BRANDON MONTEMURO

University of Washington
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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

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

FALL 2019 - PRESENT
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
    - 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

- Summer 2023 - Present
    - 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 of 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 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

- 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
    - 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

IN PREPARATION:

- Montemuro B, Manucharyan G, Viviani C, Liu Y, The Role of Islands in the Sea Ice Transport Through Nares Strait
- Montemuro B, Manucharyan G, SubZero: Sea Ice Discrete Element Model with Bonded Polygon Implementation

REFERENCES

- Available upon request