



**TENTH ANNUAL
CAPSTONE DAY**
Department of Mathematics
Georgia College

November 19, 2021
2 pm – 3:10 pm
A&S 2-70

Department of Mathematics Georgia College

Earning a college degree is a significant achievement and requires dedication and tremendous effort by each student. Several programs have been developed to help students majoring in mathematics to succeed. The First Year Academic Seminar provides an introduction to department faculty, departmental and university expectations, policies, resources and opportunities following graduation. The department conducts informal social activities and presentations by faculty and guest speakers to encourage faculty and student interaction. The department webpage serves to inform, acknowledge and encourage student majors to become involved in activities related to the major such as mathematics competitions and professional meetings. The academic honor society Kappa Mu Epsilon has been organized to encourage and provide a supporting network for the student body.

Professional schools, businesses, government and industry recognize that mathematics majors are problem solvers and are highly skilled in the use of logic and reasoning. A degree in mathematics opens many careers that are closed to those without quantitative skills. Actuarial science stands as one major example. Moreover, the demand for mathematics in education-especially in secondary schools-is tremendous. In fact, the chronic nationwide shortage of mathematics teachers is due in part to the demand in so many other areas for talented mathematics majors.

2021 Capstone Day Schedule

2 – 2:05 pm Opening Remarks **A&S 2-70**

2:05 – 3:05 pm Session **A&S 2-70**

COVID-19 and the Effect on Grades, Seth Rozelle

Mind Over Math, Morgan Grey

Taxicab Geometry and Topology, Natalie Taylor

3:05 – 3:10 pm Closing Remarks **A&S 2-70**

2021 Capstone Day Abstracts

Morgan Grey
Mind Over Math

Mindset is defined as a mental attitude toward something. Often, people believe their mindsets are pre-determined or fixed, and, unfortunately, this is a common assumption within math education. However, according to Carol Dweck and Jo Boaler, a person's ability to learn can significantly change with proper exposure to teaching strategies that foster growth mindsets. In my research, I will analyze the math mindsets of K-12 students as well as their respective math teachers' mindsets. Teachers will be asked additional open-ended questions that will analyze their teaching strategies. Ultimately, my goal is to understand which teaching strategies that help foster more growth mindsets are actively being used in the math classrooms and if they correlate with the mindsets of students and teachers.

Seth Rozelle
COVID-19 and the Effect on Grades

The goal of the project was to determine if the academic and social circumstance of the COVID-19 pandemic affected grades at Georgia College and State University in any way. The data was collected from the GCSU Grade Distribution Database and the GCSU Merits website. The scope of the analysis was primarily focused on the most popular courses at GCSU from Spring of 2018 through Spring of 2021. The consequences of this project are not only topical but also immediately relevant to the procedures of academic learning in the face of a global pandemic. We can answer the question of if what was done would suffice if a future emergency were to occur that would warrant the need of at-a-distance/hybridized learning. We compared grade distribution before and after the COVID breakout for different courses based on department, major, and level (1000, 2000, 3000, 4000). In this project, we have found that the Spring 2020 semester has multiple significant discrepancies, compared to other spring semesters.

Natalie Taylor
Taxicab Geometry and Topology

As everyone knows, when someone asks about the distance between your house and theirs, most common answer will be the distance google maps gives you. That is usually the travel distance - how far you have to walk/drive on the existing roads, but not the straight distance, "as the crows flies." Trying to locate two places on a map, they may appear much closer than the distance you must actually travel between them. In mathematics, the straight distance, known as the Euclidean distance, is what we use most of the time, but in real life it does not work properly in most cases. Therefore, a different way must be used, and one of the most common ways is given by what we call the taxicab distance. Found using the horizontal and vertical distance between the coordinates of two points, it more accurately determines the distance between places in a city, or how far a taxicab would have to drive from one place to another using the city streets. In this presentation we will define the basic taxicab metric and determine its topology on the plane, showing some applications in a city where the Euclidean distance is not feasible.

Notes



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