

# Benjamin A. Hyatt

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NSF Graduate Research Fellow

PhD Candidate in Engineering Sciences and Applied Mathematics, Northwestern University

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Center for Interdisciplinary Exploration and Research in Astrophysics (CIERA)

1800 Sherman Avenue, Evanston, IL 60201

Department of Engineering Sciences and Applied Mathematics (ESAM), Northwestern University

2145 Sheridan Road, Evanston, IL 60208

## EDUCATION

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<b>PhD in Engineering Sciences and Applied Mathematics</b> Northwestern University	Expected 2026
<b>MS in Engineering Sciences and Applied Mathematics</b> Northwestern University	2022
<b>BS in Mathematics</b> with Minors in Physics and Philosophy University of Maryland, Baltimore County (UMBC) Summa Cum Laude, with Departmental Honors GPA: 4.0	2021

## WORK EXPERIENCE

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<b>Lawrence Livermore National Laboratory</b> , Livermore, CA Computing Graduate Student Intern	2024
<b>Johns Hopkins University, Applied Physics Laboratory</b> , Laurel, MD Technical Staff (2018-2019) NASA Intern (2017, 2018) ASPIRE Intern (2016-2017)	2016 - 2019

## RESEARCH INTERESTS

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**Numerical methods:** numerical stability, IMEX and multi-rate timestepping schemes, pseudospectral methods, high-performance computing  
**Astrophysical and geophysical fluid dynamics:** convection, stars, atmospheres, aerosols, climate models, and space exploration

## HONORS AND FELLOWSHIPS

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NSF Graduate Research Fellowship	2023 - 2025
Outstanding Teaching Assistant Award, ESAM Department	2022 - 2023
Walter P. Murphy Fellowship, Northwestern University	2021 - 2022
Outstanding Graduating Senior in Mathematics, UMBC	2021
Freeman A. Hrabowski President's Advisory Council Scholarship, UMBC	2020
Undergraduate Research Award, UMBC	2019 - 2020
Undergraduate Merit Scholarship, UMBC	2017 - 2021

## PREPRINTS

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**Hyatt B. A.**, Lecoanet D., Anders E. H., Burns K. J. “Multiple scales analysis of a nonlinear timestepping instability in simulations of solitons” (arXiv:2411.07286, submitted to JCP).

## PUBLICATIONS

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5. Ballouz R. L. Ernst C. M., Barnouin O. S., Daly R. T., DellaGiustina D. N., **Hyatt B. A.**, Martin A. C., “Seismic resurfacing of asteroid (433) Eros indicates a highly dissipative interior for large near-Earth asteroids” (Nat. Astron, 2024).
4. Anders E. H., Lecoanet D., Cantiello M., Burns K. J., **Hyatt B. A.**, Kaufman E., Townsend R. H. D., Brown B. P., Vasil G. M., Oishi J. S., Jermyn. A. S. “The photometric variability of massive stars due to gravity waves excited by core convection” (Nat. Astron, 2023).
3. Ernst C. M., Daly R. T., Gaskell R. W., Barnouin O. S., Nair H., **Hyatt B. A.**, Al Asad M. M., Wilcomb K. K. “High-resolution Shape Models of Phobos and Deimos from Stereophotoclinometry” (Earth Planets Space, 2023).
2. **Hyatt B.**, Shen. J., “Stability Analysis of Model Predictive Control-Based Car-Following Control Under Linear Vehicle Dynamics” (UMBC Review, 2020).
1. Sheth S., Barnard E., **Hyatt B.**, Rathinam M., Zustiak S. P., “Predicting Drug Release from Degradable Hydrogels Using Fluorescence Correlation Spectroscopy and Mathematical Modeling” (Front. Bioeng. Biotechnol., 2019).

## PRESENTATIONS

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Contributed Poster, AGU24	2024
“Error Analysis of Single and Multi-rate Temporal Coupling Approaches in a Simplified Aerosol System”	
Invited Talk, PAESCAL SciDAC group meeting	2024
“Process coupling strategies in a simplified aerosol model”	
Contributed Poster, LLNL Summer SLAM	2024
“Error Analysis of Single and Multi-rate Temporal Coupling Approaches in a Simplified Aerosol Model”	
Contributed Talk, 76th APS Division of Fluid Dynamics Annual Meeting	2023
“Timestepping stability in pseudospectral methods”	
Contributed Talk, 75th APS Division of Fluid Dynamics Annual Meeting	2022
“Relaxing timestep restrictions for numerical stability in DNS”	
Contributed Talk, UMBC SURF	2020
“Stability Analysis Of Car-Following Control Of Linear Vehicle Dynamics With General MPC Horizon”	
Contributed Poster, UMBC URCAD	2020
“A Reaction-Diffusion PDE Model for Predicting Solute Release”	
Contributed Talk, APL NASA Intern Presentation,	2018
“Examining the Geologies and Shapes of Small Bodies”	
Contributed Talk, APL NASA Intern Presentation,	2017
“Examining the Geologies and Shapes of Small Bodies”	

## TEACHING EXPERIENCE

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**Graduate Teaching Assistantship** Northwestern University 2022 – 2023

GEN\_ENG 206-4 Honors Engineering Analysis 4 (Spring 2023)

ES\_APPM 252–1,2 Honors Multivariable Calculus (Fall 2022, Winter 2023)

**Teaching Assistant** UMBC 2019 – 2021

MATH 225 Differential Equations (Fall 2020, Spring 2021)

PHYS 224 Vibrations and Waves (Spring 2020)

PHYS 324 Modern Physics (Fall 2019)

## SERVICE AND MENTORSHIP

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**Causeway Program Mentor** 2023 – 2024

Mentored a post-baccalaureate student at Northwestern University who went on to begin doctoral studies at Purdue University in applied mathematics

**REACH Program Mentor** 2023

Co-mentored a local Evanston high school student at CIERA for three weeks during the summer on a project related to asteroseismology, sonification of astrophysical data, and programming in Python

**Member of Climate Action Team** 2022 – 2024

Worked with CIERA members to collaborate with a third-party organization Visceral Change to conduct a workplace DEI climate survey, analyze results, and incorporate community feedback in order to develop a set of recommended actions to improve DEI climate

**First-year Foundations Workshop** Northwestern University Fall 2022

Introduced incoming first-year PhD students to the Department of Engineering Sciences and Applied Mathematics, and ran review sessions to prepare them for their preliminary exams