Alexander R. Davies

Instructor of Practical Applications for Oceanography, U.S. Naval Academy

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A highly-motivated, self-driven, and results-oriented professional meteorologist and oceanographer. Strong background in scientific research, operational forecasting and impact-based decision support services, academia, environmental data management, project development and coordination, and effective scientific communication to a broad range of audiences.

Work Experience

Oceanography Department, United States Naval Academy (USNA) **Annapolis, MD**
Instructor of Practical Applications for Oceanography *10/2014–Present*

- Project lead developer and manager of a real-time environmental data stream for the USNA Oceanography Department. This ongoing project includes a dedicated data server that I maintain and a micronet of environmental sensing stations (measuring coincident atmospheric and esturaine properties). The server features UCAR/Unidata applications, customized Python software for downloading and managing TBs of data, and a simple web user interface (data download, parsing, and plotting) powered by uniquely configured Geode Systems/RAMADDA software (See "Sponsored Projects"). Data streams include products from NOAA, NASA, MARACOOS, Copernicus, Unidata, etc.
- As the USNA and Naval Support Activity (NSA)-Annapolis Command Meteorologist, I issue five day forecasts for the Academy, NSA-Annapolis, and the surrounding community, including the City of Annapolis Office of Emergency Management (OEM). I provide impact based decision support (IDSS) through professional communication to the three above listed organizations with detailed weather intelligence during high impact weather events.
- Develop, teach and support new labs for the introductory oceanography course sequence, upper level atmosphere/ocean dynamics courses, major elective courses, and Midshipmen capstone/independent research projects. I incorporate student research into externally funded grants, when applicable. Labs included the use of Matlab and rotating tank experiments.
- Department website, social media, and public outreach coordinator.
- Project lead and developer of a new Geophysical Fluid Dynamics Lab (See "Sponsored Projects").
- This is a full time, federal civilian position (DOD/USNA AD 01, Step 13 as of January 2019).

School of Marine Science and Policy, University of Delaware **Lewes, DE**
Research Fellow–Ocean Exploration, Remote Sensing and Biogeography Lab *01/2013–07/2015*

- Researched the role of mesoscale kinetic energy in the biological pump and carbon sequestration in the Southern Ocean. This interdisciplinary project integrated NASA satellite data (OSCAR Currents; MODIS products from OBPG) and model products with data collected in-*situ* by an APEX biofloat. (Research Advisor: Matthew J. Oliver, Ph.D.)

School of Marine Science and Policy, University of Delaware **Newark, DE**
Research Assistant–Air-Sea Interaction Lab *08/2010–07/2015*

- Researched and developed a theoretical model for gas flux across the the wavy air-sea interface. Implemented an empirical, wind-driven wave model to estimate the bubble-mediated flux from wave energy dissipation and whitecap coverage. (Research Advisor: Fabrice Veron, Ph.D.)

Education

University of Delaware **Newark, DE**
M.S. Marine Studies *2015*
Concentration: Physical Ocean Science and Engineering

- **Thesis Topic:** Interdisciplinary approach to understanding the air-sea carbon cycle. Research included modeling gas flux along the wavy air-sea interface, along with analyzing the role of mesoscale kinetic energy in the Southern Ocean biological pump through in-*situ* and satellite observations.
- **Thesis Advisors:** Fabrice Veron, Ph.D. and Matthew J. Oliver, Ph.D.
- All but dissertation.

Millersville University **Millersville, PA**
B.S. Meteorology *2010*
Minors: Mathematics; Government and Political Affairs

Millersville University **Millersville, PA**
B.S. Ocean Sciences and Coastal Studies *2010*
Concentration: Physical Oceanography

Additional Relevant Work Experience

Department of Earth Sciences, Millersville University **Millersville, PA**
Laboratory and Research Assistant–Ocean Sciences and Coastal Studies Program *08/2008–07/2010*

- Studied seasonal changes in physical oceanography along the Delmarva Peninsula. Developed a procedure to remove tidal currents from ship borne ADCP measurements using harmonic analysis techniques and ChesROMS model output. (Research Advisor: Ajoy Kumar, Ph.D.)

NASA/University Space Research Association **Wallops Island, VA**
Undergraduate Student Research Program–NASA/Wallops Flight Facility *05/2009-08/2009*

- Used CODAR high-frequency coastal radar to observe the spatial resolution of tidal dynamics along the continental shelf in support of the GEO-CAPE mission. (Research Advisor: John Moisan, Ph.D.)

NOAA/Office of Education **Camp Springs, MD**
Hollings Scholar–NOAA/Center for Satellite Applications and Research *05/2008-08/2008*

- Rapid monitoring of flooded areas using a combination of microwave and optical satellite sensors including AMSR-E observations. (Research Advisor: Xiwu Zhan, Ph.D.)

Maryland Sea Grant Research Experience for Undergraduates (REU) **Cambridge, MD**
REU Fellow–University of Maryland/Horn Point Lab *05/2007-08/2007*

- An analysis of the future climate predicted for the Chesapeake Bay by IPCC AR4 models. (Research Advisor: Victoria Coles, Ph.D.)

Grants and Awards

Barrett, B.S., **A.R. Davies**, and E.R.Sanabia, 2016-2018, "Intraseasonal variability of the ocean: impacts of the Madden-Julian Oscillation on the California Current, Gulf Stream, and Loop Current," NASA NNX16AH61G ($93,108).

Supported Projects

1. Developing an Environment Data, Monitoring, and Prediction System (EdMAPS) and the Severn River Watershed Observatory (SRWO).

Project Leads: **A.R. Davies**, A. Keppel, J.P. Smith, E.R. Sanabia, and L. Rodriguez, et al.
Sponsor: U.S. Navy O&M,N Funding and USNA Gift Funds
Amount: $148,526 as of 03/2019

Brief: The Environmental Data, Monitoring, and Prediction System (EdMAPS) features a dedicated server to establish a real-time meteorological and oceanographic data stream for the USNA. External data will be combined with observations made by the Severn River Watershed Observatory (SRWO) that employs fixed stations measuring coincident meteorological and estuarine conditions. The next phase is to develop a WRF/ARM model that will be couple with a Delft3D estuarine model and initialized with observations from the SRWO. The project supports USNA in the areas of: project-based learning, Midshipmen research, and STEM education. The data will also be used for environmental hazard mitigation studies, emergency planning, and environmental disaster response.

2. Rotating Tank/Geophysical Fluid Dynamics Lab

Project Leads: **A.R. Davies**, W. Swick and A. Keppel.
Sponsor: U.S. Navy O&M,N Funding and USNA Gift Funds
Amount: $25,000 as of 01/2018; $20,000 planning for fiscal year 2019

Brief: The project will expanded upon the current capabilities within the Oceanography Department to include customized rotating tanks, expanded capability to measure properties within the tanks (techniques unique to USNA), and non-rotating tanks including mixing, convection, and wave tanks.

Publications

**denotes Midshipmen co-author*

Gradone, J.C., M.J. Oliver, **A.R Davies**, A. Irwin, and C. Mofffat, 2019, Sea Surface Kinetic Energy as a Proxy for Phytoplankton Light Limitation in the Pelagic Southern Ocean, *in preparation*.

Davies, A.R., F. Veron, and M.J. Oliver, 2019, Biofloat observations of a naturally occurring phytoplankton bloom and carbon export event in the Drake Passage, *Deep-Sea Research Part I*, dio: 10.1016/j.dsr.2019.02.004.

Hino, M., S. Belanger, C. B. Field, **A. R. Davies** and K. J. March, 2019, High-tide flooding disrupts local economic activity, *Science Advances*, doi: 10.1126/sciadv.aau2736.

Barrett, B.S., **A.R. Davies**, and J.I, Rose*, 2017, Wind-driven response of the upper ocean along the U.S. West coast to tropical MJO convection, *Journal of Geophysical Research - Oceans*, 122(10) dio: 10.1002/2017JC013086.

Conference Presentations

**denotes Midshipmen co-author*

Barrett, B.S., **A.R. Davies** and K. Martin*, 2018, "Intraseasonal Variability of the Gulf Stream Current: Physical Mechanisms and Connections to Atmospheric Forcing," 7th Symposium on the MJO and Sub-Seasonal Monsoon Variability, 99th AMS Annual Meeting, Phoenix, AZ.

Hino, M., C.B. Field, S.T Belanger, **A.R. Davies**, and K.J. Mach, 2018, "Measuring the impact of high-tide floods on local economic activity," AGU Fall Meeting, Washington, D.C., Abstract # NH41A-03.

Gradone, J., M.J. Oliver and **A.R. Davies**, 2018, "Low Mesoscale Kinetic Energy as a Precondition for Phytoplankton Blooms in the Southern Ocean," Scientific Committee on Antarctic Research/lnternational Arctic Science Committee POLAR 2018, Davos, Switzerland, Abstract # BE-2 1470.

Davies, A.R., B.S. Barrett, and J.I. Rose*, 2018, "Wind-driven response of the upper ocean along the U.S. West coast to tropical MJO convection," Ocean Science Meeting 2018, Portland, OR, Abstract # A114B-1570.

Davies, A.R., M.J. Oliver, and F. Veron, 2018, "Biofloat observations of a naturally occurring phytoplankton bloom and carbon export event in the Drake Passage," Ocean Science Meeting 2018, Portland, OR, Abstract # BN44B-1208.

Barrett, B.S., **A.R. Davies**, and C.N. Steppe, 2017, "Intraseasonal variability of upper-ocean currents and photosynthetic primary production along the U.S. West Coast associated with MJO," AGU Fall Meeting, 2017, New Orleans, LA, Abstract # A41b-2263.

Barrett, B.S., **A.R. Davies**, J.I. Rose*, and E.R. Sanabia, 2017, "Madden-Julian Oscillation Modulation of Surface Ocean Currents Off the U.S. West Coast," 29th AMS Conference on Climate Variability and Change, Seattle, WA, January 2017.

Davies, A.R., M.J. Oliver and F. Veron, 2014, "The role of mesoscale kinetic energy in naturally occurring phytoplankton blooms and export in the Drake Passage," AGU Fall Meeting, San Francisco, CA.

Davies, A.R., M.J. Oliver and F. Veron, 2013, "Mesoscale Processes and Carbon Export," 6th International SOLAS Summer School, Xiamen, China.

Seminars and Other Professional Presentations

Davies, A.R. and M.K. Hudson, 2018, "Annapolis, MD Coastal Flooding Research and Mitigation Update," NWS Baltimore/Washington Coastal Flood Users Group Meeting 2018, Sterling, VA.

Davies, A.R., W. Swick and E.R. Sanabia, 2017, "Teaching Geophysics to Undergraduate Students: How Laboratory Exercises Connect Theory, Modeling, and Observations of Planetary Scale Dynamics," U.S. Naval Academy Conference on Teaching and Learning, Annapolis, MD.

Activities and Service

Grant Reviewer: Unidata Community Equipment Awards *2019-Present*

Member: U.S. Naval Academy/NSA-Annapolis Sea Level Rise Advisory Committee *2018-Present*

Member: UCAR/Unidata Users Committee *2018-2021*
Member: NWS Baltimore/Washington WFO Coastal Flooding Working Group *2018-Present*
Contributor: Annapolis Flood Mitigation Project, FEMA Hazard Mitigation Grant *2017-2018*
Alumni Reviewer: Millersville Univ. Earth Sci. Department Program Review *2016-2017*
Member: U.S. Naval Academy/NSA-Annapolis Emergy. Management Working Group *2016-Present*
Meteorological Liaison: City of Annapolis Office of Emergency. Management *2015-Present*
Command Weather Forecaster: U.S. Naval Academy and NSA-Annapolis *2015-Present*
Faculty Rep.: U.S. Naval Academy Faculty Senate IT Subcommittee *2015-Present*
Member: U.S. Naval Academy Commissioning Week Planning Committee *2015-Present*
Session Chair: Ocean Mesoscale Processes III Poster Session, AGU Fall Meeting *2014*

Professional Associations

Member: American Geophysical Union *2009–Present*
Member: American Meteorological Society *2005–Present*

Selected Awards and Scholarships

Robertson Graduate Fellowship *2013–2014*
6th International SOLAS Summer School Selectee (competitive) *2013*
Millersville University Department of Earth Sciences Award for Academic Excellence *2010*
NASA/USRA Undergraduate Student Research Program *2009*
American Meteorological Society Bhanwar Lal Bahethi Scholarship *2009*
NOAA Hollings Memorial Scholar *2007–2009*
Maryland Sea Grant Research Experience for Undergraduates Fellowship *2007*
Boy Scouts of America Eagle Scout *2005*

Selected Technical, Professional, and Personal Skills

- **Intermediate/Advanced Skills:** Matlab, Python, LaTeX, operational synoptic-scale and short term forecasts (atmosphere, estuarine, and coastal ocean), effective scientific communication to a broad range of audiences, team work/team environments, data-driven problem solving, data management, data analysis and processing, data integration

- **Working/Basic Skills:** Fortran, LINUX, Unidata Local Data Manager (LDM) and associated applications, Geode Systems/RAMADDA, Cascade Webserver, wget, HURREVAC, Unidata IDV, Seabird CTD software suite, Iver3 Vector Map (AUVs), home brewer.

References

Available upon request