Kaitlynn Lilly

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EDUCATION

University of Washington, Seattle — Seattle, WA
Applied Mathematics Ph.D. candidate **(GPA: 3.96/4.00)** | Advisor: Tom Trogdon — Expected: June 2027
Master of Science in Applied Mathematics **(GPA: 3.93/4.00)** — June 2023

University of Maryland, Baltimore County (UMBC) — Baltimore, MD
Bachelor of Science in Physics and Mathematics (**GPA: 4.00/4.00**) — May 2022

SKILLS/CERTIFICATIONS

Programming: Julia, Python, MATLAB, Mathematica, Maple, R, LabVIEW
Software: Git, LaTeX, Microsoft Office, Contributor to OperatorApproximation.jl
Certifications: Data Science Bootcamp (issued by the Erdős Institute), Top secret clearance (active June 2022 – 2023)

RESEARCH EXPERIENCE

Ph.D. Thesis Project — January 2023 – Present
University of Washington | Department of Applied Mathematics | Seattle, WA
Research Advisor: Dr. Thomas Trogdon

- Implemented a joint analytical/numerical method in Julia to solve variable coefficient time evolution partial differential equations utilizing Riemann-Hilbert framework and scattering techniques.

Intern at the Pacific Northwest National Laboratory (PNNL) — June 2024 – Present
PNNL | Power Markets Group | Seattle, WA
Data Analyst | Mentor: Dr. Allison Campbell

- Developed a complete Python model from the ground up to measure air quality equity in disadvantaged communities
- Performed electrical grid optimization model validation on EGRET and GridView
- Solely developed a time-evolution Gaussian dispersion model in Python that accounts for changes in wind direction

Intern at the Johns Hopkins University Applied Physics Laboratory (APL) — June – August 2022
John Hopkins University APL | Nuclear Command Communications Systems Group | Laurel, MD
Radio Frequency Engineer | Research Advisor: Dr. Albert Tomko

- Created and implemented a model and simulation of very low frequency gravity waves in Python.
- Developed a Python script to implement an extended Hamming linear feedback shift register encoder and decoder.
- Performed Python analysis to optimize maintenance schedules for VLF transmitters.

Department of Mathematical Sciences, Carnegie Mellon University — June 2020 – May 2022
Carnegie Mellon University | Pittsburgh, PA | Funded by NSF DMS-1908033
Undergraduate Research Assistant | Research Advisors: Dr. Jason Howell and Dr. Justin Webster

- Analytically and numerically investigated a one dimensional (1D) partial differential equation beam model for aeroelastic flutter. Found the perturbed eigenvalues.
- Constructed a system of ordinary differential equations that yielded exact solutions to the non-self-adjoint spatial problem. Created original codes in MATLAB to perform these calculations and obtain explicit solutions.

Sustained In-Semester Research, Department of Mathematics, UMBC — March 2019 – May 2022
University of Maryland, Baltimore County | Baltimore, MD
Undergraduate Research Assistant | Research Advisor: Dr. Justin Webster

- Analytically/numerically solved linear/nonlinear 1D/2D partial differential equation models of elasticity.
- Examined the initial boundary value problems for plates and beams in various configurations (clamped, hinged, free).

Patterns and Partial Differential Equations Research Experience for Undergraduates — June – August 2021
University of Minnesota Twin Cities | Minneapolis, MN | Funded by NSF DMS-2016216
Undergraduate Research Assistant | Research Advisor: Dr. Paul Carter and Dr. Arjen Doelman

- Rigorously determined existence of a front solution and numerically showed time dynamics of the Klausmeier system.
- Numerically computed the spectrum/critical curve of Klausmeier and Gilad systems and observed sideband instabilities.

Institute for Astronomy Summer Research Experience for Undergraduates May – August 2019
University of Hawaii at Manoa | Honolulu, HI | Funded by NSF-1716994
Undergraduate Research Assistant | Research Advisor: Dr. David Sanders

- Visually classified the different morphological features of a sample of 1075 galaxies.
- Constructed spectral energy distributions for each source and measured the strengths of active galactic nuclei features.

ASPIRE Intern at the John Hopkins University Applied Physics Laboratory July 2018 – January 2019
John Hopkins University Applied Physics Laboratory | Asymmetric Operations Sector | Laurel, MD
Technical Aide | Research Advisor: Ryan Mennecke

- Implanted a software defined radio that collected wideband spectrum data and transmitted over a Phase Shift Keyed modulated link to a ground asset.

TEACHING & MENTORING EXPERIENCE

Women in Applied Mathematics Mentorship Program Mentor February 2023 – Present
University of Washington | Seattle, WA

- Mentor and develop a research project for two undergraduate students in applied mathematics each year.

Goldwater Mentor May 2022 – May 2023
Purdue University | West Lafayette, IN

- Mentor a 2022 Goldwater Scholar and assist with the graduate school application process.

Teaching Assistant for Credit Risk Management Fall 2022
University of Washington | Seattle, WA

- Grade homework and exams as well as hold office hours for 60 students.

Teaching Assistant for Introduction to Mathematical Reasoning January – May 2022
University of Maryland, Baltimore County | Baltimore, MD

- Instructed a discussion section of 30 students and graded homework and activities.

First-Generation Peer Mentor January 2021– May 2022
University of Maryland, Baltimore County | Baltimore, MD

- Mentored 2 first-generation college students. Provided students with tips on how to navigate college.

Meyerhoff Peer Advisor | Lead Advisor August 2020 – May 2022
University of Maryland, Baltimore County | Baltimore, MD

- Mentored 1 underclassman Meyerhoff Scholar by providing knowledge regarding courses, research, etc.
- Created and lead peer advisor training for 80 advisors. Oversaw mentor/mentee relationships.

Arbutus Middle School Tutor/Mentor | Student Coordinator August 2018 – May 2022
University of Maryland, Baltimore County | Baltimore, MD

- Recruited 40 tutors, communicated with the site, ran professional development, volunteered 4 hours a week.

Teaching Assistant for Multi-variable Calculus August 2019 – May 2020
University of Maryland, Baltimore County | Baltimore, MD

- Instructed a discussion section of 45 students and graded quizzes and exams.

Learning Assistant for Physics 122: Introductory Physics II January – May 2019
University of Maryland, Baltimore County | Baltimore, MD

- Ran two discussion sections and assisted over 60 students with material from lecture.

Society of Women Engineers NEXT Advisor January – May 2019
Hereford High School | Parkton, MD

- Mentored 4 Hereford High School students to implement a hydroponic system. Competed at the national level.

Physics and Mathematics Tutor for the Athletic Department August 2018 – May 2019
University of Maryland, Baltimore County | Baltimore, MD

- Assisted 6 individual students on introductory physics and calculus courses.

HONORS

NSF Graduate Research Fellow April 2022 – Present
Phi Beta Kappa Honor Society April 2022 – Present
Achievement Rewards for College Scientists (ARCS) Scholar April 2022 – Present
Boeing Fellowship September 2022 – 2023

Barry M. Goldwater Scholar	March 2021 – May 2022
Meyerhoff Scholar, M30 Cohort	July 2018 – May 2022
University System of Maryland Louis Stokes Alliance for Minority Participation (LSAMP) Fellow	July 2018 – May 2022
Department Promotion and Tenure Committee for Dr. Sebastian Deffner	August – December 2021

AWARDS

Travel Award for the Conference on Nonlinear Evolution Equations and Wave Phenomena	December 2024
Boeing Service Award	June 2024
Student Travel Award for the SIAM Conference on Nonlinear Waves and Coherent Structures	April 2024
Ronald M. Shapiro Excellence in Mentoring Award	June 2021
Freeman A. Hrabowski President's Advisory Council Scholarship Award	April 2021
Poster Session Honorable Mention at Joint Mathematics Meeting	January 2021
Joint Mathematics Meeting Travel Award	December 2020
First Prize Physics Oral Presentation at Emerging Researchers National Conference	February 2020
Emerging Researchers National Conference Travel Award	February 2020
Poster Session Honorable Mention at UMD-NIST Conference for Undergraduate Women in Physics	January 2020

PUBLICATIONS

[1] Paul Carter, Arjen Doelman, **Kaitlynn Lilly**, Erin Obermayer, Shreyas Rao,
"Criteria for the (in)stability of planar interfaces in singularly perturbed 2-component reaction–diffusion equations",
Physica D: Nonlinear Phenomena, 2022, 133596, ISSN 0167-2789,
https://doi.org/10.1016/j.physd.2022.133596.

RESEARCH PRESENTATIONS

[12] "A Numerical Riemann-Hilbert Approach to the Computation of Transform Pairs" — April 2025
Oral Presenter: 50-minute talk | PDE, Dynamical systems, and Geometric analysis Seminar
The University of Kansas | Lawrence, KS

[11] "A Numerical Riemann-Hilbert Approach to the Computation of Transform Pairs" — April 2025
Oral Presenter: Advances on Integrable Systems and Inverse Scattering | Wave Phenomena Conference
The Classic Center | Athens, GA

[10] "From Oscillations to Approximations: The Rational Way" — April 2025
Oral Presenter: 12-minute talk | New Horizons in Rational Approximation workshop
Banff International Research Station | Banff, CA

[9] "A Numerical Riemann-Hilbert Approach to the Computation of Transform Pairs" — January 2025
Oral Presenter: Integrable Systems and Orthogonal Polynomials | Joint Mathematics Meetings (JMM)
Seattle Convention Center | Seattle, WA

[8] "A Numerical Riemann-Hilbert Approach to the Computation of Transform Pairs" — June 2024
Poster Presenter | SIAM Nonlinear Waves and Coherent Structures
Lord Baltimore Hotel | Baltimore, MD

[7] "Existence and Stability of Fronts in the Klausmeier Equations" — October 2021
Oral Presenter: 20-minute talk | New Connections in Math Conference
Duke University | Durham, NC

[6] "Existence and Stability of Fronts in the Klausmeier Equations"
Oral Presenter: 30-minute talk | Dynamical Systems Seminar — July 2021
Held Virtually

[5] "Spectral Properties of a Non-Self-Adjoint Beam with Applications to Flutter"
Poster Presenter | Joint Mathematics Meeting (JMM) — January 2021
Held Virtually

[4] "Spectral Properties of a Non-Self-Adjoint Beam with Applications to Flutter"
Oral Presenter: 45-minute talk | Differential Equations Seminar — October 2020
University of Maryland, Baltimore County | Baltimore, MD

[3] “Spectral Energy Distributions of Morphologically Classified X-Ray Luminous Sources”
Oral Presenter: 15-minute talk | Emerging Researchers National (ERN) Conference — February 2020
Washington D.C.

[2] “Spectral Energy Distributions of Morphologically Classified X-Ray Luminous Sources”
Poster Presenter | Conference for Undergraduate Women in Physics (CUWiP) — January 2020
University of Maryland, College Park | College Park, MD

[1] “Spectral Energy Distributions of Morphologically Classified X-Ray Luminous Sources”
Poster Presenter | American Astronomical Society (AAS) — January 2020
Honolulu, HI

PROFESSIONAL MEMBERSHIPS

Association for Women in Mathematics (AWM)
American Mathematical Society (AMS)
Society for Industrial and Applied Mathematics (SIAM)

EXTRACURRICULAR ACTIVITIES

Letters to a Pre-Scientist Pen Pal — October 2024 – Present
University of Washington Association for Women in Mathematics | Chapter Founder/President — October 2023 – Present
Numerical Analysis Research Club (NARC) [Organizer: Spring 2024] — October 2023 – Present
Applied Analysis Research Group (AARG) — October 2023 – Present
University of Washington SIAM Chapter [Vice President: Fall 2023 – Spring 2024] — October 2022 – Present