



# Introduction to Computational Science: Modeling and Simulation for the Sciences

By Angela B. Shiflet, George W. Shiflet

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Computational science is a quickly emerging field at the intersection of the sciences, computer science, and mathematics because much scientific investigation now involves computing as well as theory and experiment. However, limited educational materials exist in this field. *Introduction to Computational Science* fills this void with a flexible, readable textbook that assumes only a background in high school algebra and enables instructors to follow tailored pathways through the material. It is the first textbook designed specifically for an introductory course in the computational science and engineering curriculum.

The text embraces two major approaches to computational science problems: System dynamics models with their global views of major systems that change with time; and cellular automaton simulations with their local views of how individuals affect individuals. While the text is generic, an extensive author-generated Web-site contains tutorials and files in a variety of software packages to accompany the text.

- Generic software approach in the text
- Web site with tutorials and files in a variety of software packages
- Engaging examples, exercises, and projects that explore science
- Additional, substantial projects for students to develop individually or in teams
- Consistent application of the modeling process
- Quick review questions and answers
- Projects for students to develop individually or in teams
- Reference sections for most modules, as well as a glossary
- Online instructor's manual with a test bank and solutions

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**Introduction to Computational Science: Modeling and Simulation for the Sciences** By Angela B. Shiflet, George W. Shiflet **Bibliography**

- Sales Rank: #1291312 in Books
- Brand: Brand: Princeton University Press
- Published on: 2006-05-22
- Original language: English
- Number of items: 1
- Dimensions: 1.43" h x 7.16" w x 10.22" l, 2.45 pounds
- Binding: Hardcover

- 584 pages

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"The heart of *Introduction to Computational Science* is a collection of modules. Each module is either a discussion of a general computational issue or an investigation of an application. . . . [This book] has been carefully written with students clearly in mind."--**Bill Satzer, *MAA Reviews***

"*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."--**Wouter van Jollingen, *Physics Today***

"I think this text is a masterpiece. I know of nothing comparable. I give it five stars."--**James M. Cargal, *UMAP Journal***

#### From the Back Cover

"This is an important book with a wonderful collection of examples, models, and references."--**Robert M. Panoff, Shodor Education Foundation**

"This is a very good introduction to the field of computational science. It provides several good applications to illustrate the general nature of computational science, developing background material on a just-in-time basis."--**Peter Turner, Clarkson University**

#### About the Author

Angela B. Shiflet is Larry Hearn McCalla Professor of Mathematics and Computer Science and Chair of the Computer Science Department at Wofford College in Spartanburg, South Carolina. George W. Shiflet is Larry Hearn McCalla Professor of Biology and Chair of the Biology Department at Wofford College.

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