Madeleine J. Holland | Curriculum Vitae

(203) 300-4844 • mholland@woodwellclimate.org • LinkedIn

EDUCATION

University of Arizona Tucson, AZ
M.S. Hydrometeorology May 2020
GPA: 4.0/4.0, *Summa Cum Laude*

University of Connecticut Storrs, CT
B.S. Civil Engineering May 2018
GPA: 4.0/4.0, *Summa Cum Laude*

RESEARCH EXPERIENCE

University of Arizona Tucson, AZ
Graduate Research Assistant, Hydrology and Atmospheric Science Aug 2018 – Aug 2020

- Develop analytic frameworks, perform statistical analysis, and create visualizations using Python, R, and MATLAB
- Analyze large multitemporal geospatial data from remote sensing products, reanalysis data, global climate model output, and in situ measurements to investigate science and technology questions relevant to land, ocean, and atmosphere interactions
- Present results to broad audiences at conferences and prepare manuscripts for publication
- Collaborate with group members to share coding frameworks and data and to prepare publications and presentations

University of Connecticut Storrs, CT
Undergraduate Research Assistant, Civil & Environmental Engineering Aug 2017 – May 2018

- Supported NSF-PIRE (Partnerships for International Research and Education) Water and Food Security Project through data analysis using R

University of New Hampshire Durham, NH
Undergraduate Research Assistant, Earth Sciences Jan 2016 – May 2016

- Supported researchers by preparing quartz samples through rock crushing, sieving, magnetic separation, and froth flotation to purify quartz for cosmogenic isotope analysis

RELEVANT COURSEWORK

University of Arizona

ATMO 579: Boundary Layer Meteorology & Surface Processes Spring 2020

- Revised CAM single-column model code to run sensitivity tests with alternate cloud "brightening" parameterization
- Compared radiation budget and higher order moments between sensitivity tests and control run using Python

ATMO 555: Remote Sensing Fall 2019

- Analyzed and visualized data from a variety of remote sensing products including IMERG, SMAP, and GPM in Python

RELEVANT COURSEWORK cont.

ATMO 529: Objective Analysis in Atmospheric and Related Science Fall 2019
Interpreted atmospheric science datasets using a variety of statistical methods in Python including:

- Computed power spectra of temperature observations and assessed significance of spectral peaks using data windowing and spectral smoothing
- Performed EOF analysis to extract the dominant modes in winter geopotential height anomalies, correlated modes with climate indices, and assessed statistical significance
- Examined continental-scale patterns of precipitation anomalies associated with MEI and sunspot cycles using composite analysis

HWRS 453: Probabilistic Risk Assessment for Environmental Systems Fall 2019

- Reviewed methods to characterize wildfire regimes in the United States such as the frequency-area power-law method

ATMO 595C: General Circulation Observations and Modeling Spring 2019

- Revised CAM 5.0 model code to run sensitivity tests with alternate canopy parameterization
- Compared wind speed, temperature, turbulent fluxes, and precipitation between control run output and revised model output using R

HWRS 528: Fundamentals Systems Approach to Hydrologic Modeling Fall 2018

- Developed a computational model of a hydrologic catchment in MATLAB including automatic calibration of model parameters
- Assessed model accuracy, precision, consistency, and robustness

PROFESSIONAL EXPERIENCE

Woodwell Climate Research Center Falmouth, MA
Research Assistant, Risk Program

- Analyze climate model output and climate records to understand the risks of a changing climate on national security issues and climate-induced tensions around the world
- Develop current and future maps of various climate risk indices and develop metrics of climate stress related to investment

Town of Barnstable Barnstable, MA
Engineering Intern, Department of Public Works May 2018 – Jul 2018

- Supported engineers with wastewater, stormwater, and coastal resiliency projects through site visits, grant proposal writing, proposal evaluation, and CAD work
- Collected, filtered, and tested water samples to support the Massachusetts Estuaries Project

Haley & Aldrich Inc. Hartford, CT
Geotechnical Engineering Intern May 2017 – Aug 2017

- Monitored subsurface exploration and provided on-site engineering observation
- Operated sophisticated equipment such as a nuclear density gauge and seismograph
- Collected soil and groundwater samples and performed laboratory tests such as particle size analysis
- Produced daily field reports including written reports, figures, and photographs using Microsoft Word and Excel

TEACHING EXPERIENCE

University of Connecticut Storrs, CT
Teaching Assistant, ENVE 3120 Fluid Mechanics Jan 2018 – May 2018

- Reinforced Fluid Mechanics concepts during a minimum of 3 hours of active student contact per week including office hours and problem sessions
- Graded homework assignments and quizzes for around 40 students

Teaching Assistant, CE 2110 Fluid Mechanics Aug 2017 – Dec 2017

- Reinforced Statics concepts during a minimum of 3 hours of active student contact per week including office hours and problem sessions
- Graded homework assignments and quizzes for around 40 students

PRESENTATIONS

Los Alamos – Arizona Days Tucson, AZ
Snowpack over the Contiguous US: drivers, trends, and vegetation cover effects May 2020

El Día del Agua y la Atmósfera Tucson, AZ
Snowpack drivers and trends over the Contiguous United States Apr 2020

Land-Atmosphere-Ocean Interactions Research Showcase Tucson, AZ
Precipitation and temperature driven trends in April 1st snowpack over ConUS Feb 2020
The future of airborne snow water equivalent retrieval Feb 2019

SnowEX Workshop Baltimore, MD
Gridded snow water equivalent and snow depth from University of Arizona Sep 2019

University of Connecticut Senior Design Day Storrs, CT
Dam breach analysis for Town of Stafford, CT May 2018

TECHNICAL SKILLS

Coding Languages:
Python: Proficient in large-scale data analysis and visualization
R: Proficient in large-scale data analysis, visualization, and geospatial data manipulation
MATLAB: Proficient in large-scale data analysis and visualization
Fortran 90: Advanced in climate model code revision

Software:
Microsoft Office (Excel, Word, PowerPoint), Google Earth Engine, ArcGIS, AutoCAD, HEC-RAS

HONORS & AWARDS

Galileo Circle Scholar, *University of Arizona* Apr 2019
Babbidge Scholar, *University of Connecticut* Mar 2018
The Moles Student Award, *The Moles, New York, NY* Nov 2017
John Lenard Engineering Scholarship, *University of Connecticut* Aug 2017
Presidential Scholarship, *University of New Hampshire* Aug 2014

LEADERSHIP & OUTREACH

Hydrology and Atmospheric Science Student Association — Tucson, AZ
Outreach & Social Chair — May 2019 – May 2020
Peer Mentor — Aug 2019 – May 2020

Humane Society of Southern Arizona — Tucson, AZ
Volunteer — Jan 2019 – May 2020

Steep Rock Association — Washington, CT
Volunteer & Citizen Scientist — Jan 2018 – Present

New Milford Public School System — New Milford, CT
Volunteer Tutor and Mentor — 2012 – 2018

Monomoy National Wildlife Refuge — Chatham, MA
Volunteer — 2011 – 2013

PERSONAL INTERESTS & ACTIVITIES

Hiking, Backpacking, Skiing, Snowboarding, 4000 footers, Beekeeping, Gardening, Sailing