Preface

Hard to believe, but it is already time for the second edition! I am happy to report that the first edition of *A First Course in Systems Biology* has met with great success. The book has been a required or recommended text for over 70 courses worldwide, and it has even been translated into Korean. So why should a new edition be necessary after only five short years? Well, much has happened. Systems biology has come out of the shadows with gusto. Research is flourishing worldwide, quite a few new journals have been launched, and many institutions now offer courses in the field.

While the landscape of systems biology has evolved rapidly, the fundamental topics covered by the first edition are as important as they were five years ago and probably will be several decades from now. Thus, I decided to retain the structure of the first edition but have rearranged some items and added a few topics, along with new examples. At Georgia Tech we have used the book to teach well over 1000 students, mostly at the undergraduate level, but also for an introductory graduate-level course. Most of the additions and amendments to this new edition respond to feedback from these students and their instructors, who have pointed out aspects of the material where more or better explanations and illustrations would be helpful. New topics in this edition include: default modules for model design, limit cycles and chaos, parameter estimation in Excel, model representations of gene regulation through transcription factors, derivation of the Michaelis-Menten rate law from the original conceptual model, different types of inhibition, hysteresis, a model of differentiation, system adaptation to persistent signals, nonlinear nullclines, PBPK models, and elementary modes.

I would like to thank three undergraduates from my classes who helped me with the development of some of the new examples, namely Carla Kumbale, Kavya Muddukumar, and Gautam Rangavajla. Quite a few other students have helped me with the creation of new practice exercises, many of which are available on the book's support website. I also want to express my gratitude to David Borrowdale, Katie Laurentiev, Georgina Lucas, Denise Schanck, and Summers Scholl at Garland Science for shepherding this second edition through the review and production process.

It is my hope that this new edition retains the appeal of the original and has become even better through the alterations and twists it has taken, large and small.

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2017