

## EMPLOYMENT

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### Swarthmore College

Visiting Assistant Professor of Engineering

Swarthmore, PA

Fall 2023 –present

## EDUCATION

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### Virginia Tech

Ph.D. in Engineering Mechanics

Blacksburg, VA

2018–2023

Advisor: Mark A. Stremler

Thesis title: *Vortex Dynamics and forces in the laminar wakes of bluff bodies*

### Cornell University

B.S. in Mechanical Engineering

Ithaca, NY

2013–2017

Minor: *Sustainable Energy Systems*

## PUBLICATIONS

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- [1] Wenchao Yang, **Emad Masroor**, and Mark A. Stremler. “A New Definition of Vortex Formation Length”. *Fluid-Structure-Sound Interactions and Control*. Ed. by Daegyoun Kim et al. Singapore: Springer Nature Singapore, 2024, pp. 109–114. ISBN: 978-981-9762-11-8.
- [2] **Emad Masroor**, Wenchao Yang, and Mark A. Stremler. “Flow visualization data from experiments with an oscillating circular cylinder in a gravity-driven soap film”. *Data in Brief* 41 (Apr. 2022), p. 107819. ISSN: 2352-3409. DOI: [10.1016/J.DIB.2022.107819](https://doi.org/10.1016/J.DIB.2022.107819).
- [3] **Emad Masroor** and Mark A. Stremler. “On the topology of the atmosphere advected by a periodic array of axisymmetric thin-cored vortex rings”. *Regular and Chaotic Dynamics* 27.2 (2022), pp. 183–197. DOI: [10.1134/S1560354722020046](https://doi.org/10.1134/S1560354722020046). arXiv: [2112.06105](https://arxiv.org/abs/2112.06105).
- [4] Wenchao Yang, **Emad Masroor**, and Mark A. Stremler. “The wake of a transversely oscillating circular cylinder in a flowing soap film at low Reynolds number”. *J. Fluids Struct.* 105 (Aug. 2021), p. 103343. ISSN: 08899746. DOI: [10.1016/j.jfluidstructs.2021.103343](https://doi.org/10.1016/j.jfluidstructs.2021.103343). arXiv: [2101.00108](https://arxiv.org/abs/2101.00108).
- [5] Mark A. Stremler, Saikat Basu, and **Emad Masroor**. “Erratum: Streamline patterns in 2P vortex street equilibria”. *Journal of Fluid Mechanics*, 901 (2020). ISSN: 14697645. DOI: [10.1017/jfm.2017.563](https://doi.org/10.1017/jfm.2017.563).

## FORTHCOMING

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- [1] **Emad Masroor** and Mark A. Stremler. “A generalized Kármán drag law for vortex streets with  $N > 2$  vortices per period” (in prep).
- [2] Anshul Nayak, **Emad Masroor**, and Hodjat Pendar. “Performance comparison of a tethered and freely-swimming fin” (under review).

## PRESENTATIONS

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- [1] **Emad Masroor** and Bartosz Protas. “Periodic Norbury Vortex Rings”. *78th Annual Meeting of the APS Division of Fluid Dynamics*, Houston, TX. Nov. 2025.

- [2] **Emad Masroor** and Mark A. Stremler. “Forces on a body with a vortex-dominated wake”. *77th Annual Meeting of the APS Division of Fluid Dynamics*, Salt Lake City, UT. Nov. 2024.
- [3] **Emad Masroor**. “Dynamics of coaxial thin vortex ring arrays”. *International Congress of Theoretical and Applied Mechanics*, Daegu, South Korea. Aug. 2024.
- [4] **Emad Masroor**. “Dynamics of vortex ring arrays”. *SIAM Conference on Nonlinear Waves and Coherent Structures*, Baltimore, MD. June 2024.
- [5] **Emad Masroor** and Mark A. Stremler. “Dynamics of coaxial arrays of vortex rings”. *SIAM Sectional Meeting, New York - New Jersey - Pennsylvania*, Newark, NJ. Oct. 2023.
- [6] **Emad Masroor** and Mark A. Stremler. “Dynamics of coaxial arrays of vortex rings”. *SIAM Conference on Applications of Dynamical Systems*, Portland, OR. May 2023.
- [7] **Emad Masroor** and Mark A. Stremler. “Fluid Dynamics of a Periodic Array of Axisymmetric Thin-cored Vortex Rings”. *75th Annual Meeting of the APS Division of Fluid Dynamics*, Indianapolis, IN. Nov. 2022.
- [8] **Emad Masroor**, Anshul Nayak, and Hodjat Pendar. “A computationally efficient method for modeling the dynamics of swimming or flying flexible bodies in high-Re flows”. *2nd annual Engineering Mechanics Symposium, Blacksburg VA*. Apr. 2022.
- [9] **Emad Masroor** and Mark A. Stremler. “Vortex patterns in the wake of a transversely oscillating circular cylinder at low Reynolds number”. *74th Annual Meeting of the APS Division of Fluid Dynamics*, Phoenix, AZ. Nov. 2021.
- [10] Mark A. Stremler and **Emad Masroor**. “A generalized Karman-like drag law for exotic vortex street equilibria”. *74th Annual Meeting of the APS Division of Fluid Dynamics*, Phoenix, AZ. Nov. 2021.
- [11] **Emad Masroor** and Mark A. Stremler. “Theoretical predictions for the drag force due to exotic wakes”. *25th International Congress of Theoretical and Applied Mechanics*, Milan, Italy (virtual). Aug. 2021.
- [12] **Emad Masroor** and Mark A. Stremler. “Drag forces on a bluff body shedding a 2P wake”. *72nd Annual Meeting of the APS Division of Fluid Dynamics*, Seattle, WA. Nov. 2019.
- [13] **Emad Masroor**, Wenchao Yang, and Mark A. Stremler. “Vortex patterns in the two-dimensional wake of a transversely oscillating cylinder in uniform flow”. *IUTAM Symposium on Vortex dynamics in science, nature and technology*, San Diego, CA. June 2019.
- [14] **Emad Masroor**, Wenchao Yang, and Mark A. Stremler. “Wake Structure of an oscillating cylinder in a flowing soap film at low Reynolds number”. *71st Annual Meeting of the APS Division of Fluid Dynamics*, Atlanta, GA. Nov. 2018.
- [15] Mark A. Stremler et al. “Classifying Relative Vortex Motions in 2P Mode Wakes”. *7th Conference on Bluff Body Wakes and Vortex-Induced Vibrations*, Marseille, France. July 2018.

## INVITED TALKS

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Title: *Vortex Dynamics in the Wake*

Department of Mathematics, Indian Institute of Technology Hyderabad	March 2025
Department of Mechanical Engineering, Indian Institute of Technology Gandhinagar	March 2025
Institute of Mechanics, Chinese Academy of Sciences	August 2024
Department of Mathematical Sciences, New Jersey Institute of Technology	April 2024

## TEACHING EXPERIENCE

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No.	Semester	Name	Level
ENGR 59	Fall 2025	Introduction to Mechanics II <i>Mechanics of Materials at the level of R.C. Hibbeler</i>	Required sophomore/junior course
ENGR 21	Fall 2025	Computer Engineering Fundamentals <i>Programming for engineers, embedded systems &amp; numerical methods</i>	Required sophomore/junior course
ENGR 91	Spring 2025	Nonlinear Dynamics & Chaos <i>Text: Strogatz</i>	Elective junior/senior course
ENGR 41	Fall 2024	Thermo-Fluid Mechanics <i>Combined thermodynamics &amp; Fluid Mechanics using Munson &amp; Cengel texts</i>	Required junior course
ENGR 21	Fall 2024	Computer Engineering Fundamentals <i>Programming for engineers, embedded systems &amp; numerical methods</i>	Required sophomore/junior course
ENGR 83	Spring 2024	Fluid Mechanics <i>Advanced fluid mechanics at the level of Batchelor</i>	Elective senior course
ENGR 41	Fall 2023	Thermo-Fluid Mechanics <i>Combined thermodynamics &amp; Fluid Mechanics using Munson &amp; Cengel texts</i>	Required junior course
ENGR 19	Fall 2023	Numerical Methods for Engineering <i>Root finding, interpolation, optimization, initial value problems</i>	Required sophomore/junior course
ME 3414	Spring 2022	Fluid Dynamics <i>At the level of Munson et.al</i>	Required junior course, Virginia Tech

## RESEARCH STUDENTS

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Swarthmore College

- Dylan Jacobs, Class of 2027 Spring 2024
- Aaron Dubois, Class of 2026 Spring 2024
- Vansh Garg\*, Class of 2026 Spring 2024 –Summer 2024
- Alvin Zheng\*, Class of 2026 Summer 2024
- Jacob Sherman\*, Class of 2025 Spring 2024 –Summer 2024
- Ming Gao\*, Class of 2026 Summer 2025 –Fall 2025
- Emily Chen\*, Class of 2026 Summer 2025
- Charles Schuetz\*, Class of 2027 Summer 2025

\*received Summer Research Fellowship from Swarthmore College

## ENGINEERING EXPERIENCE

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<b>Regeneron Pharmaceuticals</b> Ph.D. Intern	Tarrytown, NY Summer 2021
<b>Toyota Material Handling</b> (Raymond Corp.) Intern Research Engineer	Greene, NY Summer 2016

## SYMPOSIA ORGANIZED

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<b>Vorticity Dynamics in Classical and Quantum Fluids</b> (co-organizer) SIAM Conference on Nonlinear Waves and Coherent Structures (NWCS)	Baltimore, MD June 2024
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## AWARDS & FELLOWSHIPS

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- National Science Foundation Graduate Research Fellowship 2019–2023
- Manuel Stein Scholarship, Engineering Mechanics Program, Virginia Tech Spring 2019
- Liviu Librescu Memorial Fellowship, Engineering Mechanics Program, Virginia Tech Spring 2020
- Daniel and Frances Frederick Fellowship, Engineering Mechanics Program, Virginia Tech Spring 2022
- College of Engineering Fellowship, Virginia Tech Spring 2018
- International Student Tuition Scholarship, Cornell University 2013 –2017
- James E. Rice Jr. Award for exceptional writing in first-year writing seminars, Cornell University Spring 2014

## SERVICE

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- Reviewer, *Progress in Computational Fluid Dynamics* ISSN 1741-5233
- Reviewer, *Physics of Fluids* ISSN 1089-7666
- Member, American Physical Society
- Member, Society for Industrial and Applied Mathematics
- Member, Society for Integrative and Comparative Biology
- Volunteer, VT Partnering for Engineering Education in Rural Schools Fall 2018
- Judge, Blue Ridge Highlands Regional Science Fair Spring 2020
- Reviewer, Graduate Student Association Travel Fund Program Spring 2018
- Reviewer, Graduate Research Development Program, Virginia Tech Fall 2022

## SYMPOSIA & SUMMER SCHOOLS ATTENDED

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**Vortex dynamics in science, nature and technology** La Jolla, CA  
International Union of Theoretical & Applied Mechanics (IUTAM) June 2019

**São Paulo School of Advanced Sciences on Nonlinear Dynamics** São Paulo, Brazil  
Escola Politécnica da Universidade de São Paulo July 2019

**Ph.D. Course on Vorticity, Vortical Flows and Vortex-Induced** Lyngby, Denmark  
Danmarks Tekniske Universitet August 2019

**Vortex Dynamics: Crossroads of Math, Physics and Applications** Hangzhou, China (online)  
Institute for Advanced Study in Mathematics December 2023