor of philosophy at San Jose State University, in California. She is an expert in scientific ethics and maintains

her own blog, “Adventures in Ethics and Science” (doctorfreeride.blogspot.com) (Schulz, 2007).

Several years ago, *C&EN* reported on three examples of fabrication and falsification involving three Japanese universities (Rovner, 2007). In one incident, as reported by *C&EN*, questions of reproducibility were reported to the RNA Society of Japan. An investigation by the involved university revealed that the research associate “failed to record experimental notes and claimed that many test samples and much of the raw data on which the papers were based were lost or destroyed” (Rovner, 2007). The university further reported that the senior investigator “neglected opportunities to appropriately supervise and verify [the research associates’s] work . . . and failed to grasp that [the research associate] was not recording experimental notes” (Rovner, 2007). The senior investigator had also been warned by colleagues but “did not follow up appropriately, the university says” (Rovner, 2007). Subsequently, the senior investigator retracted the papers and the “university dismissed the two researchers” (Rovner, 2007). This incident, similar to others involving chemical research reported in recent years, demonstrates possible fabrication and/or falsification and/or reckless behavior by a researcher which was not prevented by careful supervision by the senior investigator. The second case involved fabrication and research errors which also led to the dismissal of the scientist. The third case involved “illicit use of [research] funds” (Rovner, 2007) by a senior investigator who resigned from her university and also subsequently resigned as president-elect of International Union of Pure and Applied Chemistry (IUPAC).

RESEARCH CONDUCT AND THE LAW

Safety Violations and Alleged Criminal Behavior

One ongoing case of alleged criminal behavior by a scientist that has required serial reporting in *C&EN* is that of University of California, Los Angeles chemistry professor Patrick Harran. In 2008, an accident in his lab with t-butyl lithium and the resultant fire led to the death of Sheharbano (Sheri) Sangji. *C&EN* has covered the case almost since the day of the lab accident. Coverage has included items (Kemsley, 2014b; Torrice, 2014) posted on a *C&EN* blog, “The Safety Zone,” maintained by reporter Jyllian Kemsley as well as several news articles by Kemsley and others at *C&EN* (Kemsley, 2014a; Torrice and Kemsley, 2014). Harran has now struck an agreement with the prosecutor and by agreeing to a series of punishments, he will avoid further prosecution for felony violations of the state labor code. In the Harran-Sangji matter, *C&EN* also reported that the “Lab death defense cost \$4.5 million,” all paid by UCLA to outside law firms to defend itself (\$1.3 million) and Professor Harran (\$3.1 million) (Kemsley, 2014a). *C&EN* also reported that

the “estimated cost to outfit all UC lab workers with protective equipment” is \$4 million.

It is an unprecedented legal ordeal for an academic accused of safety violations, but *C&EN*'s coverage along with the facts of the case has sparked widespread attention, conversation, and policy changes on academic laboratory safety throughout the country and likely, around the world. Clearly, RCR includes laboratory safety. Is laboratory safety stressed enough in our academic institutions? Are safety inspections performed regularly as they are in many industrial laboratories?

Discrimination and Sexual Harassment

Discrimination and sexual harassment are misbehaviors that impact on science and which can occur in research groups. *C&EN* has covered many aspects of discrimination in science, including for race, gender, and sexual orientation.

A case involving gender discrimination at New Jersey's William-Paterson University involved a hostile workplace in science for two female chemistry professors. Among other facets of the case, the magazine's investigative reporting revealed a history of discrimination at the school:

Court documents obtained by *C&EN* show that gender harassment and discrimination complaints have been filed in the past against the WPU [William-Paterson University] department of chemistry and physics (now department of chemistry)—and [Gary J.] Gerardi and [Gurdial M.] Sharma in particular. The complaints were filed with the university by a former female chemistry faculty member who is now deceased, 15 female undergraduate students, and one female undergraduate student who also filed a complaint with the Department of Education. Upon investigation by the university and/or DOE, none of the complaints was found to have merit and therefore did not result in any disciplinary action against Gerardi and Sharma. (Schulz, 2009)

One month after the first *C&EN* story was published, WPU reached a \$1 million settlement with the two women chemistry professors who had filed complaints:

“Nobody settles a case for a million dollars if they plan to win,” [plaintiff's attorney Samuel] Samaro says. The discrimination that existed at WPU “only came to light because of this litigation.” (Schulz, 2010)

THE ROLE AND RESPONSIBILITIES OF THE MEDIA AND THE REPORTERS

While there is little doubt about the self-correcting nature of scientific research, the role of the press in exposing and increasing awareness about research misconduct and the responsible conduct of research is useful and must be recognized. As elsewhere in a democratic society, the information and watchdog

functions of the press—guided by its own ethical standards—are still vital to an informed citizenry and functioning institutions of government, academe, and business. For researchers and their institutions, widespread information on the details of a case of misconduct has the potential to help others put in place safeguards that protect scientific research.

At the same time, the media has responsibilities to both the scientific community and the readers of its writing.

Penetrating the veil of secrecy that often surrounds misconduct investigations requires and expects responsible behavior by journalists with strict adherence to professional ethics standards in general and standards that are specific to their employer. *C&EN* maintains its own ethics manual that was developed and is maintained by a staff committee of journalists. The manual reflects ethical standards in the wider journalism profession and is not subject to revision by anyone outside the immediate *C&EN* staff of journalists.

What does a reporter do? I report the facts of cases that we, as a senior editorial team, determine are of interest to our readers. When I call someone and say, “What can you tell me?” I mean that literally. If you tell me, “I can only tell you X”—fine. But, if you are willing to talk with me, I might ask further questions, which you can choose to answer or not. I do not engage in any subterfuge, misrepresent myself as a reporter, encourage anyone to break the law, and so on.

I will ask you to think about what you can tell me, and I will ask you to consider the value of me reporting information of interest to the community in deciding whether and what to say to me—but I am not some trickster or sneak who is going to try to con you into saying something you should not or do not want to say. Beyond that, there are many ways to speak with people and to help them feel at ease—I treat all of my sources with respect and try to inspire trust that I will handle any information they give me responsibly and with the utmost care. If a source is granted anonymity, I will NEVER divulge their identity to anyone other than my editor, as previously noted. In the age of blogs, citizen journalists, and the instantaneous flow of information on the Internet, these ethical standards have taken on new dimensions of importance for establishing matters of fact. In the Sezen case, for example, many rumors were in circulation concerning how the fraud might have happened and how it went undetected for so long. Some of the more salacious ones were posted on blog commentaries—typically characterized as operating with very loose standards regarding the truth.

At the time, *C&EN* was criticized by several bloggers for not publishing some of the rumors in circulation. One could fairly criticize *C&EN* and other journalistic organizations for not previously making clearer the boundaries of fact vs. rumor. It is important for the reader to know the degree to which information has been vetted. Because news organizations have never before faced such consistent challenges to their business model, such as those

presented by bloggers, readers' knowledge of journalistic ethics/standards in this regard have probably been assumed.

Publishing hearsay or rumors without facts to back them up is an ethical violation for journalists. Unfortunately, sticking to journalistic ethics was viewed by some in the blogosphere and elsewhere as outdated. In the end, however, *C&EN* was the first publication to get the whole story of the Bengu Sezen affair right, and it remains the publication of record on this case.

Writing news and feature stories about dishonesty and misconduct in scientific research is an important responsibility for *C&EN* journalists. To be sure, these stories must be balanced and objective, free of hyperbole or other exaggeration, and stick to the facts. Our goal is to focus light on stories that can have an impact and be presented with honesty and fairness.

BARRIERS TO WORKING WITH THE GOVERNMENT AND SUGGESTIONS FOR IMPROVEMENT

The government provides very clear rules on the FOIA process for the news media and even when requests are denied—I have had this happen only once—clear reasons are stated and explained within the context of the law. Where I and many other journalists sometimes do have problems is access to sources—usually, agency employees who have direct knowledge on a given subject. Increasingly, however, government public affairs officers (PAOs) have instituted policies that forbid other agency staff from speaking with journalists without the public affairs' office consent.

What often happens is that a journalist must first call a public affairs officer, explain the story being pursued, and the PAO then contacts the desired source—never a direct contact with the journalist. This of course signals the PAO of potentially controversial stories that can then be thwarted. One or more of the following often happens: agency employees are not permitted to speak, rather the PAO gives a statement; questions in writing are demanded in advance, and PAOs will insist that they be present or on the phone during an interview to monitor what is said and to interrupt or stop interviews as they see fit. On the same hand, I and many other reporters have built good working relationships with Public Affairs staff and the best of these facilitate productive interviews and information flow between sources and reporters. They do not attempt to interfere with my work or make demands—such as advance questions, review of copy—that they know I cannot fulfill.

DISCUSSION

Fraud, plagiarism, theft, and other forms of misconduct in science can be better guarded against when there is widespread knowledge about how such

deviations from the norm of behavior can happen in the first place. Honest and open discussion among scientists, funding agencies, academic institutions, and taxpayers can mitigate the widespread damage to science of even one bad actor. As with most problems that afflict society, research misconduct can grow and worsen when it is met with denial and secrecy.

As this article has outlined, the definitions of research misconduct issued by the federal government have helped clarify what constitutes misconduct and how it can be separated from less egregious behaviors such as sloppy recordkeeping, rounding errors, misunderstanding about accepted research and publication practices, and so on. At the same time, widely accepted definitions of research misconduct have aided journalists who seek to write and report about misconduct allegations and investigations, and who must make important editorial decisions about which stories are worth covering and the amount of resources that should be available for any given story. Simple misunderstandings or gaffes in the conduct of scientific research may be somewhat newsworthy during a particular week, but not over longer periods of time. Alleged research misconduct in important and visible areas of science becomes a different matter—scientists and the public in general have a greater stake in the outcomes of such work, particularly if it has been funded by taxpayer dollars. When well-known or “rising star” researchers are involved, or when there have been huge expenditures of federal money, the obligation of the news media to cover such cases in depth intensifies. The ability to evaluate allegations and known facts against the federal definition of research misconduct becomes a valuable tool for news organizations like *C&EN* and many others.

Journalists must keep their reporting factual and not speculate, reach for, or publish conclusions or analyses not supported by known facts. This is a fundamental practice in news reporting and writing as well as a point of journalism ethics common to every newsroom. For example, speculation about motivations for research misconduct in the absence of clear and supporting facts would be unethical journalistic behavior. So too would be the publication of rumors—sometimes clumsily justified as the “reporting of important rumors.” Adhering to these standards of fact-based, objective reporting can be frustrating for journalists and readers alike. But journalistic reporting retains greater information value for a longer period of time as a result.

Journalists must also be objective and fair. The journalist’s duty is to seek the truth and inform. That necessitates reaching out to and speaking on the record with all parties connected to an alleged case of research misconduct, to the extent possible. This duty includes thorough effort to gather the accused person’s side of the story and report all of it. This does not preclude challenging the accused with facts gathered from other sources—in fact, it is also an ethical duty to give the accused an opportunity to respond.

Protecting privacy is the oft-cited reason that sources will refuse to speak about allegations of research misconduct. Increasingly, sources and their employers are unwilling to even explore what they can ethically and legally tell a reporter about research misconduct cases. As stated earlier, ethical journalists would never urge a source to break the law or to jeopardize their employment or reputation.

This reporter has dealt with many instances in which even tenured faculty have been afraid to speak on the record in even general terms—such is the power accumulated by public relations bureaucrats whose agenda often runs counter to thorough news reporting when the subject is embarrassing or highly controversial. They will seek to dampen or silence public discussion of controversial stories, including research misconduct.

When a distinguished body like the Council of Scientific Editors issues recommendations to essentially evade and discourage any journalistic inquiry about research misconduct—something is surely amiss with the seriousness we are told is applied to cases of research misconduct by the scientific community. Secret tribunals, deals behind closed doors, and investigations conducted by no one other than those with a vested interest in the outcome do not have a valued history in democratic societies.

CONCLUSIONS

C&EN readership is very diverse—chemists, chemical engineers, and others with and without a technical background—with different political beliefs, different outlooks on science and interpretations of scientific research, and readers with a vested interest in government and private sector R&D policy and spending. I and other *C&EN* journalists serve all of those readers—never a select few who believe that their agenda/ideas are most correct and deserving of coverage.

Anyone who is concerned about the ethical conduct of research—including science journalists—ought to be disturbed by recent trends toward secrecy and tight message control. Problems are solved when people are free to discuss and analyze them, not when they are swept under the rug.

It is somewhat ironic that institutions pledged to free and open academic inquiry and that actively seek public money to fund scientific research will also seek to dampen or shut off information whenever the news is not so good or flattering. Cases of research misconduct are never good news, but they are a reality in every science discipline. When powerful institutions are unwilling to find ways to discuss these cases—even when the facts of official investigations have become public—the damage is perpetuated. Forbidding discussion of important matters for fear of a few days' or weeks' worth of embarrassment, signals lost balance between privacy concerns and the public's right to know how taxpayer money is spent—or misspent—and by whom.

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NOTES

1. Where the author has expressed views and opinions, these are his own and not necessarily those of *C&EN* or the American Chemical Society.
2. Intentionally failing to cite literature that disagrees with the logic and/or conclusions of a research report is an example of falsification and may be misconduct of research.
3. *Chemical & Engineering News* is published 50 times each year and distributed to over 160,000 members of the American Chemical Society as well as thousands of other readers, libraries, and institutions worldwide.

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