

# SHANICE BAILEY

Physical Oceanographer

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## EDUCATION

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Columbia University Graduate School of Arts & Science	
<b>PhD</b> , Earth and Environmental Sciences	<b>Expected 2024</b>
Dissertation: <i>Water mass transformation through the lens of numerical models and observations</i>	
Advisor: Dr. Ryan P. Abernathey	
<b>MPhil</b> , Earth and Environmental Sciences	<b>2021</b>
<b>MA</b> , Earth and Environmental Sciences	<b>2020</b>
Columbia University School of Professional Studies	
<b>Postbaccalaureate Student</b>	<b>2017 – 2018</b>
Boston University	
<b>B.A., Environmental Sciences &amp; Wildlife- Ecology/Management</b>	<b>2012 – 2016</b>
Thesis: “Feeding Behavior of African Elephants ( <i>Loxodonta africana</i> ) in Tarangire-Manyara ecosystem”	

## PUBLICATIONS

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**Bailey, S. T.**, Jones, C. S., Abernathey, R. P.: North Atlantic Subtropical Mode Water transformation by near surface eddy mixing in high resolution climate models, *In preparation for the Journal of Geophysical Research*.

**Bailey, S. T.**, Jones, C. S., Abernathey, R. P., Gordon, A. L., and Yuan, X.: Water mass transformation variability in the Weddell Sea in ocean reanalyses, *Ocean Sci.*, 19, 381–402, <https://doi.org/10.5194/os-19-381-2023>, 2023.

*Professional Feature* – ArcGIS [StoryMap](#) featured on *Estimating the Circulation and Climate of the Ocean* group’s [Featured Publications](#) page. Highlights work from **Bailey, S.T., et al., 2023**.

## PRESENTATIONS & INVITED SEMINARS

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Princeton University’s Geophysical Fluid Dynamics Lab Lunchtime Seminar	<b>November 2023</b>
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**Bailey, S. T.** , Jones, C. S., Abernathy, R. P., Gordon, A. L., and Yuan, X. (2020), Water-Mass Transformation in the Weddell Gyre, Abstract [HE44C-2128](#) presented at *Ocean Sciences Meeting 2020*, San Diego, CA, 16-21 Feb.

## TEACHING EXPERIENCE

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### **NSBP-HGS Mentoring program**

**Sept 2020-Present**

Mentor for a middle school and high school students through the National Society of Black Physicist and Harlem Gallery of Science Mentoring program. The program is directed at increasing educational resources in physics and mathematics available to students in low-income communities of color in Upper Manhattan and South Bronx. Currently serving as a mentor and role model for my students since they come from similar communities and family situations I grew up in.

### **Co-Instructor for Coastal Ocean Environment Summer School**

**Summer 2023**

COESSING is an international collaboration aimed at advancing ocean science in West Africa and furthering ties between scientists in West Africa and elsewhere around the globe. One-week summer schools have been held every year since 2015. Contributed by helping plan the schedule for the virtual component of the program and lectured on topics such as using JupyterLab and advanced use of Xarray package for research computing.

### **Technical Support for Train-the-Trainer Bootcamp**

**Jan 5-6 2023**

The Center for Learning the Earth with Artificial Intelligence and Physics (LEAP) at Columbia University hosted Train-the-Trainer Bootcamp on Climate Data Science. Provided support for this two-day immersive, hands-on workshop. The bootcamp aims to teach Climate Data Science in the cloud using python tools with an emphasis on reproducibility and collaboration; and as part of LEAP's education programming to vertically integrate research and education, and forge a LEAP research and learning community.

### **Software Carpentry Instructor**

**Summer 2021**

Co-developed and co-instructed a summer course tailored to teach doctoral students Python programming in the Biological Sciences department. Successfully implemented the course remotely via Zoom for lectures, Zulip for online discussions, and Google Colab for live-coding instructions.

### **Teaching Assistant for Research Computing in Earth Science**

**Fall 2021**

TA for graduate-level course that teaches the basic foundations of Earth and Environmental Data Science which are often overlooked. Introduces

modern computing software, programming tools, Python language and best practices that are broadly applicable to the analysis and visualization of Earth and Environmental data. The bulk of the content is devoted to in-depth exploration of the numerical analysis and visualization packages which comprise the modern Scientific Python ecosystem, including Scipy, Matplotlib, Pandas, Xarray, using real Earth and Environmental datasets.

**PyClub Outreach program**

**2020-2021**

Collaborated with colleagues in the Ocean & Climate Physics division to develop a high school level afterschool outreach program teaching local students Python programming through the scope of oceanography. The curriculum was piloted as a virtual program in Spring 2021.

**Teaching Assistant for Science for Sustainable Development**

**Fall 2020**

Teaching Assistant for an undergraduate course that provided fundamental knowledge on some topics within the natural sciences that are critical to addressing sustainable development. After completing the course, students should be able to incorporate scientific approaches into their research or policy decisions and be able to interpret scientific methods of data analysis.

**Curriculum Innovation Grant Fellow**

**2020**

Developed a technical training curriculum that promotes expanding skills in research computing. Software Carpentry certified, and trained in teaching technical topics, working closely with Columbia University's Foundation for Research Computing Program to facilitate a workshop that executes the developed curriculum.

**Girls Who Code Teacher**

**2019**

Developed syllabus and overall course structure, lectured for the class and designed practice problems.

**Tutor for Boston University Initiative for Literacy & Development**

**2012 – 2016**

Tutored K-12 grades with homework and test prep, and created activities that promoted math and literacy development in an afterschool program run by the local YMCA.

**RELATED EXPERIENCE**

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LDEO Ocean Transport Group

**Graduate Research Assistant**

**2018 – Present**

Current research project, under the advisement of Ryan Abernathey, focuses on quantifying the thermodynamics and interannual variability of water masses formed in the Weddell Sea region of the Southern Ocean. Investigation of the interior region is done through the use of water mass transformation theory and numerical models.

Learning the Earth with Artificial Intelligence and Physics

**2022**

**LEAP Momentum Fellow**

Part of inaugural cohort of 5 Fellows at LEAP that conduct research under the mission to improve near-term climate projections by merging physical modeling with machine learning. Current research will explore ML schemes to optimize mixing parameters in climate models using high-resolution satellite sea surface data.

Environmental Systems Research Institute (Esri)

**Product Engineer Intern**

**Summer 2020**

Interned as a Product Engineer within Esri's Spatial Analysis team. Completed goal for the summer to develop a prototype solution to calculate the optimal route for maritime transit and transport while considering three major cost factors: time, energy and safety. The tool will ultimately provide users to customize their optimal route solution based on their unique, weighted set of priorities.

School for Field Studies

**Student/Researcher**

**2015**

Created original elephant feeding behavior research project in the Tarangire-Manyara ecosystem, northern Tanzania – while under the advisement of Dr. Kioko, Wildlife Ecology professor. Devised the methods, wrote the proposal, conducted field data collection and analysis, composed final research paper and presented results to local community.

## MEMBERSHIPS

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Girls Who Code - Teacher

American Geophysical Union – Member

Software Carpentry – Instructor

## RELEVANT SKILLS

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Python, Xarray, data science, data engineering, working with Big Data, Dask, teaching, curriculum development.