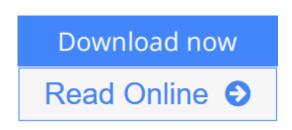# Scientific Computation: Python Hacking for Math Junkies

By Bruce E Shapiro

Scientific Computation: Python Hacking for Math Junkies By Bruce E Shapiro

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Computers are wonderful things. They improve our lives and produce works of art. Information and communication are free and available in ways that were undreamed of by many a generation ago.

And yet computers inspire fear when they are used improperly or misunderstood.

Everyone uses computers today. The typical student uses at least three: a portable notebook computer, a tablet, and a cell phone. None of these even existed before this year's college graduating class was born. So a reasonable amount of computer literacy is expected of everyone these days.

Though inspired by mathematics, much of the mathematical beauty of computation is largely ignored by both elementary computer science and introductory programming books.

This book is designed to help math junkies - anyone who likes math, studies math, or uses math in their daily life - learn about computation. The emphasis is on algorithms. It is appropriate for students with no prior programming experience as well as professional scientists.

Contents: Python programs, iPython notebooks, expressions, statements, types, lists, arrays, functions, classes, plotting, list comprehension, recursion. Applications include linear systems, computational geometry, root finding, interpolation, polynomial least squares, nonlinear and logistic regression, discrete systems, differential equations, principal component analysis, singular value decomposition, clustering, fractals, chaos, and satellite orbit propagation. Also covers numpy, plotting with pyplot, and basics maps with basemap.

Now includes more than 200 exercises for students.

Target audience: undergraduate math and science students entering their upper

level curriculum. Calculus and some linear algebra background is helpful; a review of linear algebra is included as an appendix. No prior programming experience is expected

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Editorial Review

About the Author
Bruce E. Shapiro teaches mathematics at California State University, Northridge, in the most challenging job he has ever had. For a while he collected degrees from various colleges, until his wife said uncle. In past lives he has been called a rocket scientist, a brain scientist, a computational scientist, a mathematical scientist, a data scientist and a generally annoying and snarky pain in the ass. None of those pursuits were particularly challenging. Now he spends his spare time eating chocolate chip cookies, playing with imaginary friends in the complex plane, and pontificating about the poor state of public education in California.

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