NATHANIEL CRESSWELL-CLAY

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

EDUCATION

University of Washington, Seattle WA *June 2023 - Present*
Ph.D. Student, Atmospheric and Climate Science

University of Washington, Seattle WA *September 2020 - June 2023*
Master of Science, Atmospheric and Climate Science

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

EMPLOYMENT

September 2022 - present: **National Defense Science and Engineering Graduate Fellow**, University of Washington, Seattle WA

October 2020 - 2022: **Research Assistant**, University of Washington, Seattle WA

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

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

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

PUBLICATIONS

Cresswell-Clay, N., B. Liu, D.R. Durran, Z. Liu, Z.I. Espinosa, R.A. Moreno & M. Karlbauer, 2024: A Deep Learning Earth System Model for Stable and Efficient Simulation of the Current Climate. *arXiv*. https://arxiv.org/abs/2409.16247.

Karlbauer, M, **Nathaniel Cresswell-Clay**, D. Durran, R. Moreno, T. Kurth, & M. Butz, 2024: Advancing Parsimonious Deep Learning Weather Prediction using the HEALPix Mesh. *J. Adv. Model. Earth Syst.*

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. Model. Earth Syst.* 13-7. https://doi.org/10.1029/2021MS002502.

Cresswell-Clay, N., C.C. Ummenhofer, D.L. Thatcher, A.D. Wanamaker, R.F. Denniston, Y. Asmerom & V.J. Polyak , 2022: Twentieth-century Azores High expansion unprecedented in the past 1,200 years. *Nat. Geoscience* 15, 548–553. https://doi.org/10.1038/s41561-022-00971-w.

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 , 2023: Iberian hydroclimate variability and the Azores High during the last 1200 years: evidence from proxy records and climate model simulations. *Climate Dynamics*. https://doi.org/10.1007/s00382-022-06427-6.

Whitney, N.M., A.D. Wanamaker, C.C. Ummenhofer, B.J. Johnson, **N. Cresswell-Clay** & K.J. Kreutz, 2022: Rapid 20th century warming reverses 900-year cooling in the Gulf of Maine. *Commun Earth Environ* 3, 179. https://doi.org/10.1038/s43247-022-00504-8.

SELECTED PRESENTATIONS

Cresswell-Clay, N., B. Liu, Z.I. Espinosa, M. Karlbauer, D.R. Durran, R.A. Moreno, Z. Liu (2024). A Deep Learning Earth System Model. *Climate and Atmospheric Dynamics Seminar at University of Washington. Talk.*

Cresswell-Clay, N, M. Karlbauer, D.R. Durran (2023). Improving Realism in Data-Driven Forecasting with Heterogeneous Loss. *AMS 2023 Annual Meeting. Poster.*

Cresswell-Clay, N, D.R. Durran, B. Liu, Z.I. Espinosa, Z. Liu (2025). The Weather and Climate of a Deep Learning Earth System Model. *AMS 2025 Annual Meeting. Poster.*

Cresswell-Clay, N., M. Karlbauer, D.R. Durran, R.A. Moreno, Z. Liu (2023). Coupled Modeling with Deep Learning. *AMS Annual Meeting. Talk.*

Cresswell-Clay, N., M. Karlbauer, D.R. Durran (2023). A Sea Surface Model for Coupled Data-Driven S2S Forecasting. *Climate and Atmospheric Dynamics Seminar at University of Washington. Talk.*

Z.I. Espinosa, **N. Cresswell-Clay**, D.R. Durran, R.A. Moreno, C.M. Bitz (2024). Seasonal Sea Ice Forecasting with a Deep Learning Earth System Model. *2025 AMS Annual Meeting. Talk (presenting Author)*

Cresswell-Clay, N., B. Liu, Z.I. Espinosa, M. Karlbauer, D.R. Durran, R.A. Moreno, Z. Liu (2024). A Deep Learning Earth System Model for Weather and Climate Simulation. *NDSEG Fellow Conference. Poster.*

Cresswell-Clay, N., M. Karlbauer, D.R. Durran (2023). Coupled Ocean-Atmosphere Modelling with Deep Learning. *AGU Fall Meeting. eLightning Presentation.*

Cresswell-Clay, N, C. Ummenhofer, I. Lima (2019). Hadley Circulation and its Relevance to Eastern Boundary Upwelling. *ICTP-CLIVAR Summer School on Easter Boundary Upwelling Systems hosted by the International Centre for Theoretical Physics. Poster*

AWARDS

September 2022 - September 2025: **Nation Defense Science and Engineering Graduate Fellowship** awarded to graduate students pursuing doctoral degrees

January 2025: **Second Place Best Student Oral Presentation** contributing to the 24th Conference on Artificial Intelligence for Environmental Science during American Meteorological Society's 105th Annual Meeting.

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

June 2022: **Certificate of Distinguished Service** awarded by University of Washington's Atmospheric and Climate Science Department to students who exhibit extraordinary service to the department and community.

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.