
Departmental Seminar

Seminar Title	: The Hurricane Intensification Problem: Knowns and Unknowns
Speaker	: Dr. Sundararaman Gopalakrishnan
Supervisor	: Prof. Krishna Kishore Osuri
Venue	: ER 303
Date and Time	: 22 Apr 2024 (10:30)
Abstract	: Predicting intensity changes, including, in particular, rapid intensity changes, in tropical cyclones (TCs) is a complex and challenging multiscale problem. To motivate the improvement of intensity forecasts, NOAA created the Hurricane Forecast Improvement Program (HFIP) in 2009. Supported by HFIP, noticeable progress has been made to improve the prediction of TC intensity changes by upgrading numerical models, advancing data assimilation techniques, expanding the observations assimilated into numerical models, and, above all, investing in basic research to better understand TC intensification. The state-of-the-art HWRF model is used to explore processes that have been shown to be important to TC intensification. A brief review of the existing axisymmetric theory for the intensification of TCs is also provided. However, TCs are rarely axisymmetric. The asymmetric structure in the inner core of a TC may be generated by both internal dynamics and external forcing due to environmental factors such as wind shear and moisture. We use retrospective forecasts produced by HWRF and Hurricane Analysis and Forecast System (HAFS) to investigate the role of shear-induced asymmetries in the rapid intensification (RI) of TCs. We seek to address the following questions: How do TCs rapidly intensify in a sheared environment? What is the role of eddy fluxes on TC intensification? Is the well-accepted theoretical framework of TC intensification still valid for sheared storms undergoing RI? We finally discuss the challenges related to the TC intensification problem.