Johnathon **Barbish, Ph.D.**

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Education

Ph.D. in Mechanical Engineering — *Blacksburg, Virginia*

Virginia Tech — *Aug. 2018 - Aug. 2023*

- Dissertation: *The Effect of Tension and Nonlinearity on the Dynamics of Small Elastic Systems in Fluid*
- Future Professoriate Graduate Certificate

B.S. in Mechanical Engineering (Honor Scholar)
B.S. in Physics (Honor Scholar) — *Blacksburg, Virginia*

Virginia Tech — *Aug. 2014 - May 2018*

Teaching Experiences

Assistant Professor — *James Madison University*

Department of Engineering — *Fall 2025 - Present*

Visiting Assistant Professor — *James Madison University*

Department of Engineering — *Fall 2024 - Spring 2025*

Assistant Professor (Adjunct) — *Virginia Western Community College*

Department of Engineering — *Summer 2024*

Instructor (ME 2134) — *Virginia Tech*

Department of Mechanical Engineering — *Fall 2023 - Spring 2024*

Graduate Student Instructor (ME 3124) — *Virginia Tech*

Department of Mechanical Engineering — *Fall 2019 & Spring 2020*

Graduate Teaching Assistant for Fluid Mechanics — *Virginia Tech*

Department of Mechanical Engineering — *Fall 2018*

Publications

J. Barbish, and M. R. Paul, "Computing the multimodal stochastic dynamics of a nanobeam in a viscous fluid," *Journal of Applied Physics*, vol. 136, no. 23, p. 234502, Dec. 2024, doi: 10.1063/5.0241979

J. Barbish, and M. R. Paul, "Using Covariant Lyapunov Vectors to Quantify High Dimensional Chaos with a Conservation Law," *Phys. Rev. E*, vol. 108, no. 5, p. 054202, Nov. 2023. doi: 10.1103/PhysRevE.108.054202

H. Gress, J. Barbish, C. Yanik, I. I. Kaya, R. T. Erdogan, M. S. Hanay, M. González, O. Svitelskiy, M. R. Paul, and K. L. Ekinci, "Multi-mode Brownian Dynamics of a Nanomechanical Resonator in a Viscous Fluid," *Phys. Rev. Appl.*, vol. 20, no. 4, p. 044061, Oct. 2023. doi: 10.1103/PhysRevApplied.20.044061

J. Barbish, C. Ti, K. L. Ekinci, and M. R. Paul, "The dynamics of an externally driven nanoscale beam that is under high tension and immersed in a viscous fluid," *Journal of Applied Physics*, vol. 132, no. 3, p. 034501, Jul. 2022, doi: 10.1063/5.0100462

Presentations

Invited Talks

J. Barbish, "Panel: Meet Your Future: A Conversation about Career Pathways," invited panelist at APS Global Physics Summit, Mar. 2025.

Contributed Talks

J. Barbish*, H. Gress, K. Ekinci, and M. R. Paul, "Using Theory, Simulation, and Experiment to Probe the Multimodal Thermal Noise Spectrum of a Nanobeam in Fluid Near a Wall," presented at the APS DFD, Nov. 2024.

J. Barbish*, "Studying the Multi-modal Thermal Noise Spectrum of a Nanobeam Immersed in a Viscous Fluid", presented a sound bite at the Virginia Soft Matter Symposium at James Madison University, Oct. 2024.

J. Barbish*, "Guiding Students on How to Bridge the Gap between Theory and Reality", presented a flash talk at the Scholarship of Engineering Education Symposium at the University of Virginia, Sept. 2024.

J. Barbish* and M. R. Paul, "Examining the Effects of a Nearby Wall on the Multi-modal Thermal Noise Spectrum of a Nanobeam Immersed in a Viscous Fluid", presented at the Midwestern Thermodynamics and Statistical Mechanics Meeting, Jun. 2024.

H. Gress, J. Barbish, M. R. Paul, and K. Ekinci, "Thermal Fluctuations of a Nanomechanical Beam Resonator in a Viscous Fluid," presented at the Frontiers of Nanomechanical Systems, Jun. 2023.

J. Barbish*, H. Gress, K. Ekinci, and M. R. Paul, "How Shrinking a Beam to the Nanoscale Yields Nonlinear Dynamics when Driven by Brownian Motion," presented at the Walter O'Brien Research Symposium, Apr. 2023.

J. Barbish*, H. Gress, K. Ekinci, and M. R. Paul, "Exploring the Role of Nonlinearity in the Brownian Driven Motion of Micro and Nanoscale Elastic Objects in Fluid," presented at the SIAM Southeastern Atlantic Section Meeting, Mar. 2023.

J. Barbish*, H. Gress, K. Ekinci, and M. R. Paul, "The Fluctuations of Small Elastic Objects in Fluid with Linear and Nonlinear Restoring Forces," presented at the APS March Meeting, Mar. 2023.

J. Barbish*, C. Ti, K. Ekinci, and M. R. Paul, "Multimodal Analysis of Driven Nanobeams with Arbitrary Tension in a Viscous Fluid," presented at the APS DFD, Nov. 2022.

H. Gress, J. Barbish, M. R. Paul, and K. Ekinci, "Brownian Fluctuations of a Nanomechanical String Resonator Immersed in a Viscous Fluid," presented at the APS DFD, Nov. 2022.

C. Taylor, J. Barbish, and M. R. Paul, "Molecular Fluctuations of Nanoscale Objects Immersed in Fluid," presented at the Mechanical Engineering Undergraduate Research Showcase, Virginia Tech, Sep. 2022.

J. Barbish* and M. R. Paul, "Spatially Varying Force on a Doubly Clamped Beam in Tension Immersed in Fluid," presented at the Walter O'Brien Research Symposium, Apr. 2022.

J. Barbish* and M. R. Paul, "Quantifying High Dimensional Chaos with Covariant Lyapunov Vectors," presented at the Fall Fluids Symposium, Oct. 2018.

J. Barbish*, M. Xu, and M. R. Paul, "Probing the Chaotic Dynamics of Fluids using Insights from Coupled Map Lattices," presented at the APS DFD, Nov. 2017.

M. R. Paul, M. Xu, J. Barbish, and S. Mukherjee, "Using Covariant Lyapunov Vectors to Understand Spatiotemporal Chaos in Fluids," presented at the APS DFD, Nov. 2017.

* denotes presentations given by me.

Research Experiences

Postdoctoral Researcher — *Virginia Tech, Blacksburg, VA*
Department of Mechanical Engineering — *Aug. 2023 - Jul. 2024*

Graduate Research Assistant — *Virginia Tech, Blacksburg, VA*
Department of Mechanical Engineering — *Aug. 2018 - Aug. 2023*

Summer Research Intern — *Los Alamos, NM*
Los Alamos National Laboratory — *Summer 2018*

Undergraduate Research Assistant — *Virginia Tech, Blacksburg, VA*
Department of Mechanical Engineering — *Nov. 2016 - May 2018*

Service Experiences

Director of Finance — *Virginia Tech*
Graduate and Professional Student Senate — *Oct. 2022 - May 2023*
- Developed policies and appropriations strategies for $1.7 million to student organizations
- Managed $91,000 of funding for 100+ graduate student organizations
- Chaired bi-weekly meetings, hearing over 200 funding requests

Founding President — *Virginia Tech*
Graduate Engineering Alliance (GEA) — *Aug. 2022 - May 2023*
- Founded GEA to build community amongst all engineering graduate students
- Organized student leaders across 8+ departments
- Developed action plans for analyzing the operations of student organizations

President — *Virginia Tech*
Mechanical Engineering Graduate Student Council (MEGSC) — *Feb. 2020 - May 2022*
- Founded peer mentoring program for incoming grad students
- Used $4000 budget to maximize community building amongst 300 ME grad students
- Organized outreach and technical events for prospective and current grad students

Associate — *Virginia Tech*
Graduate Academy for Teaching Excellence — *Oct. 2019 - May 2023*

Honors & Awards

2023-2024 **Dean's List for Teaching Performance**, Virginia Tech — *Blacksburg, VA*
2023 **Group on Statistical and Nonlinear Physics (GSNP) Student Speaker Finalist**, APS March Meeting — *Las Vegas, NV*
2022 **Pratt Fellowship**, Virginia Tech — *Blacksburg, VA*
2014-2018 **Dean's List: 8 semesters**, Virginia Tech — *Blacksburg, VA*
2016 **Tau Beta Pi (Engineering Honor Society)**, Virginia Tech — *Blacksburg, VA*
2016 **Sigma Pi Sigma (Physics Honor Society)**, Virginia Tech — *Blacksburg, VA*
2012 **Eagle Scout**, Boy Scouts of America — *Chesapeake, VA*