[Review published in *SIAM Review*, Vol. 55, Issue 4, pp. 804–805.]

A Primer on Mathematical Models in Biology. *By Lee A. Segel and Leah Edelstein-Keshet.* SIAM, Philadelphia, 2013. $69.00. xxiv+424 pp., softcover. ISBN 978-1-611972-49-8.

Lee Segel (1932–2005) was a superb applied mathematician and gifted teacher and expositor who modeled problems in biology and other fields, and his former student Leah Edelstein-Keshet of the University of British Columbia has earned similar recognition. Both are authors of well-known and often-used textbooks in the SIAM Classics in Applied Mathematics series. We are very fortunate that Leah was able to retrieve Lee's most recent lecture notes from the Weizmann Institute and modify and extend them to provide us this extraordinary primer, aimed primarily at biology students. The presentation benefits tremendously by its large number of illustrations, primarily generated using Bard Ermentrout's XPP software (available online and described in his SIAM publication).

The result, despite its low level of mathematical prerequisites, is very sophisticated. Readers really learn and appreciate phase plane analysis, as well as scaling, limit cycles, bifurcations, etc. Students will especially be convinced that understanding solution behavior involves lots of simplifications and geometric interpretations of the dynamics. They'll be provided exposure to analytical detail by working on the many biologically meaningful exercises and projects and consulting the many references, both biological and mathematical. Applications include the spread of infections, the extensive treatment of the quasi-steady state hypothesis in biochemical kinetics, the FitzHugh–Nagumo equations, and networks of genes and cells.

The authors don't preach but convincingly demonstrate what successful modeling is and how essential a role mathematics (mostly systems of ordinary differential equations) plays in the process. They've provided us a new and unique classic!

Robert E. O'Malley, Jr.
University of Washington