Seventeenth Annual Pikes Peak Regional Undergraduate Mathematics Conference
Saturday, 22 February 2020
9:00 am – 4:30 pm
Colorado State University – Pueblo

The focus of this one-day conference is to give undergraduate mathematics students an opportunity to present their research and expository projects in a professional, supportive setting. It is also an occasion for students to meet other students from the region, and to learn more about the mathematics profession, including graduate school and career opportunities. Based on past participation, several dozen student presenters and over one hundred attendees from Colorado, Wyoming and neighboring states are expected.

Program features will include:

- **Undergraduate Student Talks** (15-minutes each, scheduled in parallel sessions),
  based on the results of classroom projects, independent study courses, and REU or other student research projects on topics in mathematics, the history of mathematics or mathematics education.
- **Conference Lunch** and a **Careers and Graduate School Panel Discussion**
- **Keynote Talk** by Dr. Katie Morrison, University of Northern Colorado

PPRUMC Keynote Talk: Graphs, neural networks, and emergent dynamics in the brain

Networks of neurons in the brain often exhibit complex patterns of activity that are shaped by the intrinsic structure of the network. For example, spontaneous sequences of neural activity have been observed in cortex and hippocampus, and patterned motor activity arises in central pattern generators for locomotion. In this talk, we will begin with an introduction to some of the neuroscience phenomena informing our work, and then focus on a simplified neural network model known as Combinatorial Threshold-Linear Networks (CTLNs) in order to understand how the pattern of neural connectivity shapes the resultant neural activity. Specifically, the connectivity of these networks is encoded in a directed graph, and we will develop a series of graph rules characterizing how the graph structure shapes the neural dynamics by way of controlling the stable and unstable fixed points of the network.

**About our Speaker:** Dr. Katie Morrison is an Associate Professor in the School of Mathematical Sciences at University of Northern Colorado. She received her BA from Swarthmore College, double majoring in mathematics and psychology, and her PhD in mathematics from the University of Nebraska. Her dissertation work was in algebraic coding theory, but she has since transitioned into mathematical neuroscience. Dr. Morrison’s current research focuses on the mathematical theory and analysis of neural networks and neural codes, using tools from algebra, discrete mathematics, and topology.

Everyone with an interest in mathematics is encouraged to attend—don’t miss out on this opportunity to meet other students from the region who share your interest in mathematics!

Registration is free for all participants, and includes lunch.  
(Note: participants do still need to register in advance in order to attend lunch!)

- **Abstract Submission Deadline** = Monday Feb 10
- **Lunch Registration Deadline** = Monday Feb 17

To register or to submit a talk, visit the conference website:  
http://sections.maa.org/rockymt/PPRUMC/pprumc2020.html

Need more information? Talk with a mathematics faculty member at your school, or contact janet.barnett@csupueblo.edu