Sarah Ditchek

Assistant Scientist
Cooperative Institute for Marine and Atmospheric Studies (CIMAS)
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EMPLOYMENT

Cooperative Institute for Marine and Atmospheric Studies (CIMAS) | University of Miami, *Remote Employee* | October 2019-present
Position Titles: Assistant Scientist | April 2021-present
Post-Doctoral Associate | October 2019-March 2021
Group Member: Observing Systems Assessment (OSA) Group
Affiliations: Hurricane Research Division (HRD) of NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML)

EDUCATION

University at Albany, Albany, NY | August 2014-July 2019
Ph.D. in Atmospheric Science, Department of Atmospheric and Environmental Sciences (DAES)
Dissertation Title, On the Frequency, Structure, and Characteristics of Tropical Cyclone Diurnal Pulses
Advisors, Dr. John Molinari (August 2014-December 2018, retired) and Dr. Kristen L. Corbosiero (January-July 2019)
Committee, Drs. Robert G. Fovell and Brian H. Tang

Yale University, New Haven, CT | August 2010-May 2014
Bachelor of Science, Department of Geology and Geophysics (Concentration: Atmosphere, Ocean, and Climate)
Thesis Title, A Genesis Potential Index for Asian-Australian Monsoon Low Pressure Systems
Advisors, Dr. William Boos (research) and Dr. Ronald Smith (academic)

RESEARCH EXPERIENCES IN THE ATMOSPHERIC SCIENCES

University of Miami, CIMAS-AOML, *Remote Employee* | October 2019-present
Quantifying the impact of dropsondes on tropical cyclone track, intensity, and structure forecasts | October 2019-present
- Running and analyzing six simulations covering a three-year period (2017–2019) using the basin-scale HWRF
- Leading and presenting at bi-weekly team meetings, preparing monthly and quarterly updates, and contributing to quarterly report presentations

Created a visualization package for Observing System Experiments (OSEs) and Observing System Simulation Experiments (OSSEs) | October 2019-present
- Includes a hurricane (GROOT-H) and a global (GROOT-G) component, where GROOT stands for "GRaphics for OSEs & OSSEs on TCs"
- Generates graphics of error statistics and assimilated observations for both individual storms and composite studies for any number of experiments run with HWRF, basin-scale HWRF, or GFS, with user input confined to a brief namelist
- Utilized by other group and non-group members for their research and presentations
- New capabilities are continuously being added to the package

Quantified the potential impact of a Geostationary Hyperspectral Infrared Sounder on tropical cyclone track forecasts | May 2020-October 2020
- Used HWRF to run two OSSEs, each having two experiments, on a simulated tropical cyclone present in a nature run
- Contributed to the *Geostationary and Extended Orbits (GEO-XO) Hyperspectral InfraRed Sounder Value Assessment Report* and multiple end-of-project and end-of-fiscal-year presentations as an IR Hyperspectral Value Assessment Team Member

University at Albany, DAES, *Graduate Research Assistant*, University at Albany, Albany, NY | August 2014-July 2019
Conducted research on the tropical cyclone diurnal cycle | May 2016-July 2019
- Created an online archive of diurnal pulses for Atlantic basin tropical cyclones covering the years 2005-2019 (available at the Web address in the header)
- Analyzed electrically active diurnal pulses in Hurricane Harvey (2017)
- Created a climatology of Atlantic basin tropical cyclone diurnal pulses and Atlantic basin electrically active diurnal pulses
- Studied the tropical cyclone diurnal cycle using numerical modeling

Conducted tropical cyclogenesis research as an extension of an upper-level graduate class group project | February 2016-March 2017
- Created a statistical index relating environmental variables of cyclones at genesis to their maximum attained intensity
- Originated concept for project which was ultimately selected as one of four class group projects to be conducted

Conducted tropical cyclone outflow layer research | August 2014-September 2016
- Created a climatology of the structure of Atlantic basin tropical cyclones, stratified by intensity, for dynamic and thermodynamic fields
- Quantified how external eddy momentum and heat sources impact tropical cyclones

Advisor, Dr. John Molinari

AOML, Hurricane Research Division, *NOAA Hollings Scholar Intern*, Miami, FL | May 2013-December 2013 & June 2015-August 2015
Conducted a case study on eyewall mesovortices in Hurricane Fabian (2003) as part of the NOAA Hollings Undergraduate Scholarship
- Performed high-resolution analyses of small-scale features in a tropical cyclone core using data assimilation and numerical modeling
- Focused on dynamic and thermodynamic properties of evolving eyewall structure from a major hurricane's core

Advisor, Dr. Sim Aberson

Yale University, Department of Geology and Geophysics, *Undergraduate Research Assistant*, New Haven, CT | May 2011-May 2014
Conducted monsoon disturbance genesis research
- Created a statistical index associating climatological mean state variables with monsoon disturbance genesis

Advisor, Dr. William Boos

PUBLICATIONS

Ditchek, S.D., K. L. Corbosiero, R. G. Fovell, and J. Molinari, 2020: Electrically active diurnal pulses in Hurricane Harvey (2017). *Mon. Wea. Rev.*, **148**, 2283-2305.

Ditchek, S.D., K. L. Corbosiero, R. G. Fovell, and J. Molinari, 2019: Electrically active tropical cyclone diurnal pulses in the Atlantic basin. *Mon. Wea. Rev.*, **147**, 3595-3607.

Ditchek, S.D., J. Molinari, K. L. Corbosiero, and R. G. Fovell, 2019: An objective climatology of tropical cyclone diurnal pulses in the Atlantic basin. *Mon. Wea. Rev.*, **147**, 591-605.

Molinari, J., M. Rosenmayer, D. Vollaro, and **S.D. Ditchek**, 2019: Turbulence variations in the upper troposphere in tropical cyclones from NOAA G-IV flight-level vertical acceleration data. *J. Appl. Meteor. Climatol*., **58**, 569-583.

Ditchek, S.D., T. C. Nelson, M. Rosenmayer, and K. L. Corbosiero, 2017: The relationship between tropical cyclones at genesis and their maximum attained intensity. *J. Climate.* **30**, 4897-4913.

Ditchek, S.D., J. Molinari, and D. Vollaro, 2017: Tropical cyclone outflow-layer structure and the balanced response to eddy forcings. *J. Atmos. Sci.*, **74**, 133-149.

Ditchek, S.D., W.R. Boos, S.J. Camargo, and M.K. Tippett, 2016: A genesis index for monsoon disturbances. *J. Climate,* **29,** 5189-5203.

TECHNICAL SKILLS

Operating Systems: *Windows, UNIX*
Programming Languages: *Matlab, R, Fortran77, LaTex, HTML*
Numerical Modeling: *HWRF, Basin-Scale HWRF, Cloud Model 1 (CM1)*
Datasets: *GridSat, WWLLN, ERA-Interim Reanalysis, ERA-5 Reanalysis, ERA-40 Reanalysis, NCEP Reanalysis, GEFS Reanalysis*
Productivity Software: *Microsoft Office Suite including Word, Excel, PowerPoint, OneNote, Publisher*

CONFERENCE AND SYMPOSIA PRESENTATIONS

First-Author Oral Presentations

- **Ditchek, S.D.**, J. Sippel, G. Alaka, K. Apodaca, and L. Cucurull, 2021: A Systematic Assessment of Dropsonde Impact during the 2017-2019 Hurricane Seasons using the Basin-Scale HWRF. *34th Conference on Hurricanes and Tropical Meteorology, Virtual Conference*
- **Ditchek, S.D.**, J. Sippel, G. Alaka, K. Apodaca, and L. Cucurull, 2021: A Systematic Assessment of Dropsonde Impact during the 2017-2019 Hurricane Seasons using the Basin-Scale HWRF. *2021 AVAPS Users Group Meeting, Virtual Meeting*
- **Ditchek, S.D.**, J. Sippel, G. Alaka, K. Apodaca, and L. Cucurull, 2021: Quantifying the Overall and Radial Impact of Dropsondes during the 2017-2019 Hurricane Seasons using the Basin-Scale HWRF. *25th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)/101st AMS Annual Meeting, Virtual Conference*
- **Ditchek, S.D.**, J. Molinari, R.G. Fovell, and K.L. Corbosiero, 2018: The Tropical Cyclone Diurnal Cycle in CM1 using an Ensemble Approach. *33rd Conference on Hurricanes and Tropical Meteorology, Ponte Vedra, Florida*
- **Ditchek, S.D.** and J. Molinari, 2016: The Composited Tropical Cyclone Outflow Layer and the Balanced Vortex Response. *32nd Conference on Hurricanes and Tropical Meteorology, San Juan, Puerto Rico*
- **Ditchek, S.D.** and W.R. Boos, 2014: A Genesis Potential Index for Asian-Australian Monsoon Low Pressure Systems. *Yale University's Department of Geology and Geophysics' Senior Thesis Research Symposium, New Haven, CT*
- **Ditchek, S.D.** and W.R. Boos, 2012: A Genesis Potential Index for Summer Monsoon Low Pressure Systems over the Indian Continent Region. *Yale University's Department of Geology and Geophysics' Undergraduate Research Symposium, New Haven, CT*

First-Author Poster Presentations

- **Ditchek, S.D.**, J. Molinari, R.G. Fovell, and K.L. Corbosiero, 2017: The Tropical Cyclone Diurnal Cycle in CM1 using an Ensemble Approach. *18th Cyclone Workshop, Sainte Adele, Quebec, Canada*
- **Ditchek, S.D.**, J. Molinari, R.G. Fovell, and K.L. Corbosiero, 2017: Understanding the Tropical Cyclone Diurnal Cycle using Numerical Modeling. *8th Northeast Tropical Workshop, Rensselaerville, NY*
- **Ditchek, S.D.** and J. Molinari, 2015: A Composite Study of the Tropical Cyclone Outflow Layer. *17th Cyclone Workshop, Pacific Grove, CA*
- **Ditchek, S.D.** and J. Molinari, 2015: A Composite Study of the Tropical Cyclone Outflow Layer. *7th Northeast Tropical Workshop, Dedham, MA*
- **Ditchek, S.D.** and S. Aberson, 2014: Eyewall Mesovortices in Hurricane Fabian (2003) using the HWRF Ensemble Data Assimilation System (HEDAS). *13th Annual AMS Student Conference/94th AMS Annual Meeting, Atlanta, GA*
- **Ditchek, S.D.** and S. Aberson, 2013: Eyewall Mesovortices in Hurricane Fabian (2003) using the HWRF Ensemble Data Assimilation System (HEDAS). *Yale University's Department of Geology and Geophysics' Undergraduate Research Symposium, New Haven, CT*
- **Ditchek, S.D.** and S. Aberson, 2013: Eyewall Mesovortices in Hurricane Fabian (2003) using the HWRF Ensemble Data Assimilation System (HEDAS). *NOAA Hollings Undergraduate Student Science and Education Symposium, Silver Spring, MD*

Co-Authored Oral Presentations | *presenter

- Casey, S.P.F.*, **S.D. Ditchek**, A. Vidal, L. Cucurull, L. Wang, K. Garrett, and P. Weir, 2021: Assimilation of a Geostationary Hyperspectral Infrared Sounder with Updated Viewing Geometry in Global/Regional Observing System Simulation Experiments. *25th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)/101st AMS Annual Meeting, Virtual Conference*

- Kren, A.C.*, Sippel, J.A., **S.D. Ditchek**, X. Wu, L. Cucurull, G.A. Wick, and B. Annanne, 2020: Extended Impact of Global Hawk Dropsonde Observations for Tropical Cycle Cases in 2016-17. *24th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)/100th AMS Annual Meeting, Boston, MA*
- Corbosiero, K.L.* and **S.D. Ditchek**, 2019: Investigating the Diurnal Cycle of Lightning in Tropical Cyclones. *18th Conference on Mesoscale Processes, Savannah, GA* | invited presentation
- Corbosiero, K.L.* and **S.D. Ditchek**, 2019: Investigating the Diurnal Cycle of Lightning in Tropical Cyclones. *9th Northeast Tropical Workshop, Dedham, MA*
- Corbosiero, K.L., Stevenson, S.N.*, **S.D. Ditchek**, 2019: Investigating the Diurnal Cycle of Lightning in Tropical Cyclones. *9th Conference on the Meteorological Application of Lightning Data, Phoenix, AZ*
- Aberson, S.*, **S.D. Ditchek**, A. Aksoy, and K.J. Sellwood, 2014: HEDAS Analyses of a Rapidly Evolving Eyewall of a Major Hurricane – Fabian (2003). *31st Conference on Hurricanes and Tropical Meteorology, San Diego, CA*

Co-Authored Poster Presentations | *presenter

- Rentzke, N.*, **S.D. Ditchek**, and J. Sippel, 2021: Global Hawk Dropsondes Impact on Tropical Cyclone Prediction. *20th Annual Student Conference/101st AMS Annual Meeting, Virtual Conference*

FELLOWSHIPS AND AWARDS

DAES Narayan R. Gokhale Distinguished Research Scholarship Award | Fall 2020

University at Albany's Distinguished Doctoral Dissertation Award | Spring 2020

DAES Distinguished Service Award | Fall 2019

National Defense Science and Engineering Graduate (NDSEG) Fellowship | Fall 2014-Summer 2017

National Science Foundation Graduate Research Fellowship Program (NSF GRFP) Honorable Mention | Spring 2016

AfterCollege Science Student Scholarship | Spring 2015

NOAA Hollings Undergraduate Scholarship Program | Summer 2012-Spring 2014

Yale University Awards

- Department of Geology and Geophysics' Hammer Prize, *Excellence in the Oral Presentation of a Senior Thesis* | Spring 2014
- Department of Geology and Geophysics' Pat Wilde Prize, *Excellence in Marine Geology and Oceanography* | Spring 2014
- Yale College Dean's Research Fellowship in the Sciences | Summer 2012
- Department of Geology and Geophysics' Karen L. Von Damm '77 Undergraduate Research Fellowship | Summer 2012

American Meteorological Society Awards and Programs

- Private Sector Mentorship Program | Spring 2014
- Named Scholarship: K. Vic Ooyama | Fall 2013-Spring 2014
- Freshman Undergraduate Scholarship: Edgar J. Saltsman | Fall 2010-Spring 2011

Society of Exploration Geophysicists Awards

- Anadarko Scholarship | Fall 2013-Spring 2014, Fall 2011-Spring 2012, Fall 2010-Spring 2011
- General Scholarship | Fall 2012-Spring 2013

LEADERSHIP, OUTREACH, AND VOLUNTEER WORK

CIMAS Internal Advisory Committee, *Member* | July 2021-present
One of twelve members tasked with addressing any CIMAS-related issues and implementing new ideas to foster and strengthen the CIMAS community

American Meteorological Society, Monthly Weather Review, *Associate Editor* | January 2021-present

Various Journals, *Reviewer* | October 2018-present

- American Meteorological Society: *Monthly Weather Review, Journal of the Atmospheric Sciences*
- American Geophysical Union: *Geophysical Research Letters, Journal of Geophysical Research-Atmospheres*
- Royal Meteorological Society: *Quarterly Journal of the Royal Meteorological Society*

DAES/ASRC Joint Colloquium Coordinator, University at Albany, DAES, *Coordinator*, Albany, NY | April 2020-April 2021

- One of three coordinators tasked with organizing and leading the Joint Colloquium for the department
- Worked with coordinators to create a streamlined and transparent Joint Colloquium policy that emphasized diversity and fairness
- Created a centralized database of documents and spreadsheets for future coordinators related to orchestrating the Joint Colloquium

NOAA Hollings Undergraduate Scholarship Program, *Co-Mentor* | May 2020-July 2020

- Aided an HRD-affiliated Hollings Scholar in their research entitled "Global Hawk Dropsondes Impact on Tropical Cyclone Prediction"

- Provided feedback and edits to abstracts and presentations as well as gave general career advice

Office Assignment Policy Subcommittee, University at Albany, DAES, *Member,* Albany, NY | December 2018-May 2019
- One of four members tasked with creating an office assignment policy for the department
- Created a streamlined and transparent office assignment policy that emphasized diversity and fairness

Graduate Student Mentorship Program, University at Albany, DAES, *Mentor,* Albany, NY | September 2017-May 2019
- Developed concept for and aided in the implementation of this new program
- Paired with first-year graduate students to provide guidance and advice, to answer any questions they might have, to facilitate getting them acclimated to graduate school and the department at Albany, and to help them meet other students, especially upper year graduate students.

Yale Alumni Schools Committee, Schenectady & Albany, NY, *Alumni Interviewer* | May 2015-May 2019
Met and interviewed prospective students in the Capitol Region area who applied for early action or regular decision admission to Yale University

Graduate Student Committee, University at Albany, DAES, *Student Co-Chair,* Albany, NY | April 2017-April 2018
- Developed concept for a Graduate Student Committee to foster cohesiveness and structure in the events/activities run by graduate students and to foster growth and new ideas for the department's well-being and the well-being of the graduate students
- Established a calendar for use by the department which includes all events, seminars, and meetings held in the department
- Oversaw the orchestration of the September 2017 Annual Fall Picnic by new student leaders

REU and Internship Night, University at Albany, DAES, *Organizer/Presenter,* Albany, NY | yearly from 2014-2017
- Created a central database for internship, scholarship, and fellowship opportunities in the atmospheric sciences | November 2015
- Planned and executed the event including coordinating graduate student presenters | November 2015
- Presented information to students about internship, scholarship, and fellowship opportunities | 12/14, 11/15, 09/16, & 09/17

Graduate Recruitment Committee, University at Albany, DAES, *Student Chair,* Albany, NY | August 2015-August 2017
- Developed and led with two faculty members the 2016 inaugural and 2017 recruitment weekends for prospective graduate students
- Designed and produced personalized welcome materials for prospective students
- Created a centralized database of templates, implementation files, and step-by-step guides to be used by future recruitment coordinators

8th Northeast Tropical Workshop, *Co-Organizer* | May 2017
Aided in organizing the schedule and creating the website landing page for the 8th Northeast Tropical Workshop

Annual Earth Day, University at Albany, SUNY, *Booth Leader,* Albany, NY
- Volunteered at an activity booth to explain albedo and low-pressure systems to children | April 2017
- Co-led an activity booth to create anemometers with children and explain their purpose | April 2015

Annual Fall Picnic, University at Albany, DAES, *Co-Leader,* Albany, NY | September 2016 & October 2015
- Organized and coordinated the annual departmental fall picnic
- Designed invitations and managed fundraising, purchases, and budgets
- Created a centralized database of invitation templates, excel finance sheets, and a step-by-step guide to be used by future picnic coordinators

97th American Meteorological Society Annual Meeting, Lance Bosart Symposium, *Co-Organizer* | August 2016
Aided in organizing the speaker schedule for the Lance Bosart Symposium

Field Campaign, Tropical Cyclone Intensity (TCI) Experiment, *Remote Participant* | Summer 2015

Flying Cloud Institute's GIRLS Science Clubs, Conte Community School, *Volunteer,* Pittsfield, MA | May 2015
- Discussed atmospheric science topics with elementary school girls including clouds and seasons
- Helped lead experiments and demonstrations

Seventh Annual Yale Day of Service, Grassroot Givers, *Volunteer,* Albany, NY | May 2015
Worked with the Albany non-profit Grassroot Givers to create miniature libraries as part of the global Little Free Library project