

Mathematical Sciences
Center for Faculty Development¹

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Using Virtual Biology Laboratories to
Teach Mathematical Modeling

Abstract:

Mathematical modeling requires intuition about the setting being modeled. Except for the most routine settings, one needs observation and experiment to build this intuition. This poses a problem for those who want to teach modeling in a mathematics class--how do you conduct experiments? A partial answer to this difficulty is to perform experiments in a virtual world. One can create a virtual world that illustrates the salient features of a scientific setting without any of the difficulties involved in real laboratory science. In this talk, we demonstrate the use of the Bugbox-predator and Bugbox-population software applets to teach predator-prey and structured population growth modeling. We also discuss the process of designing virtual laboratory software applets using Python.

About the Speaker

Glenn Ledder is an Associate Professor of Mathematics at the University of Nebraska-Lincoln, where he joined the faculty in 1989. He received his BS in Ceramic Engineering from Iowa State University in 1977 and his PhD in Applied Mathematics from Rensselaer Polytechnic Institute in 1990. He is the author of 18 research papers, 4 pedagogical papers, and a differential equations textbook, and has received 3 National Science Foundation grants for undergraduate education. He has extensive experience in mentoring undergraduate research and is co-director of the Research for Undergraduates in Theoretical Ecology (*RUTE*) program at the University of Nebraska-Lincoln.

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