College of Science and Mathematics
Department of Mathematics

2017 – 2018 Analysis and Applied Math Seminar

Wednesday, September 27, 2017
SPEAKER: Jonathan Lewin, Kennesaw State University
TITLE: *"A Possible Revolution in the Way We Think About and Teach Integration"*
ABSTRACT: Link to pdf abstract

Thursday, October 5, 2017
SPEAKER: Naveen K. Vaidya, San Diego State University
TITLE: *"Infectious Disease Models at Within-Host and Between-Hosts Scales"*
ABSTRACT: Mathematical models are becoming increasingly useful in studying the dynamics of infectious diseases, from within-host to between-hosts scales. With HIV and influenza as case studies, I will demonstrate how modeling can provide great insights into complex phenomena of these diseases. First, I will present a within-host model that can help address some of the issues related to the HIV treatments in the face of drug resistance. Our model shows that although drug therapy cannot suppress the viral load due to resistance, it can alter the viral fitness resulting in an increase in CD4+ T cell (immune cell) count, which should yield clinical benefits. Furthermore, this benefit depends on the cell proliferation rate, which, in some situations, produces sustained T-cell oscillations. Second, using a between-hosts population model of avian influenza (AI) dynamics under periodic environmental conditions, we formulate threshold indexes, such as the basic reproductive number and the disease invasion threshold, which can describe the global dynamics of AI transmission. Our results show that time-varying environmental temperature predicts several interesting features of AI dynamics, which are observed in real data: peak-time variation, place-to-place variation, and seasonal double peaks (summer and fall).

Wednesday, October 11, 2017
SPEAKER: Zakaria El Allali, Georgia Institute of Technology
TITLE: *"How small can a spectral gap be?"*
ABSTRACT: In this work, we will study the fundamental spectral gap for Schrodinger operator on an interval within the class of single-well potential.

Wednesday, November 8, 2017
SPEAKER: Dr. Andrei Olifer, Georgia Gwinnett College
TITLE: *"A model of a virtual community with a decentralized reputation-based peer evaluation"*
ABSTRACT: This study was motivated by the problem of identifying fake news on the Internet. To explore possible solutions to this problem we introduce a model of a virtual community with a reputation system. The model is a system of ODEs for proportions of community members with certain reputations. Analytical and computational results suggest the proposed reputation system is effective in a wide range of the model parameters and even in cases when some members form cliques.

Wednesday, January 31, 2018
SPEAKER: Jonathan Lewin, Kennesaw State University
TITLE: *"The Hare and the Tortoise"*
ABSTRACT: Link to pdf abstract

Tuesday, February 13, 2018

SPEAKER: Jiu Ding, University of Southern Mississippi

TITLE: *"Chaos from the Statistical Viewpoint"*

ABSTRACT: The ergodic theory of chaotic maps plays an important role in science and technology, such as computational molecular dynamics and wireless communications. In this talk, we look at chaos from the statistical point of view, and we introduce Frobenius-Perron operators. The classic Ulam's method and its modern extension will be presented too.

Wednesday, March 14, 2018

SPEAKER: Evans Harrell, Georgia Institute of Technology

TITLE: *"Optimal Convex Sets: The lightest coins, the farthest convex sets, and other problems, some of them notoriously open."*

ABSTRACT: Often, when you wish to find the optimal shape for some purpose, there are practical reasons to suppose that the shapes to be considered are all convex. This innocuous assumption — that you can always connect two points of the set with a line segment that stays inside the set — opens the way to analysis through the introduction of something called the support function. I'll describe some problems about the optimization of the shapes of convex regions and solids, and how to get a handle on them through the support function.

Wednesday, March 28, 2018

SPEAKER: Caner Kazanci, University of Georgia

TITLE: *"EcoNet: A free online software for mathematical modelling, simulation and analysis of ecosystem models"*

ABSTRACT: EcoNet is a free online software for modeling, simulation and analysis of ecosystem network models. It has been available online since February 2007. It runs as a server-side web service, therefore it does not require an installation, and runs on any platform equipped with a standard browser, including cell phones and tablets. It uses a simple and intuitive text based model input format designed to minimize the learning curve, making it easy to pick up and use.EcoNet simulates the model using a variety of options, including differential equations, stochastic differential equations and discrete stochastic processes. It creates a model diagram and time course figure of stock values. It computes a variety of system-wide and compartment specific measures, including cycling index, centrality, mutualism, synergism, trophic levels, biodiversity, ascendency, vulnurability amd keystone index. The presentation will include a live demonstration of the new features of EcoNet version 3.