

Henry Sun (he/him) · (301) 728-1010 · hs325@duke.edu

Research Interests: marine conservation biology, phylogenetics, biodiversity, machine learning, computer vision, data science, population genomics, evolutionary theory

EDUCATION

DUKE UNIVERSITY

B.S Marine Science and Conservation, B.S Biology

Durham, NC

Expected May 2025

GPA: 4.0, Dean's List with Distinction 2021-2024

Courses: Data Structures and Algorithms, Computer Systems, Intro to Data Science, Marine Invertebrates, Marine Physiology, Organic Chemistry, Molecular Biology, Genetics and Evolution, Marine Mammal Genomics, Oceanography, Marine Social Science, Marine Ecology, Marine Megafauna, Aquaculture, Philosophy of Biology

RESEARCH EXPERIENCE

Undergraduate Researcher, Duke University Marine Lab

Advised by Dr. Dave Johnston

Beaufort, NC

October 2023 – Present

- Work with Canadian Space Agency and smartWhales initiative to refine deep learning model for detection of endangered North Atlantic right whale from satellite imagery
- Awarded \$8,000 NC Space Grant over 2024-2025 school year to research the potential for AI-generated synthetic training data to improve model performance using low-rank augmentation (LoRA)

NSF REU, Rutgers University

Advised by Dr. Josh Kohut

New Brunswick, NJ

May 2024 – August 2024

- Compare community structure of local fish species from eDNA data against oceanographic data to determine what ocean conditions lead to greater biodiversity levels
- Assess effectiveness of random forest and other ML-based techniques for biodiversity prediction and data dimensionality reduction

Research Assistant, Duke University Marine Lab

Advised by Dr. Dan Rittschof

Beaufort, NC

April 2024 – Present

- Perform DNA extractions, CO1 barcoding and read mapping of 7 Sardinian blue crabs to investigate salinity-based sympatric speciation using mitochondrial haplotypes

Research Assistant, Duke University Marine Lab

Beaufort, NC

Advised by Dr. Tom Schultz

January 2024 – May 2024

- Sampled and genotyped both local resident oyster species and farmed *C. virginica* at the Duke Aquafarm using CO1 barcoding and Nanopore sequencing
- Used machine learning variational autoencoder analysis to identify three genetically distinct bottlenose dolphin populations in the Western North Atlantic
- Created tutorials to assist new students with remote computing and bioinformatics

Bonaventura Fellow, Duke University Marine Lab

Beaufort, NC

Advised by Dr. Tom Schultz

May 2023 – August 2023

- Identified over 32,000 chromosomal-level genetic variants in 12 Atlantic bottlenose dolphins belonging to three separate populations using Manta software
- Filtered variants based on size and read quality for future genotype analysis

Bass Connections Team Member, Duke University

Durham, NC

Advised by Dr. Zackary Johnson

August 2022 - May 2023

- Designed and tested a waterproof “PlanktoScope” to photograph plankton species off the dock at Duke Marine Laboratory
- Spearheaded installation of Raspberry Pi and modification of an image segmentation pipeline for plankton identification

Climate+ Project Member, Duke University

Durham, NC

Advised by Audrey Thellman

May 2022 - August 2022

- Developed a data pipeline starting from raw field camera images of small streams and ending in images with labeled ice and snow cover using image masking, markup, and machine learning
- Demonstrated pipeline functionality with user interface in R, presented applications to USGS researchers for quantifying ice melt

Plant Growth Assistant, Duke University

Durham, NC

Advised by Brandie Quarles and Dr. Kathleen Donohue

January 2022 - January 2024

- Researched the evolution of seed dormancy and plant response to climate change, raised *Arabidopsis thaliana* plants in greenhouse, performed DNA extractions from plant tissue for genotype analysis
- Led paper discussions in lab meetings relating to plant epigenetics, maternal effects, and thermal tolerance

SELECTED AWARDS

North Carolina Space Grant Undergraduate Research Fellowship (\$8,000) 2024

- Selected as 1 of 14 recipients from a highly competitive pool of North Carolina undergraduate students conducting research related to NASA mission directorates

LEADERSHIP AND SERVICE

Executive Board Member

Duke University Marine Lab Scholars Program

Durham, NC

September 2023 - Present

- Help plan community-building events such as trivia nights, guest speakers, and group outings; reviewed over 20 prospective scholar applications and conducted interviews
- Oversaw formation of mentor-mentee pairings within program and served as a mentor for four new students, providing advice regarding research and professional development

Graphics Team Member

Duke Climate Coalition

Durham, NC

September 2021 - May 2023

- Attended weekly club meetings and designed visuals to be posted on social media related to various environmental issues both on campus and worldwide

PROFESSIONAL EXPERIENCE

Aquafarm Assistant

Duke University Marine Lab

Beaufort, NC

January 2024 – Present

- Conduct weekly maintenance on the Duke Aquafarm, including flipping oyster bags and replacing broken lines
- Coordinate student volunteers for farm trips, help plan and manage community oyster roast events

Team Member

Chick-fil-A Westfield Montgomery Mall

Bethesda, MD

Summer 2019, Summer 2021

- Worked around 20 hours a week taking orders, bagging food, and preparing desserts

TECHNICAL SKILLS

PROGRAMMING LANGUAGES: Python, C/C++, R, MATLAB, Latex, Assembly, Bash, Java

TOOLS: Git, Linux, Blender, ImageJ, genome bioinformatics, remote computing, web development (HTML/CSS/JS, Typescript, React, Node.js)

LIBRARIES: PyTorch, NumPy/Pandas, OpenCV, scikit-learn, Jupyter, Matplotlib, xarray/xroms

LAB WORK: Tissue sampling and DNA extraction, quantitative polymerase chain reaction (qPCR), magnetic-bead DNA purification, gel electrophoresis, restriction digestion, oligo primer design, Oxford Nanopore sequencing

REFERENCES

Erin Voigt, Marine Lab Scholars Program Director, Duke University

- erin.voigt@duke.edu | (443) 889-2121

Tom Schultz, Associate Professor of the Practice of Marine Molecular Conservation, Duke University

- thomas.schultz@duke.edu | (619) 823-1514

David Johnston, Professor of the Practice of Marine Conservation Ecology, Duke University

- david.johnston@duke.edu | (252) 646-1007