

## Short Courses

**Title: Perfect Partners: Mathematical Modeling, Discrete Dynamical Systems, and Technology**

**Presenter:** . William P. Fox and Richard West, Francis Marion University

**Abstract:** We begin our discussion of discrete dynamical systems (DDS) with a simple discrete model of a prescribed drug in our system. We will examine equilibrium points, stability, and long-term behavior. Next, we model a simple population model for growth or extinction of a species. Then we enhance our population model to include nonlinear terms and perhaps (with the right choice of coefficient) a view of chaos. We conclude with systems of DDS and either the competitive hunter model or predator-prey model for a particular scenario. Bring your TI-83 Plus graphing calculators so you can experience the building, numerical solutions, and graphing of these types of discrete mathematical models.

**Title: Computational Genomics**

**Presenters:** Laurie Heyer, Davidson College

**Abstract:** The interdisciplinary field of computational molecular biology, sometimes called bioinformatics, is an exciting and active research area for mathematicians, computer scientists and biologists. We provide an overview of the field, exploring in greater detail some of the data analysis methods that are useful in the study of genes and their expression. Prior biological knowledge is not required.

**Title: Algebra and Number Theory in Cryptography**

**Presenter:** Shuhong Gao, Clemson University

**Abstract:** Modern schemes for secure digital communications (including storage) are mostly based on algebraic structures. These structures include groups, rings, finite fields, vector spaces, lattices, elliptic curves, etc. In this short course, we show some of the roles that algebra and number theory play in public key cryptosystems and their cryptanalysis. Part of the presentation will be computer demonstration in Maple.

**Title: Computational Modeling in Service of Undergraduate Teaching**

**Presenter:** Dan Warner, Clemson University; Holly Hirst, Appalachian State University; Robert Panoff, Shodor Education Foundation

**Abstract:** This short course will demonstrate several tools and computational models that can be used to enhance Undergraduate Teaching. Particular emphasis will be placed on how these computational models can be used to support inquiry based learning in traditional mathematics courses.

**Title: Enhancing Logical Reasoning through Lego Robots**

**Presenter:** Nieves McNulty and Madeleine Schep, Columbia College

**Abstract:** In this hands-on short course on the use of LEGO Mindstorm robotics kits we will show how robots work and how they are programmed. We will write programs in NQC (not quite C), developed by Dave Baum with a graphic user interface created by Mark Overmars, and go through some hands-on activities that we have developed for an introduction to programming concepts. These labs address the problems of students with weak logical reasoning and lack of attention to details. Students find working with robots interesting and fun. But the real advantage of using robots is that the students get immediate feedback when they make a mistake in syntax or logic. (These lab activities are part of a project funded in part by an ILI grant from NSF).

**Title: Miles of Tiles-Patterns in the Plane**

**Presenter:** Steve Edwards, Southern Polytechnic State University

**Abstract:** This course will be an introduction to periodic and aperiodic tiling in the plane. It will include definitions of symmetry and tiling in the plane, history, elementary theorems and Penrose tiles and their seemingly paradoxical properties. All this will be lavishly illustrated with contemporary and historical images.

**MAA-SE Short Course Registration Form**

A printable version of this form is available on the meeting website at

<http://www.math.clemson.edu/~clcox/MAA-SIAM>.

Name \_\_\_\_\_

Address \_\_\_\_\_

E-mail/phone \_\_\_\_\_

Indicate your preference of course by checking the appropriate line; if you have more than one choice, indicate your first choice as 1, your second as 2, etc.

\_\_\_\_ Perfect Partners: Mathematical Modeling, Discrete Dynamical Systems, and Technology

\_\_\_\_ Computational Genomics

\_\_\_\_ Algebra and number theory in Cryptography

\_\_\_\_ Computational Modeling in Service of Undergraduate Teaching

\_\_\_\_ Enhancing Logical Reasoning through Lego Robots,

\_\_\_\_ Miles of Tiles-Patterns in the Plane

Mail this completed form with a check **payable to the MAA** in the amount of \$20.00 (non-refundable) before **March 1, 2003** to the SECRETARY:

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