

**Marangelly Fuentes-Figueroa, PHD**

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***PROFESSIONAL GOALS:***

I am a Support Scientist at NASA Goddard Space Flight Center. My research work and interests include the analysis of global model outputs and satellite data products. My goal is to advance our understanding of fundamental science in the areas of weather, climate, synoptic and tropical meteorology. My research activities are conducted using many different methods striving to achieve high standards of rigor, depth and completeness.

As a Support Scientist, at NASA Goddard Space Flight Center, I focus on analyzing the capabilities of satellite data products that include high resolution wind products created from cross-calibrated ocean surface winds derived from TRMM TMI, SSM/I(F08-F15), Seawinds, and Quikscat. Specifically, I focus on investigating weather phenomena (such as Greenland Tip Jets and tropical cyclones). Additionally, I worked on analyzing the output of the NASA GEOS-5 global model in an Observing System Experiment (OSE) for the track of tropical cyclone Nargis in the Bay of Bengal. This OSE study was feature in a press release at the NASA and JPL website ([http://www.nasa.gov/topics/earth/features/deadly\\_cyclone.html](http://www.nasa.gov/topics/earth/features/deadly_cyclone.html))

***EDUCATION:***

August, 2004 – August, 2009    Howard University, Department of Atmospheric Sciences  
PhD. in Atmospheric Sciences

August, 1999 – May, 2004    University of Puerto Rico, Physics Department  
BS. in Physics

***EMPLOYMENT AND RESEARCH RECORD:***

2009-present    Support Scientist, ERT Corp, NASA Goddard Space Flight Center, Greenbelt, MD

Supervisor: Robert Rosenberg (301-286-7126) and Hal Bloom                      40 hours per week

Salary: \$62,000 per year                      Yes you may contact supervisor

Job Description: Designed diagnostic studies to investigate the capabilities of satellite data products in the development of different weather phenomena.

2004 – 2009    Graduate Fellow, Howard University NOAA Center for Atmospheric Sciences, Washington, DC

Supervisor: Dr. Vernon Morris (202-865-8536)                      40 hours per week

Salary: \$24,000 per year                      Yes you may contact supervisor

Job Description: Designed diagnostic studies to investigate the capability of global models to spontaneously create tropical cyclogenesis. Investigated the physical processes that governed the formation of tropical cyclones in the NASA GEOS-4 and GEOS-5 global models, the NCEP GFS global model, and the ECMWF T511 Nature Run. Compared the processes of barotropic instability in the output of 5 different global models during the 2004, 2005, and 2006 hurricane season to investigate the relationship between initialization and model physical and dynamical processes. Developed an objective verification scheme based on the model forecast and analysis tools such as satellite data. Created 5-day weather forecast for the 2008 AEROSE campaign.

2007 – 2009 Graduate Research Assistant, NASA Goddard Space Flight Center, Greenbelt, MD

Supervisor: Dr. Oreste Reale(301-614-6254) 40 hours per week Salary: \$0  
Yes you may contact supervisor

Job Description: Investigated the processes of tropical cyclogenesis in global models by analyzing the outputs of the NASA GEOS-4 and GEOS-5 global models, the NCEP GFS global model, and the ECMWF T511 Nature Run. Investigated the capability of global models to represent kinetic energy transfer from the African Easterly Jet to developing tropical cyclones in order to verify which physical processes in global models are responsible for the formation of tropical cyclones in the Atlantic Basin. Analyzed the output of the NASA GEOS-5 global model in an Observing System Experiment to investigate the capability of assimilating Atmospheric Infrared Sounder (AIRS) temperature retrievals under cloudy conditions to improve Cyclone Nargis track forecast in the Bay of Bengal. Evaluated the ability of the NASA GEOS-5 global model to improve the creation of tropical cyclones close circulations and warm core by assimilating Atmospheric Infrared Sounder (AIRS) temperature retrievals under cloudy conditions. Developed a forecasting tool to analyze real-time weather forecast.

Summer 2006 Graduate Research Assistant (Summer Intern), NASA Goddard Earth Science & Technology Center, Greenbelt, MD

Supervisor: Dr. Oreste Reale(301-614-6254) 40 hours per week  
Salary: \$5,000 summer Yes you may contact supervisor

Job Description: Analyzed the output of the high-resolution NASA finite-volume General Circulation Model representation of barotropic instability in the African Easterly Jet, and its contribution to cyclogenetic processes for the case of Hurricane Frances (2004). Discussed weather maps, featuring baroclinic storms and global tropical weather systems.

Summer 2005 Graduate Research Assistant (Summer Intern), NASA Goddard Earth Science & Technology Center, Greenbelt, MD

Supervisor: Dr. Oreste Reale(301-614-6254) 40 hours per week  
Salary: \$5,000 summer Yes you may contact supervisor

Job Description: Analyzed the output of the high-resolution NASA finite-volume General Circulation Model representation of tropical cyclogenesis for the case of Hurricane Karl (2004). Discussed weather maps, featuring baroclinic storms and global tropical weather systems.

***RESEARCH INTERESTS:***

Tropical cyclogenesis in the Atlantic Basin

Physical interaction and energy transfer across scales in the Atlantic basin  
Assimilation of satellite data to improve forecast in global models  
Land-Atmosphere interactions  
Air-sea interactions  
Climate Change

***SKILLS:***

Fluent in English and Spanish  
Numerical model outputs: NASA GEOS-4 and GEOS-5, NCEP GFS, and ECMWF T511 Nature Run.  
Operating Systems: Windows, Mac, Unix, and Linux  
Software application: GrADS and some skills in ENVI.  
Languages: Some skill in MatLab, C++, and FORTRAN  
Model outputs/data set manipulation  
Data analysis and statistics  
Data analysis and quality control  
Global Model verification

***HONORS AND AWARDS RECEIVED:***

Howard University NOAA Center for Atmospheric Sciences Research Assistantship, Fall 2004  
Second place at the 2006 Howard University Graduate Research Symposium. Presentation: Evaluation of tropical cyclogenetic processes into the NASA GEOS-4.  
Minorities Striving and Pursuing High Degrees of Success (MSPHD'S) in Earth System Science Program - Participant, Fall 2007

***PUBLISHED ARTICLES:***

Reale, O., W. K. Lau, J. Susskind, E. Brin, E. Liu, L. P. Riishojgaard, M. Fuentes, and R. Rosenberg (2009), AIRS impact on the analysis and forecast track of tropical cyclone Nargis in a global data assimilation and forecasting system, *Geophys. Res. Lett.*, 36, L06812, doi: 10.1029/2008GL037122.

Press release: [http://www.nasa.gov/topics/earth/features/deadly\\_cyclone.html](http://www.nasa.gov/topics/earth/features/deadly_cyclone.html),  
<http://climate.jpl.nasa.gov/news/index.cfm?FuseAction=ShowNews&NewsID=59>

***PROFESSIONAL MEMBERSHIPS:***

American Meteorological Society (AMS)  
American Geophysical Union (AGU)  
Experimental Program to Simulate Competitive Research (EPSCoR) at the University of Puerto Rico, Mayagüez Campus  
University of Puerto Rico Society of Physics Students

Minorities Striving and Pursuing High Degrees of Success (MSPHD'S) in Earth System Science Program

***CONFERENCES AND PRESENTATIONS:***

2003 NOAA-CREST Summer Internship Conference, Mayaguez, Puerto Rico.

"Numerical Simulation of Early Rainy Season Precipitation Over the Caribbean and Puerto Rico Following a Strong El Niño Event. Part I: Model Validation."

2004 National Oceanic and Atmospheric Administration (NOAA) 1<sup>st</sup> Educational Partnership Program (EPP) Conference, New York, NY.

2005 XX SIDIM , University of Puerto Rico at Mayaguez, Mayaguez, Puerto Rico.

"Soil Moisture, Soil Temperature and Heat Flux Using Artificial Neural Networks."

27<sup>th</sup> Conference on Hurricanes and Tropical Meteorology, Monterey, CA, April 2006.

2006 Howard University Graduate Research Symposium, Howard University, Washington DC.

"Evaluation of tropical cyclogenetic processes into the NASA fvGCM."

2006 National Oceanic and Atmospheric Administration (NOAA) 2<sup>nd</sup> Educational Partnership Program (EPP) Conference, Tallahassee, FL

"Investigation of barotropic instability in the African Easterly Jet using the NASA finite-volume General Circulation Model" (Oral presentation)

2007 American Geophysical Union Fall Meeting, San Francisco, CA, December 2007.

88<sup>th</sup> Annual American Meteorological Society Meeting, Tropical Meteorology Special Symposium, New Orleans, LA, January 2008.

"Understating the processes of tropical cyclogenesis in global models" (Poster presentation)

89<sup>th</sup> Annual American Meteorological Society Meeting, Phoenix, AZ, January 2009.

***REFERENCES:***

Dr. Oreste Reale  
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