Matthew Gergley

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Education

Utah Tech University Aug. 2022 – May 2024

Bachelor of Science in Mathematics, cGPA: 3.88/4.0 *St. George, UT*

- 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

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

- Key Coursework: Linear Algebra, Differential Equations, Statistics

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

Utah Tech University *St. George, UT*

- 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

Kobackers Market *Brewster, NY*

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

Services

PREP Summer STEM Program Assistant May 2023 - Aug. 2023

Utah Tech University / AmeriCorps *St. George, UT*

- AmeriCorps position.
- Ensured the safety and appropriate behavior of seventh-grade program participants.
- Assisted teachers in grading, hands-on activities, obtaining supplies, data collection, etc. in the classroom.
- Served as a mentor to students, encouraging the development of a commitment to educational achievement.

Personal Projects / Self-Study

Lie Theory/ Lie Algebras Sep. 2024 - present

Self-Study *Harwinton, CT*

- Pursuing understanding of Lie Theory / Lie Algebras through online textbook sources (https://www.math.stonybrook.edu/~kirillov/mat552/liegroups.pdf) and online video resources.
- Completing proofs of theorems, corollaries, etc. and maintaining a LaTex file full of my notes and proofs.

Orbital Mechanics Feb. 2024 - present

Personal Project *Harwinton, CT*

- Simulating the orbit of a satellite in low Earth orbit (LEO).
- Accounting for Earth's oblateness through J2 perturbation.
- Simulating and calculating Δv for plane change maneuver.
- Creating and maintaining working Python script and a LaTeX document outlining the mathematics/physics utilized and needed.

Technical Skills

Languages: Python (Advanced), C++ (Intermediate), SQL (Beginner), MatLab (Intermediate)
Skills: Mathematics, Abstract Algebra, Classical Mechanics, Mathematical Modeling, Simulation, Linear Algebra, ODEs, Number Theory, Statistics
Key Libraries: Pandas, NumPy, SciPy, Matplotlib