

22<sup>nd</sup> Annual Natural Sciences Academic Festival  
**Mathematics Department**  
Capstone Presentations  
**Friday, 6 May 2016, Morken 214**

12:30 PM - 1:00 PM     **Jose Bonilla-Bartley**

*Graphs and Distribution*

We use graph theory to analyze the freight distribution system in America. Graph theoretic tools assist in describing the movement of goods, thus giving us a better understanding of how trucking companies allocate their resources.

1:00 PM - 1:30 PM     **Jimmy Creek**

*Graph Theory: The Five Color Theorem*

In this talk we will be using graph theory to explore the proof of the five color theorem. We will see the building blocks necessary to develop this proof and preview what it would take to prove the famous Four Color Theorem.

1:30 PM - 2:00 PM     **Kailey Lyman**

*Graph Theory in Middle School*

This capstone introduces the fundamental ideas of graph theory with an emphasis on Eulerian and Hamiltonian graphs. The overall objective is to demonstrate how these basic ideas could be implemented into middle school classrooms.

2:00 PM - 2:30 PM     **Elizabeth Maloney**

*How Firms Hire Workers: Graph Matching and the Labor Force*

We explore graph matching theory and its application to the labor market. Traditional economic models of the labor assume continuity. Instead, we model the labor market as a bipartite graph of firms and workers where salary acts as a mechanism to facilitate matches.

2:30 PM - 3:30 PM     Poster Presentation Session  
Snack Buffet  
**Morken Center Atrium/Hallway**

3:30 PM - 4:00 PM     **Nicholas Hester**

*Controlling Catan: Probability and Production*

This presentation will explore the probabilities and mathematics behind the popular board game "The Settlers of Catan." Though largely determined by luck, there are several statistical and mathematical concepts at play in the game, which we aim to better understand and apply to other board games.

4:00 PM - 4:30 PM     **Linda Tran**

*Relations within a Community*

Ethnomathematics is the study of culture through a mathematical lens. Its purpose is to observe the mathematics that naturally occurs in a society. We will look at kinship relations of the Warlpiri from Australia and the Basque from France, and show how they can be analyzed with abstract algebra.

4:30 PM - 5:00 PM     **Liyun Avila**

*Geometry Construction in Euclidean and Non-Euclidean*

In this talk, we investigate straightedge and compass constructions in Euclidean and non-Euclidean geometries. In particular, we show how to construct addition, subtraction, multiplication, division and square root of two segments. We also introduce stereographic projection.