GABE LUMPKIN

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Education

George Mason University   August 2023 - May 2025
MS Mathematics

George Mason University, Fairfax   August 2017 - May 2023
BS Mathematics

Teaching Experience

Tutor at Enrich and Excel (1-7 Students)   August 2022 - June 2023

- Tutor small groups of high school students in Precalculus, Calculus AB, and Calculus BC
- Design worksheets to aid in student understanding
- Assist in problem solving in active learning environment

Tutor at PassCS Math Tutoring   January 2023 - June 2023

- Tutor students at the university level in Calculus I-III, Linear Algebra, and Discrete Mathematics
- Prepare exercises catered to individual student needs
- Navigate meeting the needs of non-traditional students

Graduate Learning Assistant, Graduate Topology (10-20 Students)   Spring 2024 & Spring 2025

- Assist in student understanding of material covered in lecture
- Select relevant exercises to adequately prepare students for topology preliminary exam
- Present exercises in weekly problem solving sessions
- Provide constructive written feedback on graded assignments

Graduate Teaching Assistant, Calculus 3 (145 students)   Fall 2024

- Manage classrooms of 12-40 students
- Maintain pace with paired course schedule and syllabus
- Meet with students weekly to review and supplement material presented in lecture
- Design lectures and worksheets which capture key concepts and highlight areas where students need practice
- Employ the Active Learning model to encourage student participation and collaboration

Mentoring & Service Work

Graduate Mentor, Mason Experimental Geometry Lab   Spring 2024

- Introduce advanced mathematical topics in geometry and knot theory to undergraduate student research group
- Meet weekly to assess student research progress and provide feedback, direction, and goals for the project

Graduate Mentor, Mason Experimental Geometry Lab   Fall 2024

- Present introduction to algebraic geometry to undergraduate students

- Meet weekly to assess student research progress and provide feedback, direction, and goals for the project

- Use expertise and research experience in the field to assist in students' progress

Student Research Talks (StReeTs) Management   August 2023 - Spring 2025

- Find graduate and undergraduate students to present research talks

- Ensure that the seminar maintains a friendly and welcoming environment

- Update website weekly

Talks & Presentations

Spaces of Geometric Structures: StReeTs (George Mason University), October 27, 2023

Deformation Spaces of Geometric Structures: Geometry, Topology, and Algebra Conference (Temple University), May 31, 2024

Research

Foliations of Surfaces (MEGL, GMU, Advised by Dr. Yiannis Loizides and Quincy Frias, worked with Deven Linthcum): This project studied the interplay between algebraic structures and the geometric objects they are associated to. In particular, we sought to determine if a foliation of a surface is completely determined by its holonomy data. Roles included:

- Work with small research group to build understanding of the field of differential geometry

- Survey the state of active research in the theory of foliations

- Develop ways to visualize and describe complex mathematical theory

- Make connections between differential geometry and abstract algebra

- Design and give presentation to audience consisting of undergraduates with no background on the project and experts in the field

Resolving Neural Ideals (MEGL, GMU, Advised by Dr. Rebecca RG and John Kent, worked with Connor Poulton and Justin Cox): In this project, we studied algebraic objects (neural ideals) constructed from combinatorial data which is related to the firing of neurons. Computations were done using the software Macauley2, designed for researched in algebraic geometry and commutative algebra. Roles included:

- Work with small research group to strengthen background in commutative algebra

- Construct novel examples highlighting algebraic structures of interest to neuroscience

- Compute free resolutions using Macauley2

- Identify patterns in computation results

- Record results and relay relevant information to researchers

- Design and give presentation to audience consisting of undergraduates with no background on the project and experts in the field

Spectroscopy and Solar Flares (OSCAR, GMU, Advised by Dr. Art Poland): In this project we interpreted spectral imaging of the sun using a software called Information Data Language (IDL). We then wrote a series of programs which would assign to each pixel an intensity value, then trace the pixels of highest intensity. Roles included:

- Learn unfamiliar software

- Develop background in astronomy, particularly spectroscopy, and imaging

- Extract meaning from data, including understanding instrument error

- Design a series of programs to quickly and efficiently extract relevant data

- Work closely with researcher and team of undergraduate researchers to solve problems and reach conclusions about data

Technical Skills & Certifications

Proficient Languages/Software: Matlab, Python, Mathematica, Macauley2

Certificate of Completion: Program for Advanced Teaching in Mathematics (PAT Math), GMU

References (add info after verifying)

Teaching/Professional

Dr. Timothee Bryan

Dr. Benjamin Schweinhart

Academic

Dr. Anton Lukyanenko

Dr. Carlos Rautenberg