BRANDON MONTEMURO

Saint Michael's College Cheray Science Hall Colchester, VT. 05439 Phone: 484-798-7772 bmontemuro@smcvt.edu brandonmontemuro.com

EDUCATION

FALL 2013- MAY 2020 PH.D. IN INTEGRATED APPLIED MATHEMATICS UNIVERSITY OF NEW HAMPSHIRE ADVISOR: Greg Chini DISSERTATION: An Asymptotic Self-Sustaining Process Theory for Uniform Momentum Zones and Internal Interfaces in Unbounded Couette Flow GPA 3.87/4.00

FALL 2006-SPRING 2010 B.S. IN AEROSPACE ENGINEERING PENNSYLVANIA STATE UNIVERSITY Minors in Mathematics and Engineering Leadership Development GPA 3.78/4.00

ACADEMIC POSITIONS

FALL 2024- PRESENT INSTRUCTOR/LEAHY TEACHING FELLOW IN PHYSICS, SAINT MICHAEL'S COLLEGE PHYS 107 – Meteorology PHYS 220 – General Physics I

SPRING 2024 INSTRUCTOR, FREEDOM EDUCATION PROJECT PUGET SOUND PHYS 114 – General Physics I

FALL 2019 - SPRING 2024 POSTDOCTORAL SCHOLAR, UNIVERSITY OF WASHINGTON ADVISOR: Georgy Manucharyan

WINTER 2023 INSTRUCTOR, UNIVERSITY OF WASHINGTON BOTHELL

• BIS/BIO 285 – Our Changing Oceans

FALL 2018

INSTRUCTOR, UNIVERSITY OF NEW HAMPSHIRE

• ME 503 – Thermodynamics

FALL 2015 - SPRING 2019

RESEARCH ASSISTANT, UNIVERSITY OF NEW HAMPSHIRE

FALL 2014 - SPRING 2015

TEACHING ASSISTANT, UNIVERSITY OF NEW HAMPSHIRE

- ME 696 Introduction to Engineering Computing
- ME 503 Thermodynamics

PROFESSIONAL DEVELOPMENT

- Summer 2023, UW Mentoring Enrichment and Leadership Development Institute
 - o Mentoring and Advising learning track designed for graduate students, postdoctoral scholars, research scientists and staff, interested in building an intentional mentoring and advising culture of care, engagement and accountability.
- Summer 2023, MAA Team-Based Inquiry Learning workshop attendee
 - Team-Based Inquiry Learning (TBIL) is a structured form of active learning that uses the structure of Team-Based Learning as a means of bringing inquiry into lower-division courses. This workshop provides instructors with an overview of how to use TBIL in their courses, such as Calculus I, Calculus II, and Linear Algebra.
- Fall 2022, The Inclusive STEM Teaching Project attendee
 - The Inclusive STEM Teaching project is a 6-week course designed to advance the awareness, self-efficacy, and ability of faculty, postdocs, and doctoral students to cultivate inclusive STEM learning environments for all their students and to develop themselves as reflective, inclusive practitioners.

PROFESSIONAL EXPERIENCE

SUMMER 2010 - SUMMER 2013

SYSTEMS ENGINEER, LOCKHEED MARTIN

- Created new and modify existing requirements
- Wrote Request for Changes (RFCs), System Problem Reports, and Engineering Directives
- Interface Control Document Point of Contact
- Reviewed incoming Customer RFCs

HONORS

At University of Washington

• Science Teaching Experience Program-Working in Science Education Scholar 2022-2023

At University of New Hampshire

- College of Engineering and Physical Sciences Fellowship Recipient 2013
- Honorable Mention for NSF Graduate Research Fellowship Program 2014
- Summer TA Fellowship 2015
- NSF and US National Committee on Theoretical and Applied Mechanics Early Career Presenter Fellowships 2021

At Penn State

- Graduated with Distinction from the Pennsylvania State University
- Diefenderfer Scholarship Recipient

At Lockheed Martin

• Team Special Recognition Award

SERVICE

- Co-organizer for Granular Nature of Sea Ice Workshop 2021
- Review Duties: Journal of Fluid Mechanics, Acta Oceanologica Sinica

ADVISING

- Fall 2024 Present
 - AJ Coronato: Junior physics major at Saint Michael's College. Approximation algorithms were used to simplify common physical scenarios in fluid mechanics. These were implemented to solve the governing equations that describe these situations using numerical methods.
- Summer 2023 Summer 2024
 - Krista Matuska: Cooperative Institute for Climate, Ocean, and Ecosystem Studies undergraduate intern. Synthesized observational data from arctic sea ice floes and performed parameter explorations on a simplified sea ice model.
- Summer 2023
 - Hugh Shields: Princeton High Meadow Environmental Institute undergraduate intern.
 Ran the SubZero sea ice model to explore the physical processes that govern the creation of pancake ice in the Arctic.
- Summer 2022 Spring 2023
 - Camille Viviani: Undergraduate research at the University of Washington; used image segmentation software on optical satellite imagery to validate model outputs.
 - Yuna Liu: Undergraduate research at the University of Washington; ran SubZero simulations of the Nares Strait for parameter explorations.

PUBLISHED SOFTWARE

 Brandon P. Montemuro, & Georgy E. Manucharyan. (2023). SubZero: a discrete element sea ice model that simulates floes as evolving concave polygons (v1.0.4). Zenodo. https://doi.org/10.5281/zenodo.8205778

SKILLS

Programming Languages

- Matlab
- Julia
- Python
- Dedalus computational framework

PROFESSIONAL MEMBERSHIPS

- 2013-Present American Mathematical Society
- 2013-Present Society for Industrial and Applied Mathematics
- 2016-Present American Physical Society
- 2022-Present American Geophysical Union
- 2022-Present Association of Polar Early Career Scientists

CONFERENCE PRESENTATIONS

- AGU Annual Meeting 2024 (upcoming)
 - o Role of Small Islands in Sea Ice Dynamics and Transport Through Nares Strait
- Ocean Sciences Meeting 2024
 - o The role of islands in the summer breakup of sea ice arches in Nares Strait
- AGU Fall Meeting 2022
 - Lifecycle of sea ice floes reproduced using a new discrete element sea ice model
- Ocean Sciences Meeting 2022
 - Subzero: A new Discrete Element Sea Ice Model with an Explicit Representation of Floe Life Cycle
- International Congress of Theoretical and Applied Mechanics 2020+1
 - A Self-Sustaining Process Theory for Uniform Momentum Zones and Internal Interfaces in Turbulent Shear Flows
- Modeling the Granular Nature of Sea Ice Workshop 2021
 - SubZero: Floe-Resolving Sea Ice Model Validation and Test Cases
- American Physical Society Division of Fluid Dynamics 2018
 - A Self-Sustaining Process Theory for Uniform Momentum Zones and Internal Layers in Wall Turbulence
- UNH Graduate Research Conference 2018
 - Viscous Versus Inviscid Exact Coherent States in High Reynolds Number Wall Flows
- American Physical Society Division of Fluid Dynamics 2017
 - Viscous Versus Inviscid Exact Coherent States in High Reynolds Number Wall Flows
- American Physical Society Division of Fluid Dynamics 2016
 - A Theory for Coupled Uniform Momentum Zones and Vortical Fissures in Turbulent Wall Flows
- UNH Graduate Research Conference 2016
 - Asymptoticically-Reduced Modeling of Coexisting Uniform Momentum Zones and Internal Shear Layers in Turbulent Wall Flows

INVITED TALKS

- University of Puget Sound Seminar Series 2023
 - \circ $\,$ Modeling the Intermittent Jamming of Sea Ice Floes in Nares Strait
- CICOES Intern Seminar Series 2023
 - SubZero: Explicit Representation of the Floe Life Cycle with a new Discrete Element Sea Ice Model
- UW Physical Oceanography Seminar 2023
 - Modeling the dynamics of sea ice floes passing through Nares Strait
- UNH IAM Seminar 2022
 - SubZero: Explicit Representation of the Floe Life Cycle with a new Discrete Element Sea Ice Model
- 9th Annual ArcTrain Meeting 2022
 - SubZero: A new Floe-Resolving Sea Ice Model with an explicit representation of Floe Life Cycle
- UW Physical Oceanography Seminar 2022
 - \circ SubZero: Sea Ice Model with an Explicit Representation of a Floe Life Cycle

PUBLICATIONS

PUBLISHED:

- Montemuro B, Manucharyan G. SubZero: A discrete element sea ice model that simulates floes as evolving concave polygons. *Journal of Open Source Software*, **8(88)**, 5039, 2023
- Manucharyan G, Montemuro B. SubZero: A Sea Ice Model with an Explicit Representation of the Floe Life Cycle. *Journal of Advances in Modeling Earth Systems*, **14**, e2022MS003247, 2022
- Montemuro B., White C, Klewicki J., & Chini, G. A self-sustaining process theory for uniform momentum zones and internal shear layers in high Reynolds number shear flows. *Journal of Fluid Mechanics*, **901**, A28, 2020
- Chini G, Montemuro B, White C, Klewicki J. A self-sustaining process model of inertial layer dynamics in high Reynolds number turbulent wall flows, *Philosophical Transactions of the Royal Society A* ., **375**, 20160090, 2017

SUBMITTED:

• Montemuro B, Manucharyan G, The Role of Islands in the Sea Ice Transport Through Nares Strait

IN PREPARATION:

- Stechmann S, Hu J, Montemuro B, Chen N, Manucharyan G, Tollar E, and Zhang M, Power laws in the sea ice floe size distribution: a stochastic theory
- Montemuro B, Manucharyan G, SubZero: Sea Ice Discrete Element Model with Bonded Polygon Implementation

REFERENCES

• Available upon request