NIMBioS

National Institute for Mathematical
and Biological Synthesis

The National Institute for Mathematical and Biological Synthesis

cordially invites you to an

Interdisciplinary Seminar

Dr. Richard Schugart

on

"Can mathematics heal all wounds?"

Tuesday, November 10, 2015
3:30-5 p.m.
Reception & refreshments at 3 p.m.

Hallam Auditorium, Room 206
1122 Volunteer Boulevard

Richard Schugart (Mathematics, Western Kentucky University, 2015) is a sabbatical fellow at NIMBioS. Schugart has developed preliminary optimal control models using ordinary and partial differential equations for the treatment of bacterial infection with either topical or hyperbaric oxygen therapy. At NIMBioS, he is analyzing models for existence of weak solutions and is developing numerical methods for solving the systems of differential equations. Analysis of the simulation results will suggest optimal treatment strategies for bacterial removal in wounds.

Abstract: In this talk, I will present multiple wound-healing problems. The first problem uses optimal control theory to analyze the treatment of a bacterial infection in a wound with oxygen therapy. Two types of oxygen therapies (hyperbaric and topical) will be presented and preliminary results will be presented. The second problem uses patient data to formulate a mathematical model for proteolytic enzyme interactions and their effects on the healing response of a wound. Curve fitting of the model and sensitivity analyses will be presented with some interesting results when comparing different sensitivity analyses. Extensions of both problems will also be discussed.