

Nevertheless, Berube has some good ideas and addresses some important issues. For example, he covers societal and ethical implications as well as government initiatives and actors. Had his book been better edited, it might have been a useful contribution to the literature on nanotechnology, although from a specific point of view that focuses on inflated claims.

The Nanotech Pioneers by Edwards, who is a medical-technology analyst and science writer with a doctorate in biology, is better because it is shorter and has financial figures and creative illustrations. It provides an appropriate overview of many areas of interest and contains some relevant history and descriptions of some commercial advances. It even discusses a bit of the same hype that Berube documents.

But, like Berube's book, the lack of editing is destructive. The first eight pages of chapter 1 contain five errors, ranging from a statement that is both factually and grammatically incorrect—"nanotech seeks to rebuild the world one molecule (or even one atom) a time"—to incorrect descriptions about the bonding in graphite and in diamond. On page 36 the author describes the birth of the National Nanotechnology Initiative and misspells van der Waals forces and the names of Paul Alivisatos and James Murday. In addition, Edwards makes several technical and historical errors. For example, the silicon from which chips are made is not analogous to the stone in lithography (page 41), nor did Erwin Schrödinger become famous for his uncertainty principle (page 44). Also, the level of tunneling current is not directly proportional to the distance between scanning tip and surface (page 57).

Such editing errors make the book much more difficult to read and can confuse nonscientists. In addition, the author's topic choices are questionable. Although the book claims to be about nanotech pioneers, with pages and pages on Bill Joy and Ray Kurzweil, the names of Sam Stupp and Alan Heeger—true nanotech pioneers—are not mentioned. Lots of information is discussed from the first chapter to the last, including the gray- and green-goo scenarios in which nanobots or bioengineered life forms run amok and take over the world. But the author does not discuss such challenging and promising nanotechnology advances as regenerative medicine or custom coatings.

The books by Berube and Edwards discuss a timely and interesting topic. But for each, a well-edited second edi-

tion might help a lot. In the interim, better analysis of nanotechnology is out there. More scientists and engineers should take up the challenge of writing it right. It is important for the public and private sectors to understand the ideas and challenges behind nanotechnology; unfortunately, *Nano-Hype* and *The Nanotech Pioneers* may do more to add to the confusion than to clarify the concepts, applications, and people involved.

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Introduction to Computational Science

Modeling and Simulation for the Sciences

Angela B. Shiflet and George W. Shiflet
Princeton U. Press, Princeton, NJ,
2006. \$69.50 (554 pp.).
ISBN 978-0-691-12565-7

Computational science is a relatively new field, but it has conquered the scientific world quickly and now offers a valuable tool set for today's researchers. Without its modeling and simulation applications, modern physics, chemistry, and biology would not exist. *Introduction to Computational Science: Modeling and Simulation for the Sciences* by Angela Shiflet and George Shiflet, a wife-and-husband team, aims to be a comprehensive, basic text for beginning students of computational science.

The book's strength is that almost from the first page it lets the reader do the science. Soon after the short theoretical introduction, readers have made their first computational model using their chosen model-building and simulation software.

Angela Shiflet is chair of the department of computer science, and George Shiflet is chair of the department of biology, both at Wofford College in South Carolina. They have been smart enough not to pick a specific software package; instead, they offer an accompanying website where readers can access software-specific content for the models presented in the book. This approach allows the authors to keep their book

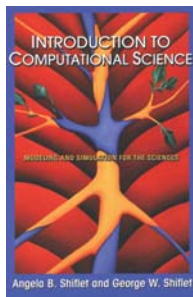
up to date, which is a must in this rapidly evolving field.

The book supports common software packages such as STELLA, Vensim, and even Excel, which makes it easy for the beginner. The text treats two main computational methods: system dynamics, which is based on numerical integration of first-order differential equations, and cellular automata for modeling spatially distributed phenomena. The authors discuss other techniques like Monte Carlo simulation and data-driven analysis in less detail.

Introduction to Computational Science delves right into the basic concepts of the field—from computer representation of numbers to the basics of difference and differential equations to system dynamics and Euler integration. Sometimes I thought that the level may be a little too low for undergraduates enrolled in a computational science course, as most will already have some mathematical background. But luckily, the book does not stop at the basics: It eventually succeeds in bringing students to a reasonably advanced level. Let me reassure those who fear that computational science is not for them because they are not programmers: The book does not contain a single line of programming code, unlike other similar texts such as *An Introduction to Computational Physics* (Cambridge U. Press, 1997) by Tao Pang and *Introduction to Computational Science and Mathematics* (Jones and Bartlett, 1996) by Charles F. Van Loan. Using today's software, one can learn the basics without having to program.

I was impressed by the number of student projects the book offers. Newtonian mechanics, population dynamics, the spreading of diseases and fires—they are all present. Each project follows a fixed pattern: After a short introduction, students have the task of creating a model for simulating the systems that are presented. So, apart from learning about computer modeling, they can also extend their scope of knowledge about the subject under analysis. It is interesting to see how, with relatively simple building blocks, one can really get into many domains using computational science. Students may think they can easily come to grips with unknown territory using the newly acquired software tools offered in the book, but such an assumption may be misleading in some cases where a greater knowledge of programming is required.

The book's weak part is in the chapter on high-performance computing.



The problem comes from the authors' attempts to stay at a basic level, with the result that the text presents a rather shallow insight into such topics as data partitioning and sequential algorithms for the N -body problem. To appreciate high-performance computing, the reader would need more programming knowledge.

Computational science is increasingly finding its way into K–12 education. For instance, in some European countries it is becoming a regular part of the science curriculum in high schools. The Shiflets' book is suitable for many high-school science teachers, especially because its several examples can be easily adapted to a level that students can understand as they use software for system dynamics and cellular automata.

Introduction to Computational Science is useful for students and others who want to obtain some of the basic skills of the field. Its impressive collection of projects allows readers to quickly enjoy the power of modern computing as an essential tool in building scientific understanding.

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Every Other Thursday

Stories and Strategies from Successful Women Scientists

Ellen Daniell
Yale U. Press, New Haven, CT, 2006.
\$27.50 (268 pp.).
ISBN 978-0-300-11323-5

Ellen Daniell's *Every Other Thursday: Stories and Strategies from Successful Women Scientists* is unusual—part autobiography, mostly self-help. It provides an overview of the author's 20 years of participation in a support group centered in the San Francisco Bay area. Daniell, who has worked in academics as an assistant professor of molecular biology at the University of California, Berkeley, and in the biotechnology industry, is now a writer and consultant. Although not originally designed this way, "Group," which is how the members refer to themselves collectively, is currently composed of only women associated with education and the life sciences. Its members have made presentations about Group objectives and methods at scientific conferences. An appendix presents biographies of the members. Daniell's narrative offers many personal revelations. For exam-

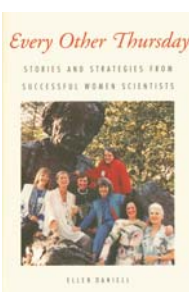
ple, readers may (or may not) be surprised to learn that the salary of Judith Klinman, who became the first female chair of the chemistry department at Berkeley in 2000, was for a time lower than that of many of her male faculty colleagues.

As a self-help book, *Every Other Thursday* has much more substance than most. The sound advice is based on the author's written records of two decades of discussions by this accomplished and perceptive group of women. The suggestions are densely packed and arranged in chapters by topic, such as "Off Balance and Out of Control: Managing Time and Establishing Equilibrium"; "Life Is a Limited Resource: Taking Care of Ourselves"; and "Boss, Mother, Friend, Role Model: Working with Students and Employees."

Several pages of thoughtful consideration are offered in "Putting It Out There: Writing and Giving Talks." One Group member describes giving a professional talk as "trying to be the leading lady in a play you wrote yourself" (page 158). These successful women advise their female colleagues to make their talks "about doing justice to the science, not about selling yourself" (page 159).

In the chapter "Nobody Taught Us This in School: Institutional Politics and Strategy," the author suggests that women "discourage the tendency to assume a victim role" (page 162). In a discussion that encourages women scientists to advocate their own well-being, Daniell admonishes women scientists to "treat ourselves with compassion" (page 218). The definitions of problems and the advice offered struck me as valid overall, and I only regret the apparent omission by Group to consider scientific creativity and the creative process.

I found reading the book straight through to be overwhelming because of the breadth and depth of the discussions and the intensity of advice offered for professional careers and lives. However, from time to time I expect to find great value in consulting the book for specific issues. The problems, ideas, and insights in the book are most pertinent to women scientists, but there are certainly sound suggestions for all women who pursue professional careers in large institutions. Group's formation, discussed in chapter 16, "Pigs, Contracts, and Strokes: Group Process and History," was inspired by the concepts of radical psychiatry. A certain amount of jargon is used throughout



the book, which is finally defined in this chapter.

Overall, the book is Daniell's story of her career and the major, supportive role that Group has played in her life. Several chapters are devoted entirely to the author's personal experiences. It is easy to sympathize with Daniell's disappointment and anger at not

receiving tenure as the first woman in the molecular biology department at Berkeley; however, it will be less easy for many of us to identify with her as she agonizes, some years later, over whether to retire from a scientific career at age 50. Nonetheless, that personal element helps to maintain readers' interest, and it provides part of the unique character of the book.

One of the author's stated objectives in writing *Every Other Thursday* is to encourage other professional women to form support groups. Although I am not certain how well Group's exceptional Californian experience can be replicated in other places or in other times, the main ideas certainly merit broader implementation. In 1998 the Camille and Henry Dreyfus Foundation Inc provided seed money to a coalition of women chemists to form COACH groups. The Committee On the Advancement of Women Chemists (see <http://coach.uoregon.edu>) is dedicated to discussing the problems women face in academia in the chemical sciences and to developing and implementing programs to alleviate those problems. It will be interesting to read a follow-up on COACH at the end of two decades to see how it has spoken to a new generation of women scientists facing equally difficult challenges.

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