LETTER FROM THE ADVISORS

The fields of computer science and information science have had unquestioned impact over the several decades of their existence. As academic disciplines, they have evolved to take a central role in science, mathematics, and engineering at universities and research institutions around the world. They have a rich history that connects to David Hilbert, Alan Turing, John von Neumann, Alonzo Church, Claude Shannon, and many other leading mathematicians and scientists of the twentieth century.

Computer science and information science now encompass core areas such as algorithms and data structures, programming methodology and languages, theoretical computer science, computer architecture, artificial intelligence, networking and communications, database systems, parallel and distributed computation, cryptography, information theory, privacy and security, machine learning, computer-human interaction, computer graphics, and operating systems. These fields are all expanding and have direct impact on the development of the computational and communication infrastructure that surrounds us today.

Research in computer science and information science now provides a foundation for research in many other fields, from computational biology and chemistry to physics, neuroscience, and all subareas of engineering. Indeed, computation and information now play an essential role in science, as scientists are confronted with massive amounts of data, computational models, and large-scale simulations of natural phenomena. More broadly, academics in all fields are recognizing the essential role of computer science and information science in the production and dissemination of knowledge in their discipline.

As evidenced by the titles in this catalog, Princeton University Press has a history of publishing in these areas and is now announcing the formalization of a new book list dedicated to computer science and information science. It will include a select list of advanced field-shaping textbooks, outstanding research monographs, and excellent trade books of broad interest covering the areas mentioned above. We see this expansion as a logical extension of what Princeton University Press has published across the disciplines in recent years.

As advisors to this publishing venture, we hope that you will offer your suggestions or even consider contributing to a list that includes books by many leaders who have made computer science and information science what they are today.

Sanjeev Kulkarni and Robert Sedgewick

Vickie Kearn
Executive Editor, Mathematics
Vickie_Kearn@press.princeton.edu
Discrete and Computational Geometry
Satyan L. Devadoss & Joseph O’Rourke

“Discrete and Computational Geometry meets an urgent need for an undergraduate text bridging the theoretical sides and the applied sides of the field. It is an excellent choice as a textbook for an undergraduate course in discrete and computational geometry! The presented material should be accessible for most mathematics or computer science majors in their second or third year in college. The book also is a valuable resource for graduate students and researchers.”
—Egon Schulte, Zentralblatt MATH

Discrete geometry is a relatively new development in pure mathematics, while computational geometry is an emerging area in applications-driven computer science. Their intermingling has yielded exciting advances in recent years, yet what has been lacking until now is an undergraduate textbook that bridges the gap between the two. *Discrete and Computational Geometry* offers a comprehensive yet accessible introduction to this cutting-edge frontier of mathematics and computer science.

2011. 272 pages. 182 color illus. 4 line illus.
Cl: 978-0-691-14553-2 $65.00 | £44.95

Numerical Methods
Design, Analysis, and Computer Implementation of Algorithms
Anne Greenbaum & Timothy P. Chartier

“An instructor could assemble several different one-semester courses using this book—numerical linear algebra and interpolation, or numerical solutions of differential equations—or perhaps a two-semester sequence. This is a charming book, well worth consideration for the next numerical analysis course.”
—William J. Satzer, MAA Focus

*Numerical Methods* provides a clear and concise exploration of standard numerical analysis topics, as well as nontraditional ones, including mathematical modeling, Monte Carlo methods, Markov chains, and fractals. Filled with appealing examples that will motivate students, the textbook considers modern application areas, such as information retrieval and animation, and classical topics from physics and engineering. Exercises use MATLAB and promote understanding of computational results.

2012. 472 pages. 78 halftones. 145 line illus.
Cl: 978-0-691-15122-9 $95.00 | £65.00

Information Science
David G. Luenberger

“This is a fascinating and enjoyable book to read. It is clear throughout the book that David Luenberger is an experienced teacher who has put careful thought into his writing. He wrote and uses this book for a course in the Dept. of Engineering—Economic Systems and Operations Research at Stanford University. The students range from sophomores to graduate students, and the book is very readable for students at all of these levels.”
—Susan Kelly, UMAP Journal

From cell phones to Web portals, advances in information and communications technology have thrust society into an information age that is far-reaching, fast-moving, increasingly complex, and yet essential to modern life. Now, renowned scholar and author David G. Luenberger has produced *Information Science*, a text that distills and explains the most important concepts and insights at the core of this ongoing revolution.

2006. 448 pages. 210 line illus. 6 halftones.
Cl: 978-0-691-12418-6 $110.00 | £75.00

Many of the books in this catalog are now being made available as e-book editions that can be purchased from online booksellers and from the Princeton University Press website at press.princeton.edu.
Feedback Systems
An Introduction for Scientists and Engineers
Karl Johan Åström & Richard M. Murray

“Åström and Murray have prepared a very well-written introductory work for scientific and engineering audiences. . . . [T]his work is a valuable addition to the important area of control and feedback systems.”
—M.G. Prasad, Choice

“This is a refreshing text which is delightful to read, and which even experts in the area may find a valuable resource.”
—Matthias Kawski, Mathematical Reviews

This book provides an introduction to the mathematics needed to model, analyze, and design feedback systems. It is an ideal textbook for undergraduate and graduate students, and is indispensable for researchers seeking a self-contained reference on control theory. Unlike most books on the subject, Feedback Systems develops transfer functions through the exponential response of a system, and is accessible across a range of disciplines that utilize feedback in physical, biological, information, and economic systems.

2008. 408 pages. 24 halftones. 183 line illus. 5 tables.
Cl: 978-0-691-13576-2 $72.50 | £50.00
Not for sale in South Asia

Probability, Markov Chains, Queues, and Simulation
The Mathematical Basis of Performance Modeling
William J. Stewart

“The book represents a valuable text for courses in statistics and stochastic processes.”
—Hassan S. Bakouch, Journal of Applied Statistics

Probability, Markov Chains, Queues, and Simulation provides a modern and authoritative treatment of the mathematical processes that underlie performance modeling. The detailed explanations of mathematical derivations and numerous illustrative examples make this textbook readily accessible to graduate and advanced undergraduate students taking courses in which stochastic processes play a fundamental role. The textbook is relevant to a wide variety of fields, including computer science, engineering, operations research, statistics, and mathematics.

2009. 776 pages. 175 line illus.
Cl: 978-0-691-14062-9 $99.95 | £69.95

Introduction to the Numerical Solution of Markov Chains
William J. Stewart

“The book contains very rich material which is the result of long-term research in this field. . . . [It] excellently reflects the great experience that the author has in the theory of Markov chains, matrix algebra, numerics and informatics. [Stewart] . . . richly illustrates the book with numerous examples, flow-charts, pictures and even computer screen copies.”
—Mathematical Reviews

“I know of no other book that has the same breadth of coverage as this one by William Stewart. Because it is both comprehensive and well-organized, this work will be valuable as a reference book and for use in the classroom.”
—Richard Muntz, University of California, Los Angeles

1994. 539 pages. 41 line drawings 74 tables.
978-0-691-03699-1 $120.00 | £82.50

Validated Numerics
A Short Introduction to Rigorous Computations
Warwick Tucker

“This little book is a very important supplement to existing books on validated numerics. It is a must for researchers working in this field.”
—G. Alefeld, Mathematical Reviews

2011. 152 pages. 41 line illus. 18 tables.
Cl: 978-0-691-14781-9 $45.00 | £30.95

Scientific Parallel Computing
L. Ridgway Scott, Terry Clark, & Babak Bagheri

“L. Ridgway Scott, Terry Clark, and Babak Bagheri have prepared a thorough treatise of the foundational and advanced principles of parallel computing. . . . [T]his book provides an excellent background for understanding grids and parallel algorithms in general.”
—Choice

2005. 392 pages. 75 line illus.
Cl: 978-0-691-11935-9 $90.00 | £62.00
Not for sale in South Asia
New—Second Edition

**Introduction to Computational Science**
Modeling and Simulation for the Sciences
Angela B. Shiflet & George W. Shiflet

Praise for the previous edition:

“A masterpiece. I know of nothing comparable. I give it five stars.”
—James M. Cargal, *UMAP Journal*

“This is an important book with a wonderful collection of examples, models, and references.”
—Robert M. Panoff, Shodor Education Foundation

2014. 856 pages. 3 halftones. 204 line illus. 80 tables.
Cl: 978-0-691-16071-9 $99.50 | £69.95

One of Choice’s Outstanding Academic Titles for 2005
Rubin H. Landau, Winner of the 2006 Undergraduate Computational Engineering and Sciences Award, The Krell Institute

**A First Course in Scientific Computing**
Symbolic, Graphic, and Numeric Modeling Using Maple, Java, Mathematica, and Fortran90
Rubin H. Landau

“Essential…. Rubin Landau offers a practical introduction to the world of scientific computing or numerical analysis. He introduces not only the concepts of numerical analysis, but also more importantly the tools that can be used to perform scientific computing.”
—Choice

2005. 512 pages. 62 line illus. 4 tables.
Cl: 978-0-691-12183-3 $95.00 | £65.00

Not for sale in South Asia

New

**Statistics, Data Mining, and Machine Learning in Astronomy**
A Practical Python Guide for the Analysis of Survey Data
Željko Ivezic, Andrew J. Connolly, Jacob T. VanderPlas & Alexander Gray

“In the era of data-driven science, many students and researchers have faced a barrier to entry. Until now, they have lacked an effective tutorial introduction to the array of tools and code for data mining and statistical analysis. The comprehensive overview of techniques provided in this book, accompanied by a Python toolbox, free readers to explore and analyze the data rather than reinvent the wheel.”
—Tony Tyson, University of California, Davis

Princeton Series in Modern Observational Astronomy

2014. 560 pages. 16 color illus. 2 halftones. 173 line illus.
Cl: 978-0-691-15168-7 $95.00 | £65.00

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**Mathematical Modeling of Earth’s Dynamical Systems**
A Primer
Rudy Slingerland & Lee Kump

“The authors should be congratulated for a brilliant book and pedagogical milestone.”
—Gidon Eshel, Bard College

2011. 248 pages. 3 halftones. 72 line illus. 9 tables. 1 map.
Pa: 978-0-691-14513-6 $57.50 | £39.95
Cl: 978-0-691-14514-3 $110.00 | £75.00

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Magnetic Field, Density Stratification, Rotation
Gary A. Glatzmaier

“The computational methods Glatzmaier describes can be applied to a huge range of nonlinear problems, with a variety of physical effects. There is a great deal of potential here for new investigations. In fact, our generation has barely scratched the surface!”
—Chris A. Jones, University of Leeds

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**A Survey of Computational Physics**
Introductory Computational Science
Rubin H. Landau, Manuel José Páez & Cristian C. Bordeianu

 “[A]n excellent undergraduate textbook.”
—John W. Mintmire, Oklahoma State University

2008. 688 pages. 190 line illus.
Cl: 978-0-691-13137-5 $99.95 | £69.95

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2008. 688 pages. 190 line illus.
Cl: 978-0-691-13137-5 $99.95 | £69.95

Not for sale in South Asia
Forthcoming
Mathematics for the Life Sciences
Erin N. Bodine, Suzanne Lenhart & Louis J. Gross
“There are no other books quite like this one on the market. Other texts on the subject do not have nearly the amount of statistics and probability that this one has, nor do they do as much to help build practical MATLAB skills. The abundance of data-driven examples, exercises, and student projects also sets this book apart from its competitors.”
—Trachette L. Jackson, University of Michigan
September 2014. 608 pages. 50 color illus. 100 line illus.
Cl: 978-0-691-15072-7 $85.00 | £59.00

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Benjamin M. Bolker
“Bolker’s book is a must-buy for anyone wanting to fit data to models and go beyond hypothesis testing, but it is certainly not an ‘introductory’ text in the sense of ‘simple.’ This book is a tour de force for anyone who studied ecology for his or her interest of nature’s working. But it is the one single book that can propel the statistical novice to the cutting edge of statistical ecology.”
—Carsten F. Dormann, Basic and Applied Ecology
2008. 408 pages. 99 line illus.
Cl: 978-0-691-12522-0 $65.00 | £44.95

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James S. Clark
“Jim Clark has been able to pitch his message just right; one can see the ecological forest and the statistical, distributional, and computational trees at the same time. By reading this book, statisticians will gain an appreciation for the complexity of models in the ecological and environmental sciences, and ecologists will see the potential for hierarchical statistical modeling in their research arenas. Clark explains his material extremely well, but he is also rigorous in his statistical developments.”
—Noel Cressie, Ohio State University
2007. 632 pages. 163 line illus. 21 tables.
Cl: 978-0-691-12178-9 $95.00 | £65.00
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Pa: 978-0-691-12262-5 $25.95 | £17.95

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A Practical Introduction
Steven F. Railsback & Volker Grimm
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—Donald L. DeAngelis, U.S. Geological Survey
2011. 352 pages. 62 line illus. 9 tables.
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Edited by Stanton Braude & Bobbi S. Low
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—Suzanne H. Alonzo, Yale University
2010. 288 pages. 72 halftones. 12 line illus. 80 tables.
Pa: 978-0-691-13674-5 $55.00 | £37.95
Cl: 978-0-691-13673-8 $99.50 | £69.95

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Forthcoming
**Biomolecular Feedback Systems**
Domitilla Del Vecchio & Richard M. Murray

This book provides an accessible introduction to the principles and tools for modeling, analyzing, and synthesizing biomolecular systems. Featuring numerous exercises and illustrations throughout, *Biomolecular Feedback Systems* is the ideal textbook for advanced undergraduates and graduate students. For researchers, it can also serve as a self-contained reference on the feedback control techniques that can be applied to biomolecular systems.

November 2014. 392 pages. 13 halftones. 165 line illus.
Ci: 978-0-691-16153-2 $85.00 | £59.00

**Three Views of Logic**
Mathematics, Philosophy, and Computer Science
Donald W. Loveland, Richard E. Hodel & S. G. Sterrett

Demonstrating the different roles that logic plays in the disciplines of computer science, mathematics, and philosophy, this concise undergraduate textbook covers select topics from three different areas of logic: proof theory, computability theory, and nonclassical logic. The book balances accessibility, breadth, and rigor, and is designed so that its materials will fit into a single semester.

2014. 344 pages. 7 line illus. 10 tables.
Pa: 978-0-691-16044-3 $49.50 | £34.95

**Computational Economics**
David A. Kendrick, P. Ruben Mercado, & Hans M. Amman

“Important and useful…. [T]his book represents an excellent way to learn computational economics, doing it.”
—Pietro Terna, *Journal of Artificial Societies and Social Simulation*

"*Computational Economics* is a pioneering textbook by the world leaders in the field.”
—Alan S. Manne, Stanford University

2006. 448 pages. 112 line illus. 36 tables.
Ci: 978-0-691-12549-7 $115.00 | £80.00

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The Laws of Truth
Nicholas J. J. Smith

“You will find this book outstanding—whenver you read it, but you’ll be even smarter if you read it before other, even excellent, logic books in your library.”
—George Hacken, *Computing Reviews*

2012. 544 pages. 80 line illus. 90 tables.
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One of Amazon.com’s Best Science Books of 2013
Honorable Mention, 2013 PROSE Award in Popular Science and Mathematics, Association of American Publishers

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Lance Fortnow
“Fortnow’s book is just the ticket for bringing one of the major theoretical problems of our time to the level of the average citizen.”
—Veit Elser, Science
“Fortnow effectively initiates readers into the seductive mystery and importance of P and NP problems.”
—Publishers Weekly
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The Ingenious Ideas That Drive Today’s Computers
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—Paul Curzon, Science
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—Ernest Davis, SIAM News
2013. 232 pages. 5 halftones. 98 line illus. 1 table.
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Google Bombs, Chocolate-Covered Pi, and Other Cool Bits in Computing
Tim Chartier
“A magnificent and curious romp through a wonderful array of mathematical topics and applications.”
—Clifford A. Pickover, author of The Math Book
2014. 152 pages. 89 color illus. 19 halftones. 20 line illus. 10 tables.
Cl: 978-0-691-16060-3 $24.95 | £16.95

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Amy N. Langville & Carl D. Meyer
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—Richard J. Wilders, MAA Reviews
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Pa: 978-0-691-16231-7 $21.95 | £14.95
Cl: 978-0-691-15422-0 $29.95 | £19.95
Winner of the 2013 Euler Book Prize, Mathematical Association of America Honorable Mention, 2012 PROSE Award, Popular Science and Popular Mathematics, Association of American Publishers

With a foreword by
Martin Gardner

Magical Mathematics
The Mathematical Ideas That Animate Great Magic Tricks
Persi Diaconis & Ron Graham

“The Riemann hypothesis, the Mandelbrot set, Fermat’s last theorem—these mathematical notions and others underlie all manner of magic tricks. Mathematicians Persi Diaconis—also a card magician—and Ron Graham—also a juggler—unveil the connections between magic and math in this well-illustrated volume.”
—Scientific American

“The connection between magic and mathematics has a long and intriguing history, and throughout their book Diaconis and Graham present detailed and fascinating insight into that history.”
—Richard Wiseman, Nature Physics

Magical Mathematics reveals the secrets of amazing, fun-to-perform card tricks—and the profound mathematical ideas behind them—that will astound even the most accomplished magician.

2011. 264 pages. 133 color illus. 14 halftones. 56 line illus. 10 tables.
Cl: 978-0-691-15164-9 $29.95 | £19.95

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Paul J. Nahin

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—Games Magazine

“I particularly recommend Digital Dice for the task of teaching undergraduates in mathematics the fundamentals of computation and simulation.”
—James M. Cargal, UMAP Journal

Princeton Puzzlers
2013. 288 pages. 1 halftone. 31 line illus. 22 tables.
Pp: 978-0-691-15821-1 $18.95 | £12.95

The Logician and the Engineer
How George Boole and Claude Shannon Created the Information Age
Paul J. Nahin

“Meshing logic problems with the stories of two extraordinary men—Victorian philosopher-mathematician George Boole and twentieth-century information theorist Claude Shannon—Paul Nahin fashions a tale of innovation and discovery…. Alongside a gripping account of how Shannon built on Boole’s work, Nahin explores others key to the technological revolution, from Georg Cantor to Alan Turing.”
—Nature

The Logician and the Engineer shows how a form of mathematical logic and the innovations of two men paved the way for the digital technology of the modern world.

2012. 248 pages. 2 halftones. 41 line illus. 25 tables.
Cl: 978-0-691-15100-7 $24.95 | £16.95

Number-Crunching
Taming Unruly Computational Problems from Mathematical Physics to Science Fiction
Paul J. Nahin

“While there is a plethora of computational physics books, only this one brings the shear joy and fascination of the subject to the general reader.”
—Lawrence Weinstein, coauthor of Guesstimation

Number-Crunching
2011. 408 pages. 4 halftones. 98 line illus. 6 tables.
Cl: 978-0-691-14425-2 $29.95 | £19.95

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The Autobiography of Martin Gardner
Martin Gardner

"For half a century, Martin Gardner (1914–2010) was an international scientific treasure.... Gardner's passion for writing and his warmth and humour shine forth on every page of this book, making it a memoir of a great human being.”
—David Singmaster, Nature

"A huge intellect, a prolific author, and a caring, responsible citizen of the world.”
—From the afterword by James Randi

Undiluted Hocus-Pocus offers a rare, intimate look at Gardner's life and work, and the experiences that shaped both.

2013. 288 pages. 54 halftones.
Cl: 978-0-691-15991-1 $24.95 | £16.95

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With a foreword by Douglas Hofstadter and a new preface by the author
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Andrew Hodges

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"A captivating, compassionate portrait of a first-rate scientist who gave so much to a world that in the end cruelly rejected him. Perceptive and absorbing, Andrew Hodges's book is scientific biography at its best.”
—Paul Hoffman, author of The Man Who Loved Only Numbers

2013. 632 pages. 26 halftones. 20 line illus.
Pa: 978-0-691-14754-3 $27.95 | £19.95

The Silicon Jungle
A Novel of Deception, Power, and Internet Intrigue
Shumeet Baluja

"[F]righteningly convincing.…. Baluja simplifies the abstract world of tech-speak for the rest of us while aiming to do for the Internet what Upton Sinclair's The Jungle did for the meat industry: make readers reconsider its safety.”
—Stephen Morrow, Library Journal

2011. 352 pages.
Cl: 978-0-691-14754-3 $27.95 | £19.95

The Computer from Pascal to von Neumann
Herman H. Goldstine

"The book is first-rate: it is written in a style that all can understand.”
—Nature

In 1942, Lt. Herman H. Goldstine, a former mathematics professor, was stationed at the Moore School of Electrical Engineering at the University of Pennsylvania. It was there that he assisted in the creation of the ENIAC, the first electronic digital computer. Herman Goldstine writes as both historian and scientist in this first examination of the development of computing machinery, from the seventeenth century through the early 1950s. His personal involvement lends a special authenticity to his narrative, as he sprinkles anecdotes and stories liberally through his text.

Pa: 978-0-691-02367-0 $59.95 | £41.95

The Garden in the Machine
The Emerging Science of Artificial Life
Claus Emmeche

Translated from the Danish by Steven Sampson

"A serious, sensible introduction to an exciting new field. It is not every day that one can see science fiction clash with natural philosophy in such a civilized fashion.”
—Karl Sigmund, Science

1996. 214 pages. 26 figs.
Pa: 978-0-691-02903-0 $28.95 | £19.95

When Computers Were Human
David Alan Grier

"Human computers have ... been largely forgotten, and David Alan Grier ... is intent on restoring them to their rightful place in history.”
—Ann Finkbeiner, Discover

2007. 424 pages. 50 halftones.
Pa: 978-0-691-13382-9 $35.95 | £24.95
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Tools and Techniques for Scientific Computing
Ben Klemens

“I enjoyed reading this book and learned a great deal from it. Modeling with Data filled in a lot of holes in my knowledge, and I think that will be true in general for other readers as well. There is a lot of high-quality and interesting material here.”
—Brendan Halpin, University of Limerick

Modeling with Data fully explains how to execute computationally intensive analyses on very large data sets, showing readers how to determine the best methods for solving a variety of different problems, how to create and debug statistical models, and how to run an analysis and evaluate the results.

2008. 472 pages. 35 line illus. 16 tables. Cl: 978-0-691-13314-0 $82.50 | £57.50

Google’s PageRank and Beyond
The Science of Search Engine Rankings
Amy N. Langville & Carl D. Meyer

“[This book] offers a comprehensive and erudite presentation of PageRank and related search-engine algorithms, and it is written in an approachable way.”
—Jonathan Bowen, Times Higher Education Supplement

“[A] must-read for those interested in how search engines work.”
—Michael W. Berry, SIAM Review

“If I were taking, or teaching, a course in linear algebra today, this book would be a godsend.”
—Ed Gerstner, Nature Physics

2012. 240 pages. 11 halftones. 26 line illus. Pa: 978-0-691-15266-0 $24.95 | £16.95

The Structure and Dynamics of Networks
Mark Newman, Albert-László Barabási, & Duncan J. Watts

“The Structure and Dynamics of Networks performs an important service by bringing together in one volume a number of papers on network theory, and placing them in their historical context… [T]he volume will serve as an introduction to the topic for the novice and a resource for the more experienced researcher.”
—Sarah Boslaugh, MAA Reviews

“Each and every one of the featured papers represents a fundamental breakthrough, forming altogether a highly coherent body of knowledge. Professors Newman, Barabási, and Watts succeed in their selection, and at the same time add an extra value to the book with enlightening and interesting discussions. I strongly recommend this book to researchers and students of the field and, in general, to anyone who wants to enter or learn more about this exciting field of research.”
—Marián Boguñá, Journal of Statistical Physics

2006. 624 pages. 182 line illus. Pa: 978-0-691-11357-9 $90.00 | £62.00

Numerical Methods for Stochastic Computations
A Spectral Method Approach
Dongbin Xiu

“Short and comprehensive, this book is appropriate for novices of polynomial chaos. Many diverse fields are adopting this method, and this book can be used for first-year graduate studies as well as senior undergraduate courses. The book includes important new developments, such as non-Gaussian processes and stochastic collocation methods.”
—George Karniadakis, Brown University

2010. 144 pages. 24 line illus. Ct: 978-0-691-14212-8 $52.50 | £36.95

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Small Worlds
The Dynamics of Networks between Order and Randomness
Duncan J. Watts

“An engaging and informative introduction.”
—Science

“Playfully and clearly written…. [Watts] uses examples adroitly, and mixes abstract theory with real-world anecdotes with superb skill…. I have not enjoyed reading a book this much in a long time.”
—Peter Kareiva, Quarterly Review of Biology

Everyone knows the small-world phenomenon: soon after meeting a stranger, we are surprised to discover that we have a mutual friend, or we are connected through a short chain of acquaintances. Duncan Watts uses this intriguing phenomenon—colloquially called “six degrees of separation”—as a prelude to a more general exploration: under what conditions can a small world arise in any kind of network?

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