

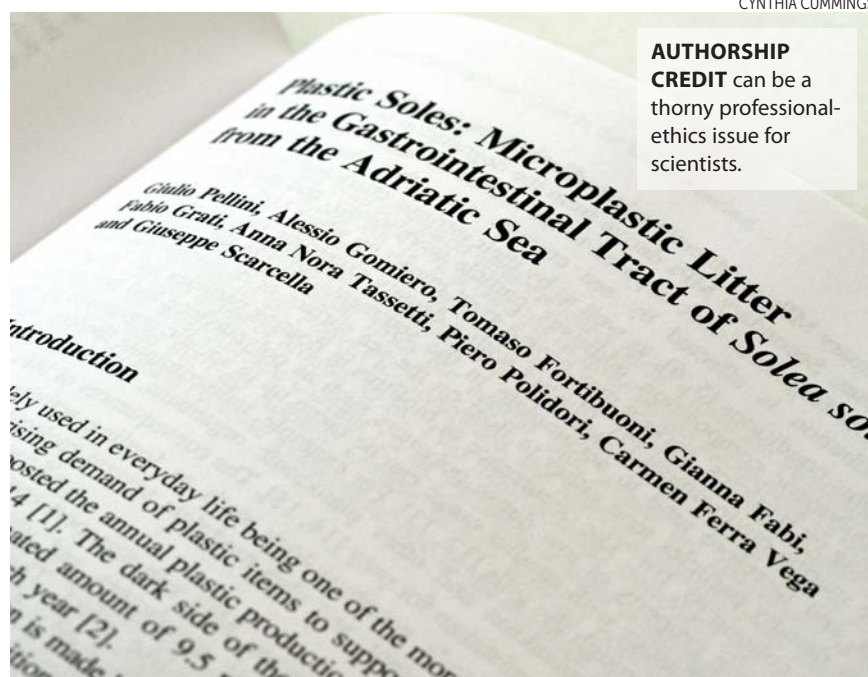
like to be in one of Oxford's all-woman colleges clearly guides her writing. The Oxbridge universities are the oldest in England and among the oldest in Europe, and they did not admit women for most of their long histories. That fact makes them prime candidates for exploring the long process of women's fight to be recognized as regular students with full privileges. Fara parallels internal institutional struggles at Oxbridge with the wider fight for women's suffrage and acceptance into the scientific professions.

It seems significant, though, that Smedley, Geddes, and others were associated with universities outside Oxbridge. The book is missing a fuller discussion of what women were doing at redbrick universities like University College London (UCL). Considered the college of the working man, UCL was sometimes called the radical infidel college and it allowed women to take full degrees from its opening in 1826. Fara mentions a favorite story about Egyptologist Margaret Murray invading the UCL men's common room and causing quite a stir; she also talks about Marie Stopes, a biologist and unconventional sexologist active at UCL. Both women tackled many of the challenges Fara's Oxbridge women encountered. Although it is reasonable to set boundaries so that a book does not become a multivolume series, a full chapter on the women of UCL and other universities would have been useful as a counterpoint to the discussions of Oxbridge.

Fara closes out the book with a short chapter on the future of women in the sciences in the UK. In 1918 women property owners age 30 and over won the right to vote in the UK, and 10 years later, universal suffrage was established for all citizens over 21. The new voting rights were a monumental achievement that allowed women to change politics, economics, and society, but they did surprisingly little to help women enter the sciences. As Fara argues—and as women currently in scientific professions could understand—women continue to face many challenges as they pursue scientific careers. Fara concludes her valuable study by examining the lessons we can still learn from the women of the early 20th century.

Kathleen Sheppard

Missouri University of Science
and Technology
Rolla



AUTHORSHIP

CREDIT can be a thorny professional-ethics issue for scientists.

Ethical issues from authorship to human-subjects research

As science exerts increasing influence over our lives, a growing number of scholars have grappled with ethical issues surrounding scientific research. Sandra Greer, an emeritus professor of chemistry and biochemistry, adds to the literature with her book *Elements of Ethics for Physical Scientists*. Although many of the issues Greer raises are not examined in depth, one of the book's strengths is its breadth—the topics covered range from authorship and peer review to debates about weapons development. Greer supplements each chapter with case studies and inquiry questions that often contain interesting nuggets of historical information. One such story, about Robert Millikan and his famous oil-drop experiment, asks the reader to consider the ethics of his research practices.

Chapter 1 introduces the reader to two of the main theoretical traditions in ethics: utilitarianism, in which actions are judged based on their societal consequences, and Kantianism, in which actions are judged based on whether ethical obligations have been upheld. Greer provides the reader with an overview of the basics of

Elements of Ethics for Physical Scientists

Sandra C. Greer
MIT Press, 2017.
\$50.00



ethical theory, but some gaps are present. Those include the absence of a direct mention of virtue ethics, which focuses on the character of the actor. It is a strange omission; virtues such as being honest, fair, and sincere tend to be at the core of most professional codes of ethics and discussions about what defines a good scientist. But Greer does outline important things that she thinks scientists should value, such as truth, the sanctity of human life, and the universe.

From there the book moves into a discussion of how to practice science and publish scientific findings ethically. Greer highlights how both fraud and research misconduct, such as falsification, fabrication, and plagiarism, can plague scientific

fields. The distinction between fraud and misconduct, however, could have been presented more clearly. Furthermore, Greer does not spend much time on how career pressures, such as the “publish or perish” mentality, contribute to misbehavior in the sciences. She also describes some of the key US federal ethics training initiatives whose main goal is to curtail misconduct, but noticeably absent is a mention of the Responsible Conduct of Research policies promulgated by federal agencies.

Elements of Ethics for Physical Scientists spends significant time on peer review, authorship, and publication practices and also describes recent efforts to promote open-access scientific publishing. For instance, Greer discusses author-ordering conventions and indicates that they are not universal in the sciences. Variations can be present even within a field—for example, Greer notes that organic chemists usually list senior investigators first, whereas physical chemists list senior investigators last. To illustrate the importance of scientific mentoring, she includes a fascinating diagram: the academic family tree of crystallographer William Henry Bragg, a famously successful mentor of junior scientists.

One of the book's most important contributions is in chapter 5, which contains a section on gender and diversity—topics often excluded from books on science and ethics. The chapter delves into how “accumulated microinequities” can detrimentally affect underrepresented groups who seek to pursue careers in the sciences. The chapter also includes a fairly standard introduction to research with human subjects and with nonhuman vertebrates. Those sections are a bit weaker than others in the book; some of Greer's claims require more nuance and precision. For example, the book states that “surveys and educational tests are not usually considered research,” which is misleading. In fact, many types of surveys conducted by social scientists and education researchers fall within the scope of regulations governing human-subjects research.

The book's concluding chapter looks at some key issues at the intersection of science and society, including weapons development and intellectual-property considerations. Greer's description of the role chemists and physicists played during 20th-century wars is particularly illu-

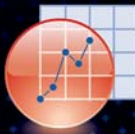
minating. The helpful appendices include a list of biographies of famous scientists and a brief overview of resources related to teaching ethics courses.

Although its title indicates that the focus will be on the physical sciences, the book does not fully deliver on that promise. It would have been good to see more detail about norms, practices, and ethical challenges specific to the physical sciences. For example, Greer should be lauded for highlighting the problem of reproducing

research findings, but she could have said more about the particular factors that make physics and chemistry experiments difficult to reproduce. That being said, she offers a clearly written and accessible introduction to the subject matter, one that could especially benefit students or others relatively new to ethical issues in the sciences.

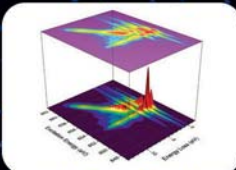
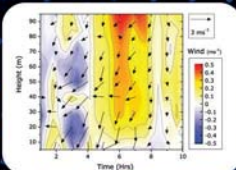
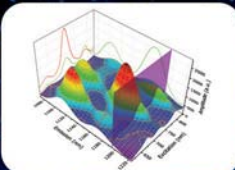
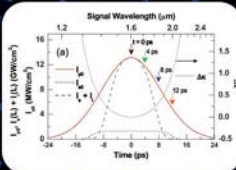
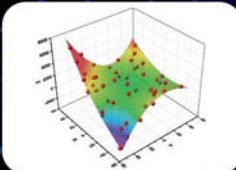
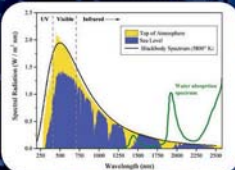
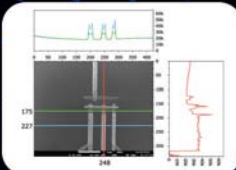
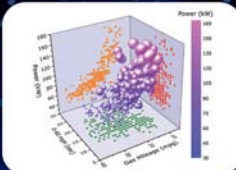
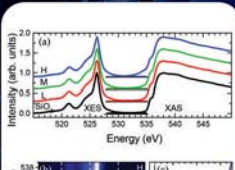
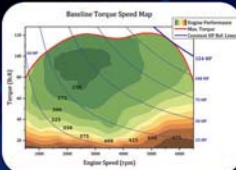
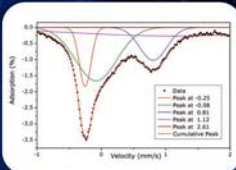
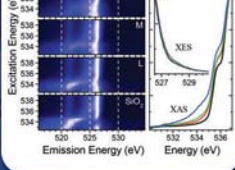
Jason Borenstein
Georgia Institute of Technology
Atlanta

New Version!



ORIGIN® 2018

Graphing & Analysis

Over 75 New Features & Apps in Origin 2018!

Over 500,000 registered users worldwide in:

- 6,000+ Companies including 20+ Fortune Global 500
- 6,500+ Colleges & Universities
- 3,000+ Government Agencies & Research Labs



25+ years serving the scientific & engineering community

For a **FREE 60-day**
evaluation, go to
OriginLab.Com/demo
and enter code: 2876