

# MATTHEW GERGLEY

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## EDUCATION

### Utah Tech University

Aug. 2022 – May 2024

St. George, UT

Bachelor of Science in Mathematics, cGPA: 3.88/4.0

- Key Coursework: Python, Mathematical Modeling, MatLab, Statistical Inference, Physics I/II, Number Theory, Abstract Algebra, Discrete Mathematics, Real Analysis
- Presidents List: Spring 2023, Fall 2023, Spring 2024; Deans List: Fall 2022

### University of Massachusetts Amherst

Aug. 2021 – May 2022

Amherst, MA

Major: Mathematics; Transferred after an academic year, cGPA: 2.98/4.0

- Key Coursework: Linear Algebra, Differential Equations, Statistics

## TECHNICAL SKILLS

**Languages:** Python (Advanced), C++ (Intermediate), SQL (Beginner), MatLab (Intermediate)

**Skills:** Mathematics, Abstract Algebra, Classical Mechanics, Mathematical Modeling, Simulation, Linear Algebra, PCA/TOPSIS, ODEs, Number Theory, Statistics

**Key Libraries:** Pandas, NumPy, SciPy, Matplotlib

## KEY RESEARCH PROJECTS / PRESENTATIONS

### A Mathematical Model of HPA Axis Dynamics and Impacts of Alcohol Consumption

|Python, MatLab, Differential Equations|

June 2023 – present

- Developed a mathematical model utilizing a negative feedback loop showing how varying levels of alcohol consumption impacts stress response.
- Included circadian drive analysis relative to an individuals BAC.
- Presented at the **Joint Mathematics Meeting 2024** (JMM) in San Francisco, CA, the **Utah Tech Research Symposium 2024**, and the **International Mathematics and Statistics Student Research Symposium 2025**.
- Currently in the publishing process in the *International Journal of Mathematics and Computer in Engineering*.

### Optimizing Police Patrolling

|Linear Algebra, Statistics, Optimization, Python, SQL|

Jan. 2023 – May 2023

- Worked with the Santa Clara/Ivins Police Department to develop a patrol route that optimizes response time and also ideal shift change times.
- Generated heat maps for 911 call locations based on a call severity scale and provided insights into seasonal differences.
- Presented to the **Santa Clara/Ivins Police Department** and at the **Santa Clara/Ivins City Alliance Luncheon**.

### Maximizing Astronaut Productivity

|Differential Equations, Statistics, Optimization, Python|

Aug. 2022 – Dec. 2022

- Developed astronaut work schedule, via our mathematical model, that maximizes astronaut productivity while minimizing stress.
- Utilizing a normal distribution to model productivity in relation to cortisol levels following the Yerkes-Dodson Law.
- Presented at the **MAA Intermountain Section Meeting 2023** and the **Utah Tech Research Symposium 2023**.

## EXPERIENCE

### Mathematics Tutor

Sep. 2022 – May 2024

St. George, UT

Utah Tech University

- Tutored university students across various mathematics disciplines, improving their understanding and academic performance.
- Collaborated with other tutors and managers in order to improve efficiency in the tutoring center.

### Cashier

Aug. 2018 – Mar. 2021

Brewster, NY

Kobackers Market

- Provided customer service, handled transactions, and managed product inventories.

## SERVICES

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<b>PREP Summer STEM Program Assistant</b>	May 2023 - Aug. 2023
<i>Utah Tech University / AmeriCorps</i>	St. George, UT
<ul style="list-style-type: none"><li>• AmeriCorps position.</li><li>• Ensured the safety and appropriate behavior of seventh-grade program participants.</li><li>• Assisted teachers in grading, hands-on activities, obtaining supplies, data collection, etc. in the classroom.</li><li>• Served as a mentor to students, encouraging the development of a commitment to educational achievement.</li></ul>	

## PERSONAL PROJECTS / SELF-STUDY

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<b>Lie Theory/ Lie Algebras</b>	Sep. 2024 - present
<i>Self-Study</i>	Harwinton, CT
<ul style="list-style-type: none"><li>• Pursuing understanding of Lie Theory / Lie Algebras through online textbook sources (<a href="https://www.math.stonybrook.edu/~kirillov/mat552/liegroups.pdf">https://www.math.stonybrook.edu/~kirillov/mat552/liegroups.pdf</a>) and online video resources.</li><li>• Completing proofs of theorems, corollaries, etc. and maintaining a LaTex file full of my notes and proofs.</li></ul>	
<b>Orbital Mechanics</b>	Feb. 2024 - present
<i>Personal Project</i>	
<ul style="list-style-type: none"><li>• Simulating the orbit of a satellite in low Earth orbit (LEO).</li><li>• Accounting for Earth's oblateness through J2 perturbation.</li><li>• Simulating and calculating <math>\Delta v</math> for plane change maneuver.</li><li>• Creating and maintaining working Python script and a LaTeX document outlining the mathematics/physics utilized and needed.</li></ul>	