

Mr. Joan Manuel Castro Sánchez

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OBJECTIVE

Sharing my knowledge and experience to prepare future professionals in Science, Technology, Engineering and Math areas (STEM). My long time goal will be to work an educational institution in Puerto Rico. Moreover, I have a special interest to continue my research collaboration focus in remote sensing applied to climate change studies in the Caribbean.

EDUCATION

2012-2021 – University of Puerto Rico, Mayagüez Campus

Ph.D *Civil Engineering Student* (Water Resources and Environmental Engineering) G.P.A 3.63

2003-2007 – University of Puerto Rico, Mayagüez Campus

M.S. Electrical Engineering (Remote Sensing). G.P.A. 3.60

1996- 2002 – University of Puerto Rico, Mayagüez Campus

B.S. Electrical Engineering (Digital Signal Processing). G.P.A. 3.20

WORK EXPERIENCE

August 2021 Department of Industrial Engineering, UPRM

Part Time Professor

Course: Probability and Statistics for Engineers. Fall semester dictating fundamental probability and statistic course (ININ 4010) for undergraduate engineering students.

February 2018 to December 2019 – Department Industrial Engineering, UPRM

Graduate Student Advisor (Undergraduate Special Topic)

Collaborate with Dr. Nazario Ramirez to manage undergraduate students to introduce in research projects (ININ 4998).

January 2012 to May 2020 Department of Civil Industrial and Electrical Engineering, UPRM

Graduate Student Research member for UPRM NOAA-CREST and CUERG (Coast Urban Environmental Research Group) CUNY, New York City, NY, USA

Direct collaboration in the following research projects

- Real time estimation of surface Relative Humidity in the Caribbean Region based on satellite products.
- Climatology Air Temperature and Heat Index in the Caribbean Region to determine potential climate changes.
- Detection and estimation of rainfall of warm clouds in Puerto Rico based on GOES Products.
- Calibration and validation of radar rainfall estimation in west coast of Puerto Rico.

Dictate seminars to undergraduate and graduate students to use basic software applications on Civil, Industrial and Electrical Engineering. Supervised by Dr. Nazario Ramirez, Dr. Jorge Gonzalez and Dr. Rafael Rodriguez Solis.

January 2012 to December 2013 Department of Industrial Engineering, UPRM
Probability and Statistic for Engineering Instructor

Two years of experience dictating fundamental probability and statistics course (ININ 4010) for undergraduate engineering students.

November 2008 to October 2012 University of Puerto Rico, Mayagüez PR

Professional Services: Researcher Assistant

Develop a product to improve cloud identification and rainfall estimation in the Caribbean and Puerto Rico. Supervised by Dr. Nazario Ramirez and Robert Kuligowski.

August 2008 to October 2009 – Industrial Engineering Computer Center, UPRM

Computer Lab Assistant (Software and Hardware Technician)

Install and Repair software to computer center lab in Industrial Engineering Department. Supported and supervised by Edwin Morales, Dr. William Hernandez, and Israel Tirado.

January 2007 – May 2008 UPRM – CASA (Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere)

Graduate Researcher Student

Collaborate with other graduate students to develop a method to improve rainfall detection on Puerto Rico, using CASA radar network, NEXRAD, and satellite polar and geostationary images. Supervised by Dr. Nazario Ramirez and Dr. Sandra Cruz Pol.

January 2006 to December 2008 – Industrial Engineering Computer Center, UPRM

Graduate Student Advisor

Collaborate with other graduated students to dictate seminars to undergraduate students on basic software applications on Industrial Engineering Department. Supervised by Edwin Morales, Dr. William Hernandez, Prof. Mercedes Ferrer, Dr. Nazario Ramirez and Israel Tirado.

January 2003 – December 2007 – Caribbean Climate Studies Group, UPR, Mayagüez PR

Graduate Student Researcher

Sponsored by NASA ESPCOR, and NOAA CREST. I have been collaborating in the following research project. Supervised by Dr. Nazario Ramirez, Dr. Jorge Gonzalez and Dr. Hamed Parsiani

- New strategies to predict hurricane displacement and intensity over the North Atlantic Basin.
- Prediction of seasonal hurricane activity over the Atlantic from 2006 to 2055.
- Climate change detection over Puerto Rico.
- Estimation of soil moisture over Puerto Rico using NEXRAD Rainfall observations.
- Validation a High Resolution rainfall retrieval satellite algorithm over Puerto Rico

January 2003 to May 2004 – Puerto Rico Water Resources Research Institution, Mayagüez PR

Graduate Student Researcher

Graduated Student Collaboration in sampling and validation process of Water Quality Parameters of Mayagüez Bay research. Supervised by Dr. Nazario Ramirez, Dr. Fernando Gilbes and Dr. Jorge Rivera Santos.

PAPERS ON JOURNALS AND/OR PROCEEDINGS

- Ramirez-Beltrán, N.D., J.E Gonzalez, **JM Castro**, M.Angeles, E. Harmsen and C. Salazar, (2017) "Analysis of Heat Index in Mesoamerica and Caribbean Region", Journal of Applied Meteorology and Climatology, American Meteorological Society, DOI: 10.1175/JAMC-D-16-0167.1
- **Castro J.M** ; UPRM, NEW SCHEME TO IMPROVE THE DETECTION OR RAINING CLOUDS IN PUERTO RICO, PRYSIG Symposium; October 2016 http://cohemis.uprm.edu/prysig/pdfs/pres_castro16.pdf
- **Castro J.M** An Algorithm to improve warm cloud raining detection. 8th Biennial Education and Science Forum Aug 2016, CUNY/CCNY NY.
- **Castro J.M** Caribbean Rainfall Nowcasting based on Satellite Data. 21th SIGMA Xi STUDENT POSTER DAY, April 2016, UPRM
- **Castro J.M**, 36th Puerto Rico Interdisciplinary Meeting (PRISM), March 2016, Ponce, PR, Caribbean Rainfall Nowcasting based on Satellite Data <https://prlsamp.rcse.upr.edu/index.php/events/jtmprism>
- **Castro J.M.** A Rainfall Nowcasting Algorithm Based Hydro-Estimator Data AMS Conference; January 2016; New Orleans, Louisiana. <https://ams.confex.com/ams/96Annual/webprogram/Paper279544.html>
- Ramirez-Beltran, N.D., **J. M. Castro**, and J. Gonzalez (2015). An algorithm for predicting the spatial and temporal distribution of rainfall rate. *International Journal of Water*, Vol. 9 No 4, pp 315-333
- Ramirez-Beltran, N.D., L. T. Molina, **J. M. Castro**, S. Cruz-Pol, J. G. Colom-Ustáriz and N. Hosannah. (2015). A nonlinear regression model in time and space domain for radar rainfall nowcasting. *International Journal of Hydrology Sciences and Technology*, Vol. 5, No. 3, pp 208-232. <https://ams.confex.com/ams/95Annual/webprogram/Paper256468.html>
- **Castro J.M** ; UPRM; MODIS AND GOES DATA TO DETECT WARM RAINING CLOUDS PRYSIG Symposium; October 2015; http://cohemis.uprm.edu/prysig/pdfs/pres_castro15.pdf
- **Castro J.M** ; CoRP Symposium September 2015, NOAA-NESDIS, Maryland: A Rainfall Nowcasting Algorithm Based Hydro-Estimator Data <http://cicsmd.umd.edu/outreach/cor/>
- **Castro J.M** NEA Science Day, March 2015, UPRM: Rainfall Nowcasting Algorithm based on Radar and Satellite Data
- **Castro J.M** January 2015 Rainfall Nowcasting Algorithm Based on Radar and Satellite Data; American Meteorology Society (AMS 2015) , Phoenix, Arizona;
- **Castro J.M** Estimation of Effective Radius at Cloud Tops Using Satellite Data PRYSIG 2014 Symposium September 2014, UPRM; http://cohemis.uprm.edu/prysig/pdfs/pres_castro14.pdf
- **Castro J.M** A regression model with radar and satellite data for rainfall nowcasting. (CoRP) Science Symposium, September 2014, The City College of New York Steinman Auditorium/Lecture Hall (ST-161); http://noaacrest.org/corp2014/Corp2014_Agenda_Final.pdf
- **Castro J.M** .Feb. 2014 Estimation of Effective Radius at Cloud Tops Using Satellite Data. NEA Science Day Conference, , UPR Mayaguez,
- **Castro J.M** Estimation of Effective Radius at Cloud Tops Using Satellite Data PRYSIG 2013 Symposium October 2013, UPRM; http://cohemis.uprm.edu/prysig/pdfs/pres_jcastro13.pdf
- **Castro J.M.** and Ramirez-Beltran, N.D., (2013) 8th Annual NOAA-Crest Symposium. Estimation of Effective Radius and Cloud Motion Vector to improve rainfall forecasts in Puerto Rico; June 5, 2013 to June 6, 2013. City College of New York, New York City, New York.
- Ramirez-Beltran, N.D. and **Castro J.M.**, (2013). Multivariate Bernoulli Distribution to Predict the Location of Rainy Pixels, *IIE Annual conference*, May 18-22, 2013, San Juan Puerto Rico.
- **Castro J.M.** and Ramirez-Beltran, N.D., (2013). Extended Forecast of Atlantic Basin Seasonal Hurricane Activity, *IIE Annual conference*, May 18-22, 2013, San Juan Puerto Rico.
- **Castro J.M.**, March 2012, Estimation of Effective Radius and Cloud Motion Vector NOAA EPP Science and Education Forum. Tallahassee, Florida
- **Castro J.M.**, August 2012; Estimation of Effective Radius and Cloud Motion Vector to improve rainfall forecasts in Puerto Rico; NOAA CREST Day,.

- Ramírez Beltran N.D, **Castro J.M.**, Vasquez R., Harmsen E., and Cruzado, H. Transfer function models and neural networks to estimate soil moisture. Submitted to *Journal of the American Water Resources Association* (2008).
- Ramírez Beltran, N.D, Calderon, C. Vasquez, R. Harmsen, E. and **Castro, J.M.** Remote sensing and statistical techniques to estimate soil moisture over tropical areas. Submitted to *Journal of Applied Remote Sensing*.
- Ramirez-Beltran, N.D., **Castro J.M.**, Gonzalez, J., Erickson, D. J., Jury, M., and Allison, J., Long-term prediction of hurricanes in the North Atlantic Basin. Submitted to *International Journal of Climatology*.
- Ramirez-Beltran, W.K.M. Lau, A. Winter, **J.M. Castro**, and N.R. Escalante. Empirical Probability Models to Predict Precipitation Levels over Puerto Rico Stations. *Monthly Weather Review*. Vol. 135, No. 3, pp 877-890, 2007.
- Ramirez-Beltran, N.D., Cruz-Pol, S., Ortiz, X., **Castro J.M.**, Kuliwoski, R. An algorithm to improve the NEXRAD rain rate estimates. *IEEE International Geosciences and Remote Sensing Symposium*, Barcelona, Spain, 23-27, July, 2007.
- Ramirez-Beltran, N.D. **Castro J.M.**, Gonzalez, J. and Angeles, M. Prediction of trends of tropical Storms in the North Atlantic. *27th Conference on Hurricanes and Tropical Meteorology*, Monterrey, CA, April, 24-28, 2006.
- Ramirez-Beltran, N.D., Gilbes F., and **Castro J.M.** Empirical Models to Estimate Seawater Parameters in Mayagüez Bay. *The 31th International Symposium on Remote Sensing of Environment – 2005 “Global Monitoring for Sustainability and Security.”* , Saint Petersburg Russia. June 20-24, 2005.
- Ramirez-Beltran, N.D., F. Gilbes, and **J.M. Castro**. A stochastic-dynamic model to predict fecal coliforms at the mouth of the Añasco River *Coastal Environment V Incorporating Oil Spill Studies*, WIT Press, Great Britain, pp 83-93, 2004.
- Ramirez-Beltran, N.D., and **J.M. Castro**, Deep Layer of Upper Air and Multivariate Time Series Models to Predict Hurricane Tracks. Preprints of the AMS: *The 26th Conference on Hurricanes and Tropical Meteorology* Miami FL , May 2-7, 2004
- Ramirez-Beltran, W.K.M. Lau, A. Winter, **J.M. Castro**, and N.R. Escalante. Empirical Probability Models to Predict Puerto Rico Monthly Rainfall Process. *17th Conference on Hydrology, 83th Annual AMS Meeting*. Long Beach California, February 9-13, 2003

SKILLS

Technical and Non-Technical Strengths are focused on Data Analysis, Images Processing, Programming, Computer Operating System management and Statistics. Matlab Programming, Remote Sensing, Digital Signal Processing, Image Processing Time Series Analysis, Statistical Analysis.

- Knowledge of two operating systems: **Linux, Windows** and Macintosh.
- Programming in **C++** Language and **MATLAB**.
- Offer to undergraduate and graduate students software seminars based on Office Word, Excel, Power Point, VISIO, **MATLAB**, LINDO, TI Scientist Calculators (TI-85 and TI-89), and Minitab
- Remote Sensing: Classification and Detection - Pattern Recognition using lineal and nonlinear schemes: Kth Nearest Neighbors, Artificial Neural Networks and Principal Components Analysis. Image Processing using **MATLAB** and **Q-GIS**
- Time Series Analysis: Apply Linear and Non-Linear Optimization to forecast climate activity and analyze other stochastic process.
- Data Recollection and Analysis using numerical data models (**NCEP** Analysis Data) and satellite sensors like **MODIS** (Terra and Aqua)

INTEREST

Jogging, basketball, volleyball, riding bicycle, play tennis, writing and reading.

REFERENCES

Available References upon request.