Undergraduate Research Opportunity at UNCW Center for Marine Science

There are several summer internships available for research in Physical Oceanography at the UNCW Center for Marine Science or the Coastal Engineering Building. Internships this summer will be ~8 weeks long, spanning May-to-August, 2023. During this time, 30-40 hour work weeks are expected, with an hourly pay of $15/hour. We will accept written applications for research internships submitted to a mentor by **March 3, 2023**. Please contact a mentor for further info.

Applications consist of:

1. A statement of interest (1 - 2 pages) that answers the following questions:
   - What is your interest in participating in this summer research internship?
   - What project are you most interested in? Do you have a second choice?
   - What relevant skills do you currently have?
   - What research skills do you want to develop and how does this internship fit in to your academic and career goals?
2. Your CV or resume
3. List at least one reference who can speak to your potential to conduct research.

SUMMER 2023 PROJECTS:

1. River plume and wave data collection for Frying Pan Shoals Project
Description: Historic physical oceanographic data from around Frying Pan Shoals need to be centrally collected and analyzed. Participation in oceanographic study including preparation of field equipment and offshore field sampling
Expected results: A data report, reproducible code for scientific figures.
Location: CMS or CE
Needed skills: Willingness to work with interdisciplinary science team, manual work on research vessels, Programming in MATLAB and spreadsheets, scientific writing and communication.
Mentors: Grimes (grimesdj@uncw.edu), Long (longjw@uncw.edu), Suanda (suandas@uncw.edu)

2. Laboratory data and numerical model comparison of surface wave characteristics
Description: Prior data (remote sensing, wave gauges) from laboratory study of wave breaking and rip currents (University of Washington) are to be analyzed for wave properties (shape, spectra, energy) near and through the breakpoint. These will be compared to numerical model output to better understand the representation of wave breaking in computer models.

Expected results: Analysis of wave characteristics over multiple experiments. Presentation of analysis to multi-institution research group. Reproducible code for scientific figures.
Location: CMS or CE
Needed skills: An interest in learning wave observation and modeling technology. Programming in MATLAB, scientific communication.
Mentors: Grimes (grimesdj@uncw.edu), Suanda (suandas@uncw.edu), Wei (weiz@uncw.edu)

3. Representing rocky bottom bathymetry in numerical models of currents and waves.
Description: Wave propagation and dissipation effects over rocky coastlines are poorly represented in models because friction over rocks is very different than over sand. This project involves learning to run and analyze an idealized numerical model of wave propagation and the associated currents.
Expected results: Presentation of analysis to UNCW research group. Reproducible code for scientific figures.
Location: CMS
Needed skills: Programming in MATLAB, interest in numerical models, and oral scientific communication.
Mentors: Acevedo Ramirez (acevedoramirezc@uncw.edu), Suanda (suandas@uncw.edu)

4. Remote Estimates of Surf-zone Vorticity Forcing from Short-Crested Breaking Waves
Description: A number of modeling studies have shown that directionally spread waves that have short breaking crest lengths force surfzone rotational currents, a precursor to transient rip-currents. This project is an attempt to measure crest length statistics in 2 Hz imagery from the USACE-FRF in Duck, NC over Sept-Oct for several years.
Expected results: A data report, reproducible code for scientific figures.
Location: CMS or CE
Needed skills: Willingness to work and learn with interdisciplinary science team, Programming in MATLAB and spreadsheets, scientific writing and communication.
Mentors: Grimes (grimesdj@uncw.edu), Elgar (WHOI), Raubenheimer (WHOI)

5. Modeling Surf-zone Vorticity
Description: Remote and in situ measurements of surfzone currents exhibit significant energy at low-frequencies and large scales. These can be due to the effects of complex bathymetry, but these motions are present even when bathymetry is alongshore uniform. This project will attempt to model two quasi-realistic storm periods from observations using Funwave-TVD and/or SWASH to study the different effects of bathymetric variability and surf-zone eddy dynamics.
Expected results: A working model, brief data report, reproducible code for scientific figures.
Location: CMS or CE
Needed skills: Willingness to work and learn with interdisciplinary science team, Programming in MATLAB and spreadsheets, scientific writing and communication.
Mentors: Grimes (grimesdj@uncw.edu), Suanda (suandas@uncw.edu), Elgar (WHOI), Raubenheimer (WHOI)