NATHANIEL CRESSWELL-CLAY

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Atmospheric Sciences-Geophysics (ATG) Building
Box 351640, Seattle WA 98105-1640

EDUCATION

University of Washington, Seattle WA *September 2020 - Present*
Graduate Student, Atmospheric Sciences

Tufts University, Medford MA *September 2015 - May 2019*
Bachelor of Science in Mathematics, Cum Laude

Woods Hole Oceanographic Institution, Woods Hole MA *September 2017 - December 2017*
S.A.W. Student

PUBLICATIONS

Weyn, J.A., D.R. Durran, R. Caruana, N. Cresswell-Clay, 2021: "Sub-seasonal forecasting with a large ensemble of deep-learning weather prediction models". *J. Adv. in Modeling Earth Sys*, 13, e2021MS002502. DOI: 10.1029/2021MS002502.

Cresswell-Clay, N., C.C. Ummenhofer, D.L. Thatcher, A.D. Wanamaker, R.F. Denniston, Y. Asmerom, V.J. Polyak, 2021: "Unprecedented Expansion of the Azores High due to Anthropogenic Climate Change". *(in review).*

Thatcher, D.L., A.D. Wanamaker, R.F. Denniston, C.C. Ummenhofer, Y. Asmerom, V.J. Polyak, N. Cresswell-Clay, F. Hasiuk, J. Haws, D.P. Gillikin, 2021: "Iberian hydroclimate variability and the Azores High during the last 1200 years: Evidence from proxy records and climate model simulations". *(in review)*

WORK EXPERIENCE

October 2020 - Present: **Graduate Research Assistant**, University of Washington, Seattle WA

October 2021 - Present: **Graduate Teaching Assistant**, University of Washington, Seattle WA

June 2019 - June 2020: **Guest Investigator**, Woods Hole Oceanographic Institution, Woods Hole MA

June 2018 - August 2018: **Guest Student**, Woods Hole Oceanographic Institution, Woods Hole MA

RESEARCH EXPERIENCE

September 2020 - Present: **Machine learning applications to weather prediction**
Using deep convolutional neural nets to simulate circulation and create seasonal so subseasonal ensemble weather forecasts.

June 2019 - Present: **Variability and evolution of the Azores High in the last millennium**
Using Last Millennium Ensemble simulations from CESM and proxy reconstructions to understand variability of the Azores High and hydroclimate on the Iberian Peninsula.

June 2018 - August 2018: **Eastern boundary upwelling and Hadley Cell intensity**
Used POP2 ocean model output and NOAA atmospheric reanalysis data to explore the relationship between the Hadley Circulation and eastern boundary upwelling systems.

September 2018 - May 2019: **The role of first order circulation in tropical expansion**
Recreated the Held-Hou formulation for Hadley Circulation and explored its sensitivity to changes in climate projected under CMIP5 emissions pathways. (Senior Honors Thesis; Committee: James Adler, Anne Gardulski)

September 2017 - December 2017: **Storm driven rainfall in south Western Australia**
Used high resolution precipitation observations to explore the connection between rainfall in south Western Australia and upper ocean properties in the Indian Ocean.

ACTIVITIES

September 2021 - Present: **Graduate Student Representative** for the University of Washington Department of Atmoshperic Sciences, Seattle WA.

October 2021 - Present: **Undergraduate Mentor** for University of Washington Department of Atmospheric Sciences, Seattle WA.

July 2019: **ICTP-CLIVAR Summer School** on Eastern Boundary Upwelling, Trieste, Italy.

AWARDS

October 2021: **ASIS Prize for an Outstanding Contribution of Relevance to Society** awarded by Artificial Intelligence for Science, Industry and Society.

March 2020: **Top Scholar** awarded by the University of Washington to outstanding applicants to graduate programs

May 2019: **High Honors in Thesis** awarded upon completion of undergraduate thesis defense

July 2019: **ICTP-CLIVAR Summer School on Eastern Boundary Upwelling scholarship** awarded to attend summer school held at International Centre for Theoretical Physics, Trieste, Italy.

PRESENTATIONS

September 2021: **Weather Prediction with a Deep Neural Net**
Oral presentation at University of Washington Atmospheric Sciences End of First Year Reports, Seatte WA

May 2019: **First Order Atmospheric Approximations and Tropical Expansion**
Oral presentation at Tufts University Undergraduate Research and Scholarship Symposium, Medford MA

July 2019: **Hadley Circulation and its Relevance to Eastern Boundary Upwelling**
Poster presentation at ICTP-CLIVAR Summer School on Easter Boundary Upwelling Systems; International Centre for Theoretical Physics, Trieste, Italy

December 2017: **Source of Extreme Winter Rainfall in Southwestern Australia**
Oral presentation at Wood Hole Oceanographic Institution