Victoria Whitley Clark

Graduate Student & Teaching Assistant

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Profile

Experienced researcher with a strong background in applied mathematics and scientific computing, focusing on fluid dynamics. Currently pursuing a PhD in the Applied Mathematics, Statistics, and Scientific Computing (AMSC) Program at the University of Maryland. Passionate about numerical applications in ocean dynamics, particularly in the ocean submesoscale and interactions with topography. Skilled in connecting mathematical and computational concepts to natural phenomena.

Education

University of Maryland, College Park — *College Park, MD*

Applied Mathematics, Statistics, and Scientific Computing PhD Program — *Expected Defense, July 2025*

- **Advisor: Jacob Wenegrat, PhD**
- **Flagship Fellowship, Hauptman Summer Fellowship**

University of North Carolina at Chapel Hill — *Chapel Hill, NC*

Bachelor of Science in Applied Mathematics with Honors — *May 2019*

- **Minor in Women's and Gender Studies**
- **Deans List, Phi Beta Kappa**

Skills

Large Eddy Simulation (LES)	Oceananigans
Coding Languages	Julia, Python, Bash
Computational Software	MATLAB, Mathematica, Dedalus
Version Control and Documentation	GitHub, Latex
3D Image Processessing Software	ImageJ, BoneJ, PerGeos, ilastik, iMorph, Blob3D

Research Experience

Dept. of Atmospheric and Oceanic Sciences, Univ. of Maryland — *College Park, MD*

Graduate Research Assistant, Dr. Jacob Wenegrat — *July 2020 - PRESENT*

- **Consideration of the Modification and Breaking of Near Inertial Waves (NIWs) in Dense Overflows**
  - Simulated dense overflows to study the dynamics of the Denmark Strait in LES
  - Implemented NIW ray tracing, using ODE solvers on simulations of dense overflows
- **Exploration of Internal Wave Breaking and Mixing in the Bottom Boundary Layer**
  - Created new diagnostics to examine the mechanisms and measure the parameters involved
  - Connected the ocean's circulation to the small scale mixing processes near topography
- **Investigation into Ekman Arrest Interactions with Internal Waves on a Slope**
  - Set up 3D LES simulations in Oceananigans to reflect internal waves and Ekman arrest on a slope
  - Analyzed data to determine how the dynamical features interact and respond to each other
- **Implementation of Immersed Boundary Method within Oceananigans' LES code**
  - Worked with developers through GitHub to create a user-friendly feature for dealing with complex topography
  - Revised and updated the code to ensure numerics correctly matched the physics in ocean problems

Joint Applied Math and Marine Science Fluids Lab, Univ. of North Carolina *Chapel Hill, NC*

Undergraduate Research Assistant, Drs. Richard McLaughlin, Roberto Camassa *Sep 2016 - Jul 2019*

- **Diffusion Anomalies in Fluids with Salt-Stratified Densities**
  - Investigated previously recorded effect seen in the diffusion of more viscous salt-stratified fluids
  - Analyzed and compared data to PDE model and neutral stability analysis developed for triple diffusion
- **Construction of a Multi-Probe Conductivity Meter using Raspberry Pis**
  - Built a conductivity meter by wiring Raspberry Pis to the individual probes
  - Programmed the Pis in Python to take continuous data from several probes at once
- **Diffusion Effects of Falling Spheres through Stratified Salts**
  - Studied a sphere's prolonged residence time at the interface of salt-stratified fluids
  - Simulated entrainment dominated regimes through controlled stratified-diffusion tests

National Energy Technology Laboratory *Morgantown, WV*

Mickey Leland Energy Fellow, Dr. Sarah Brown *May 2018 - Aug 2018*

- **Quantification of Flow-Induced Deformation in Porous Geomaterials**
  - Determined strain in porous materials with multi-scale computed tomography (CT)
  - Analyzed image-processing software to determine the most effective way to quantify strain in 3D samples

Teaching Experience

UMD Mathematics Department *College Park, MD*

Instructor *Fall 2023, 2021, 2020, Spring 2020*

- **Introduction to Math Modeling and Probability**
  - Sole taught 60 students in both in-person and virtual environments
  - Planned weekly lessons, integrating group work, quizzes, and worksheets into their exercises
- **Developmental Mathematics**
  - Managed 3 different teaching timelines within one class of 80 non-mathematically inclined students
  - Lead a team of undergraduate teaching assistants within the classroom.

UMD Mathematics Department *College Park, MD*

Teaching Assistant *Spring 2024, 2023, 2021, Fall 2019*

- **Multivariable Calculus, Calculus 2**
  - Taught supplementary discussion sections for 60 students in in-person and virtual environments
  - Created and lead group work where students must think deeply about the material rather than just problem solve

Service

Girls Talk Math Camp *College Park, MD*

Director *Jan 2020 - PRESENT*

- Organize speakers, activities, and curriculum for 40 high school students from underrepresented genders in math
- Hire and oversee a team of undergraduate and graduate students leading campers in day to day activities
- Created and managed a budget for all program years, with funding from the NSF and MAA

Graduate Student Committee of AMSC, MATH and STAT *College Park, MD*

Chair, Social/ Seminar Lead *Aug 2023 - June 2024*

- Founded a new council to represent graduate students in all three programs within the math department
- Organize events and seminars for the AMSC, MATH, and STAT graduate students

Applied Math, Statistics, and Scientific Computing Mentoring Program *College Park, MD*

Mentor *Aug 2020 - June 2024*

- Mentor 1-2 first year graduate students as they begin to aclimate to graduate school
- Serve as a sounding board on topics such as class choices, work-life balance, and professional development

Women in Mathematics *College Park, MD*

President, Treasurer *Jul 2020 - May 2023*

- Integrate undergraduate positions into the executive board to ensure students at every level feel connected and valued
- Organize professional and social events to foster connections among those from underrepresented genders in math

Applied Math, Statistics, and Scientific Computing Student Council *College Park, MD*

President *Aug 2022 - May 2023*

- Represent the student voice during graduate council meetings
- Organize events and seminars for the AMSC and MATH graduate students

Publications

Accepted by J. Phys. Oceanogr.

Whitley, V. and J. O. Wenegrat, 2024: Breaking internal waves on sloping topography: connecting parcel displacements to overturn size and interior-boundary exchanges, and mixing

Presentations

Connecting parcel displacements from breaking internal waves on topography to interior-boundary exchanges and mixing
Gordon Research Conference: Ocean Mixing
South Hadley, MA
June 2024

Breaking internal waves on sloping topography: connecting parcel displacements to overturn size, interior-boundary exchanges, and mixing
U.S. Naval Research Laboratory (Invited Talk)
Stennis Space Center, MS
May 2024

Breaking internal waves on sloping topography: connecting parcel displacements to overturn size, interior-boundary exchanges, and mixing
Ocean Sciences Meeting 2024
New Orleans, LA
Feb 2024

Connecting parcel displacements from breaking internal waves on topography to overturn size and interior-boundary exchanges
National Oceanographic Partnership Program Annual Conference
Gulfport, MS
Jan 2024

Breaking internal waves on sloping topography: connecting parcel displacements to overturn size, interior-boundary exchanges, and mixing
Ocean's Lunch Seminar
College Park, MD
Oct 2023

Breaking internal waves on sloping topography: connecting parcel displacements to overturn size and interior-boundary exchanges
The Burgers Program for Fluid Dynamics Symposium
College Park, MD
Oct 2023

What are... Internal Waves
Joint AMSC, MATH, and STAT Student Seminar
College Park, MD
Sep 2023

Immersed Boundary Methods for Simulating Topography in Ocean Applications
AMSC Graduate Student Seminar
College Park, MD
Oct 2022

Submesoscale Instabilities of the Bottom Boundary Layer in the Presence of Internal Tides
Ocean Sciences Meeting 2022
Virtual
Feb 2022