

Edit Undergraduate Research Advisors (/node/96392/edit)

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## CLIM 408 Senior Research [Atmospheric Science]

# Undergraduate CLIM 408 Research Advisors

CLIM 408 Senior Research consists of student research, under the direction of a faculty member, in atmospheric science, physical oceanography, climate dynamics, or a related field. Students are encouraged to go to faculty web pages (click on individual instructor names below) or the department research pages (<https://science.gmu.edu/academics/departments-units/atmospheric-oceanic-earth-science/research-centers>) to learn more about individual research interests of faculty members.

Once a student has identified a potential advisor, the student should email the professor to schedule an appointment to discuss a possible research project.

Faculty members who have expressed interest in advising CLIM 408 projects include:

Natalie Burls Associate

Professor

<https://science.gmu.edu/academics/departments-units/atmospheric-oceanic-earth-sciences/majors-minors/undergraduate-0>  
Undergraduate Research Advisors | GMU College of Science

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Ocean Dynamics, Coupled

OceanAtmosphere Climate Variability and  
Paleoclimatology

Paul Dirmeyer

Professor of Climate Dynamics Role of  
land surface in climate

Barry A. Klinger

Associate Professor, Graduate  
Coordinator

Ocean circulation and climate

Cristiana Stan

Professor

Climate predictability and dynamics

David Straus

Professor

Atmospheric circulation and predictability

# Past Undergraduate CLIM 408 Projects

Below are some examples of the kind of great projects that AOES Atmospheric Science majors have been able to work at George Mason University and beyond. Expand panels to see project topic.

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Gregory Mon  
(2019)

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Poleward Trend in the South Atlantic  
Subtropical Ocean Front: A Possible  
Verification of Hadley Expansion



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Jeremy Goldstein  
(2018)

An analysis of how re-forecasts from CFSv2 improved from the real time GFS forecasts for hurricane Isabel in 2003

The purpose of this paper is to analyze how an updated re-forecast improved from original GFS forecasts for hurricane Isabel. The variables that will be discussed in this paper include total rainfall, wind shear, 200mb and 850mb winds, and 500 mb heights. These variables were picked because they are important variables that could be used to indicate a hurricane threat. The variables discussed in this paper are analyzed by using GrADS to review the 00Z forecasts for September 18th 2003 which was when the storm first made landfall. The results indicate that the re-forecasts from the CFS generally did a better job accurately forecasting the observed values for all variables. Both models did a good job picking up the location of these features but had a difficult time narrowing down the exact magnitude.

## Cristina Benzi

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Wind energy? I'm a big fan

Although many countries across the world have realized the importance and environmental benefits of renewable energy, many regions in the US have yet to take advantage of these resources. Several economic, social, and political factors play a role in renewable energy implementation, but little attention and research has been conducted on the environmental feasibility of such projects. The West North Central region of the United States has one of the greatest potentials for wind energy, but because of its current heavy reliance on coal and oil, there is little research on how much wind energy potential there is. This project attempts to provide a preliminary analysis on wind power viability in this region by modeling wind speed and variability from 1980 to 2017; this data was also made into an interactive web application (<https://mygmu.maps.arcgis.com/apps/Cascade/index.html?appid=f250d58d08c84512ab58f2056bd227aa>) in the effort to make this type of information more accessible, visually appealing, and interesting to the public.

## Zachary H. M (2018)

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Antarctic sea-ice variability: Assessing trends and mechanisms

## Thomas Cocc

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A Climatological Study of Tropical Cyclones in the Atlantic Basin

Using the HURDAT data set, the frequency and intensity of tropical cyclones were examined on a 100-year time scale along with points of origin, probability track distribution, and land and sea impacts. The results indicate that tropical cyclone activities in the Atlantic Basin show quite variability. The possible reasons for this variability is due to Saharan Air Layer activities, intensity and location of jet stream, events such as El Niño, La Niña, and the Atlantic Multi-Decadal Oscillation.



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Joseph Anderson

(2016)

A Measures-Oriented Forecast Verification for  
Fairfax, Virginia

The objective of this project is to compare two categories of weather forecasts: human and the operational Global Forecasting System (GFS) numerical model. The comparison will be based on the forecast verification of each category; continuous variable testing (temperature) and Dichotomous variable testing (precipitation). The following will explore the significance/ noteworthiness of forecasting and then an indepth review of pertinent forecast verification techniques. Relevant techniques include; methods of verification of real continuous scalar quantities, and methods of verification of binary (dichotomous) events.

Richard Circo

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Minerva Storm Analysis

The Minerva forecast models' accuracy at predicting which days are particularly stormy in the North Atlantic and North Pacific was analyzed. Variables that defined storminess were heat flux, momentum flux, and geopotential height squared. A hypothesis that the higher resolution models would more correctly predict which days were stormy was falsified, as there was no significant relationship between model resolution and skill score for prediction. There was, however, the result that most forecasts for the North Pacific were more accurate than the North Atlantic, specifically for momentum flux. This is possibly because of the models' mishandling of the Greenland Tip Jet.

