

AUGSBURG

(The Augsburg College Mathematics Department Colloquium Newsletter)

Upcoming colloquium:

October 8, 2014, 4:30–5:30 PM, Old Main 105

CORY HAIGHT-NALI: *The Effects of Rotational Symmetry on Laguerre's Method*

Abstract: Laguerre's Method is an iterative method for finding roots of polynomials that in many cases appears to work with an arbitrary (complex) initial approximation of a root. This summer, I investigated the sets of initial guesses that lead to convergence. I will present results that suggest that rotational symmetry negatively impacts the size of these sets and that breaking this rotational symmetry allows for a far greater range of initial guesses that converge to a root.

TAYLOR KURAMOTO: *An Epidemiological Model of BRSV Infection Dynamics*

Abstract: Bovine Respiratory Syncytial Virus (BRSV) is one etiological agent in the larger Bovine Respiratory Disease (BRD) Complex that causes damage to the respiratory tract, facilitates bacterial growth and compromises the immune system. Negative effects of BRSV include costs stemming from death, reduced performance, poor growth and the administration of vaccines and treatments. Understanding the effect of cattle contact networks on the transmission of the pathogens causing BRD will help reduce unnecessary treatments, costs and public health concerns of growing drug resistance. A stochastic agent-based epidemiological model has been developed to predict the outcome of infection under different circumstances. The model simulates the spread of BRSV using a spatially implicit contact network generated by a real time location system and visualized in NetLogo. It takes a top down approach to understanding the complex relations between the key transmission components. The underlying theory relies on basic SIR compartmental principles. Simulations were completed under varying initial conditions and compared final, maximum, and time of maximum infected prevalence to see how disease dynamics and emergence differ. A two-tailed t-test and time series of infected prevalence were also run and created.

This Week's Colloquium Speaker #1:

Cory Haight-Nali, 2015



Dr. Cory Haight-Nali has spent most of his childhood in the jungles of South America. Being raised by monkeys and eating worms during most of his childhood left a deep intellectual impact on him. He learned how to make circular worm rings by the age of 3.14 months. By the age of 1.618 years, he learned how to use pieces of gold to cut worms in a visually most appealing way. By the age of 2.718 years, Cory naturally learned to cut logs and build bonfires. We could go on and on, but in the limited space in this newsletter we would just like to say we are thrilled to have such a special individual blessing us with his presence. Cory will present on the importance of rotational symmetry of monkeys sitting around a bonfire!

This Week's Colloquium Speaker #2:

Taylor Kuramoto, 2015



Taylor is a senior math major who transferred to Augsburg from St. Olaf. At Augsburg, she is a Sabo Scholar, a Bonner Leader, and plays midfield on Augsburg's soccer team. Her career goal is to get a PhD in Applied Mathematics and work in the industry or maybe teach. This fall, Taylor is applying for an English Teaching Assistant position in South Korea. She has also gone on Alternative Spring Break trips with Campus Ministry to do service work in New Orleans and Laredo, TX. Her favorite classes at Augsburg cover a broad spectrum, from comparative politics, to Spanish, and Discrete Mathematical Structures. In her free time, Taylor likes to listen to music, eat a lot of food, and binge watch Netflix. And—Taylor's goal last season was the first ever to get an instant replay on our new scoreboard!

PROBLEM OF THE WEEK #4:

In a certain country, 3% of the population have heart disease, and 70% of those with heart disease are smokers. Of those without heart disease, 20% are smokers. What fraction of smokers in the country have heart disease?

(Solutions are due to Prof. B. Iik (handwritten or e-mailed) by the end of the day Friday, Oct. 18, 2014.)



POTW #2 (submitted/correct/partially correct/winner): 2/1/1/Dan Walker; POTW #3: 3/2/1/Tim Crowell