ICOAST-MODELING: MODELING OF *E. COLI* AND NUTRIENTS DISPERSAL IN THE GUANA-TOLOMATO-MATANZAS LAGOONAL SYSTEM AND ADJACENT OCEAN

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As one of the twenty-nine National Estuarine Research Reserve (NERR) in the country, the Guana-Tolomato-Matanzas NERR (GTMNERR) protects and provides for a great diversity of plants and animals. People, as important figures preserved this ecosystem in time, but also improve its long term contamination and degradation. Massive coastal urbanization has significant impacts on the coastal zone, including eutrophication, hypoxia, fish kills, and water-borne pathogens. One of the main ecological concerns in regard to septic tank usage and agricultural runoff is the release of nutrients and fecal bacteria (i.e. E.coli) into the surrounding environment. Numerical analyzing of bacteriological and chemical pollution using a hydrodynamic and water quality model, with a focus on the GTM estuary and the adjacent ocean waters will be the starting point to enhance preservation activities, empowering local, county and state authorities to make proactive decisions about coastal water quality management.

To achieve this goal, we are developing a 3D hydrodynamic and water quality model (Delft3D FLOW-WAVE-WAQ) as part of the UF-iCoast initiative. The model extends about 50km north and south of the City of St. Augustine, including the GTMNERR and the adjacent ocean. The hydrodynamic calibration is being performed using water levels, and tidal constituents distributed by the NOAA and the GTMNERR stations along with the domain. The calibration of the water quality model will be performed using the nutrient measurements collected in surface waters, as well as nutrient measurements routinely carried out by the GTMNERR. We will simulate pollutant dispersal under different conditions, allowing us to understand how tidal range, rainfall, storms, wind, salinity, oxygen concentration, and freshwater input affect nutrients and bacterial residence time and dispersal. Once tested, the model will be coupled with a forecasting platform, permitting the short term prediction of pollutant dispersion in the GTMNERR system an in the adjacent ocean.

PRESENTER BIO: Mr. Daniele Pinton is a Ph.D. graduate student at the Coastal Engineering graduate program. Daniele is part of the within Dr. Canestrelli's lab, which focuses on the improvement of numerical hydrodynamic and eco-morph dynamic models in coastal, estuarine and riverine environments.