

The cost of blind ambition

Plastic Fantastic

How the Biggest Fraud in Physics Shook the Scientific World

Eugenie Samuel Reich
Palgrave MacMillan, New York,
 2009. \$26.95 (266 pp.).
 ISBN 978-0-230-22467-4

Reviewed by Myriam P. Sarachik

The gripping tale of the Jan Hendrik Schön scandal is told in Eugenie Samuel Reich's new book *Plastic Fantastic: How the Biggest Fraud in Physics Shook the Scientific World*. From 1998 to 2002, Schön, a young investigator working at Bell Labs, misled the physics community with a breathtaking series of extraordinary claims. He reported achieving spectacular, ground-breaking advances that included a field-effect transistor based on organic crystals, the quantum Hall effect and zero-field metal-insulator transition in that device, superconductivity where others had failed to find it, the first organic laser, the first light-emitting field-effect transistor, "behavior indicative of transistor action in single molecules," and more. They all turned out to be sheer fabrications.

I am a condensed-matter physicist working close to Schön's area of interest. Although I have not met him personally, I know a number of people who knew him well, including some of his coauthors, and I was sharply aware of the events as they unfolded. Moreover, as president of the American Physical Society in 2003, I was engaged in the ensuing debate over the scandal and was involved in the formation of a task force to reexamine and strengthen the society's policies on ethical conduct.

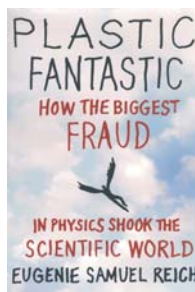
Familiar though they were, I found the retelling of those astonishing events completely engrossing. In great detail, Reich describes the rise and fall of Schön's short-lived scientific career,

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from his work as a graduate student in a large group at the University of Konstanz to his arrival at Bell Labs, where he made those incredible scientific claims, through his papers' enthusiastic acceptance, the growing skepticism, and the final unraveling.

Reich's narrative of the most sensational case of scientific fraud in physics in recent memory is a riveting, suspenseful must-read. Schön, sometimes unwittingly guided by his colleagues' ready acceptance and enthusiasm, was clever enough to know which claims would be viewed with the greatest excitement. Yet he was not smart enough to realize that some of his devices required the unachievable—for example, voltages that exceed breakdown potentials and electric fields that extend farther than Coulomb's law allows. When faced with questions he could not answer, Schön quickly announced yet another finding even more dramatic than the last. The pace of his publications accelerated—45 of them in 2001—and healthy skepticism grew. The entire magical superstructure finally came crashing down when colleagues noticed that Schön's papers on different devices contained identical data, down to the noise. The denouement followed quickly and, in concert with it, the book hastens its pace and ends rather abruptly, as if the author had grown impatient to finish it. Had Reich taken more time to summarize and discuss the questions she raises in her introduction, her compelling book would have been even better.

Schön's role in the whole affair is beyond comprehension. One gets a rather vague, foggy impression of him—a very pleasant fellow, by all accounts mild-mannered and eager to please. How could such a seemingly ordinary, self-effacing person have committed fraud on so massive a scale? More to the point, how could we in the physics community have allowed him to get away with it? Clearly, the responsibility extends well beyond Schön himself. Our reluctance to question the basic integrity of colleagues, the self-interest of journals and institutions—



Bell Labs in this instance—our own wishful thinking, our ambitions, and our failure to set standards for recording and storing data are all factors that enabled those fraudulent claims to go unrecognized for too long.

Reich challenges our reliance on the premise that science is self-correcting—that is, that wrong results or theories are ultimately corrected and superseded. Although it became clear in fairly short order that Schön's results were all hatched in his head rather than in his lab, his deception was nevertheless enormously costly to many investigators who spent substantial time and resources in vain attempts to replicate his results. It had a particularly devastating effect on young postdocs and graduate students who lost valuable time at a crucial juncture in their careers. Although a number of Schön's claims have now been realized using different methods and materials, Reich points out that fraudsters like Schön could get credit for "first discovery" if, before they are caught, their false claims are confirmed by others on the basis of genuine data.

Clearly, *Plastic Fantastic* challenges the scientific community to identify and implement ways to police ourselves more effectively in order to obviate attempts by others to do it for us.

Mathematics for Physics

A Guided Tour for Graduate Students

Michael Stone and Paul Goldbart
Cambridge U. Press, New York,
 2009. \$90.00 (820 pp.).
 ISBN 978-0-521-85403-0

Without textbooks, the education of scientists is unthinkable. Textbook authors rearrange, repackage, and present established facts and discoveries—along the way straightening logic, excluding unnecessary details, and, finally, shrinking the volume of preparatory reading for