

# Kaitlynn Lilly

U.S. Government Clearance: Top Secret

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## EDUCATION

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### University of Washington, Seattle

Applied Mathematics Ph.D. candidate | Advisor: Tom Trogdon  
Master of Science in Applied Mathematics (GPA: 3.93/4.00)

Seattle, WA

Expected: June 2027  
June 2023

### University of Maryland, Baltimore County (UMBC)

Bachelor of Science in Physics and Mathematics (GPA: 4.00/4.00)

Baltimore, MD

May 2022

## HONORS

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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

Barry M. Goldwater Scholar

March 2021 – May 2022

Sigma Pi Sigma, Physics Honor Society

March 2020 – May 2022

Pi Mu Epsilon, Mathematics Honor Society | UMBC Chapter President

March 2020 – May 2022

Honors College

August 2018 – 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

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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

## SKILLS

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**Programming:** Julia, Python, MATLAB, Mathematica, Maple, LaTeX, R, LabVIEW

**Software:** SAOImage DS9, GNU Radio, Software Defined Radio

## PROFESSIONAL MEMBERSHIPS

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Association for Women in Mathematics (AWM)

American Mathematical Society (AMS)

Society for Industrial and Applied Mathematics (SIAM)

## RESEARCH EXPERIENCE

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### Ph.D. Thesis Starter Project

January 2023 – Present

University of Washington | Department of Applied Mathematics | Seattle, WA

Research Advisor: Dr. Thomas Trogdon

- Implementing 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 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 the 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.

## PUBLICATIONS

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[2] 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>.

[1] “Spectral Energy Distributions of Morphologically Classified X-Ray Luminous Sources” **Kaitlynn Lilly**, Connor Auge, David Sanders. 2019. REU proceedings, University of Hawaii at Manoa. <https://student.ifa.hawaii.edu/reu/wp-content/uploads/sites/2/2019/08/Kaitlynn-Lilly.pdf>

## RESEARCH PRESENTATIONS

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[9] “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

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

[7] “An Introduction to My Research: Stability of Large-Scale Structures” February 2021  
 Oral Presenter: 15-minute talk | Meyerhoff Scholars Program Selection Weekend  
 Held Virtually

[6] “Spectral Properties of a Non-Self-Adjoint Beam with Applications to Flutter” Poster Presenter   Joint Mathematics Meeting (JMM) Held Virtually	January 2021
[5] “Spectral Properties of a Non-Self-Adjoint Beam with Applications to Flutter” Oral Presenter: 45-minute talk   Differential Equations Seminar University of Maryland, Baltimore County   Baltimore, MD	October 2020
[4] “Spectral Energy Distributions of Morphologically Classified X-Ray Luminous Sources” Oral Presenter: 15-minute talk   Emerging Researchers National (ERN) Conference Washington D.C.	February 2020
[3] “An Introduction to My Research: Active Galactic Nuclei” Oral Presenter: 15-minute talk   Meyerhoff Scholars Program Selection Weekend University of Maryland, Baltimore County   Baltimore, MD	February 2020
[2] “Spectral Energy Distributions of Morphologically Classified X-Ray Luminous Sources” Poster Presenter   Conference for Undergraduate Women in Physics (CUWiP) University of Maryland, College Park   College Park, MD	January 2020
[1] “Spectral Energy Distributions of Morphologically Classified X-Ray Luminous Sources” Poster Presenter   American Astronomical Society (AAS) Honolulu, HI	January 2020

## TEACHING & MENTORING EXPERIENCE

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<b>Women in Applied Mathematics Mentorship Program Mentor</b> University of Washington   Seattle, WA	February 2023 – Present
<ul style="list-style-type: none"> <li>Mentor and create a project for two undergraduate students in applied mathematics each year</li> </ul>	
<b>Goldwater Mentor</b> Purdue University   West Lafayette, IN	May 2022 – May 2023
<ul style="list-style-type: none"> <li>Mentor a 2022 Goldwater Scholar and assist with the graduate school application process</li> </ul>	
<b>Teaching Assistant for Credit Risk Management</b> University of Washington   Seattle, WA	Fall 2022
<ul style="list-style-type: none"> <li>Grade homework and exams as well as hold office hours for 60 students</li> </ul>	
<b>Teaching Assistant for Introduction to Mathematical Reasoning</b> University of Maryland, Baltimore County   Baltimore, MD	January – May 2022
<ul style="list-style-type: none"> <li>Instructed a discussion section of 30 students and graded homework and activities</li> </ul>	
<b>First-Generation Peer Mentor</b> University of Maryland, Baltimore County   Baltimore, MD	January 2021– May 2022
<ul style="list-style-type: none"> <li>Mentored 2 first-generation college students. Provided students with tips on how to navigate college.</li> </ul>	
<b>Meyerhoff Peer Advisor   Lead Advisor</b> University of Maryland, Baltimore County   Baltimore, MD	August 2020 – May 2022
<ul style="list-style-type: none"> <li>Mentored 1 underclassman Meyerhoff Scholar by providing scholar with knowledge regarding courses, research, etc.</li> <li>Created and lead peer advisor trainings for 80 advisors. Oversaw mentor/mentee relationships.</li> </ul>	
<b>Arbutus Middle School Tutor/Mentor   Student Coordinator</b> University of Maryland, Baltimore County   Baltimore, MD	August 2018 – May 2022
<ul style="list-style-type: none"> <li>Recruited 40 tutors, communicated with the site, ran professional development, volunteered 4 hours a week.</li> </ul>	
<b>Teaching Assistant for Multi-variable Calculus</b> University of Maryland, Baltimore County   Baltimore, MD	August 2019 – May 2020
<ul style="list-style-type: none"> <li>Instructed a discussion section of 45 students and graded quizzes and exams.</li> </ul>	
<b>Learning Assistant for Physics 122: Introductory Physics II</b> University of Maryland, Baltimore County   Baltimore, MD	January – May 2019
<ul style="list-style-type: none"> <li>Ran two discussion sections and assisted over 60 students with material from lecture.</li> </ul>	

**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.

**EXTRACURRICULAR ACTIVITIES**

Organizer of Numerical Analysis Research Club (NARC)

March 2024 – Present

University of Washington Association for Women in Mathematics Chapter Founder/President

May 2023 – Present

University of Washington SIAM Chapter Vice President

October 2022 – Present