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Hurricane Dorian 2019

NSF

WOODS HOLE OCEANOGRAPHIC INSTITUTION
1930

StEER Preliminary Virtual Reconnaissance Report
Kijewski-Correa et al.

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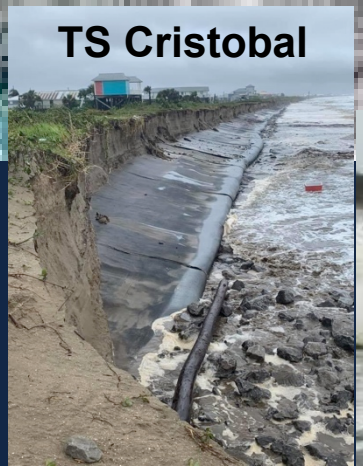

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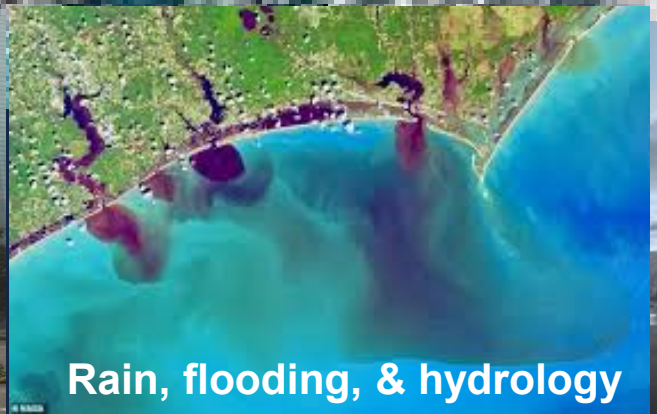
Surge & Waves

Thermal properties

Wind



Rain, flooding, & hydrology

Geology & engineering

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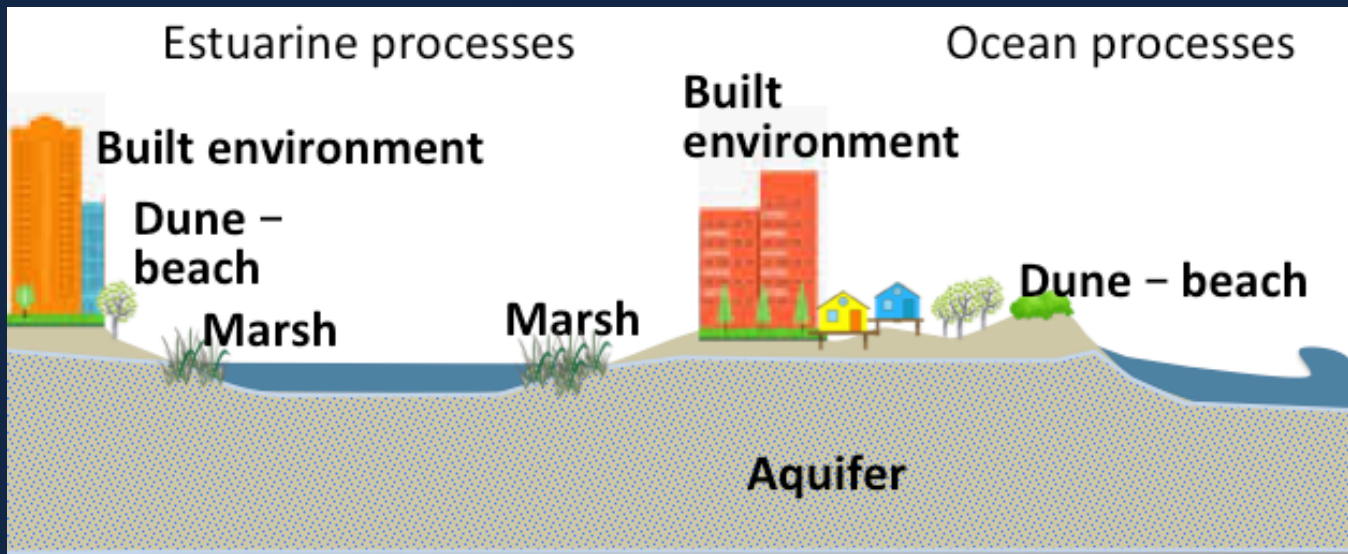
To understand and improve resilience to storm impacts, need to understand interactions and feedbacks among natural processes, built environment, and socio-economic responses

The Nearshore Water-Land System



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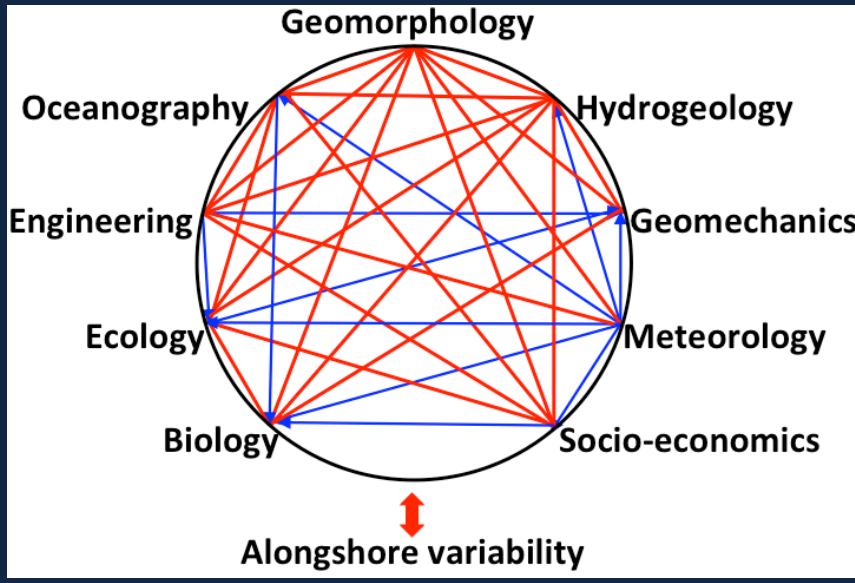
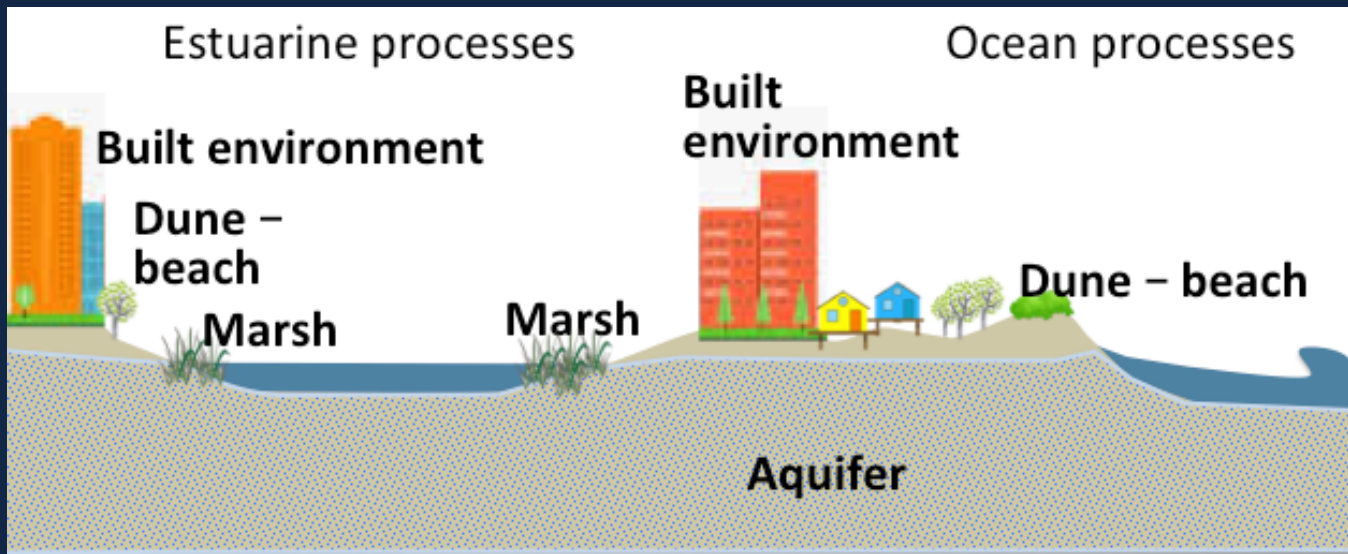


The Nearshore Water-Land System



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NEER Development Workshop, Aug 2019

NSF Award #1848650, 1932775, 1939275
GEO, ENG, & CoPe

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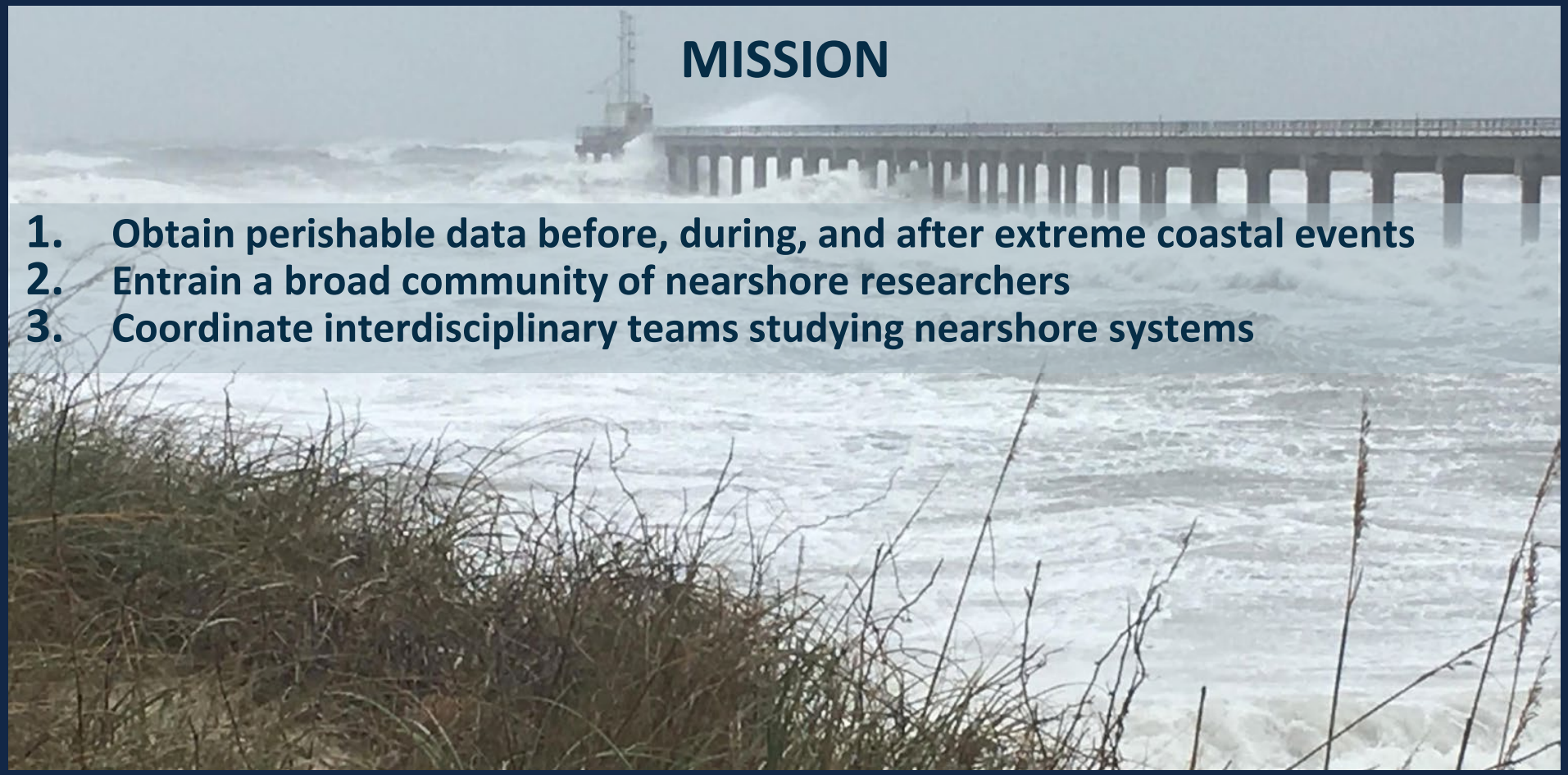
Vision: Improve resilience of the "*nearshore system*" by obtaining and sharing observations that are critical to understanding and modeling event-driven interactions between natural-system processes (ocean, land, and atmosphere), the built environment, and societal responses and actions.

MISSION

1. **Obtain perishable data before, during, and after extreme coastal events**
2. **Entrain a broad community of nearshore researchers**
3. **Coordinate interdisciplinary teams studying nearshore systems**



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Set guidelines for:

Internal & external communications & coordination (Slack)

Training, safety, and entraining emerging members

Dissemination of preliminary and QC'd data (DesignSafe-CI)

Sharing information about potential field sites

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BENEFITS OF MEMBERSHIP

EVENT COORDINATION: Broad membership enables organization of interdisciplinary teams to respond rapidly to extreme events on all U.S. coasts.

SUPPORT: Travel and equipment funding, RAPID-EF equipment rental, and coordination between Home and Field Teams and other rapid response groups, provides logistical support.

OPPORTUNITIES: Interacting with a diverse group of researchers leads to new ideas and collaborations.

FUTURE FUNDING: Storm observations may form the basis for NSF Rapid proposals, or proposals to study the longer-term recovery of the system

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COVID-19

Local researchers and deployments, potentially including consecutive deployments by small groups traveling individually

Virtual and remote studies, including gathering public imagery, phone and internet-based surveys, and remote (aerial, satellite) measurements

Expanding network, including coordination with regional and national researchers, agencies, and managers

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Britt Raubenheimer
Coastal oceanographer
NEER Lead

Lori Peek
Sociologist

University of Colorado Boulder

NATURAL HAZARDS CENTER

STEERING COMMITTEE

Nina Stark
Coastal geotechnical engineer

Laura Moore
Coastal geomorphologist

Holly Michael
Hydrogeologist

Steve Elgar
Physical oceanographer

Qin Jim Chen
Coastal engineer

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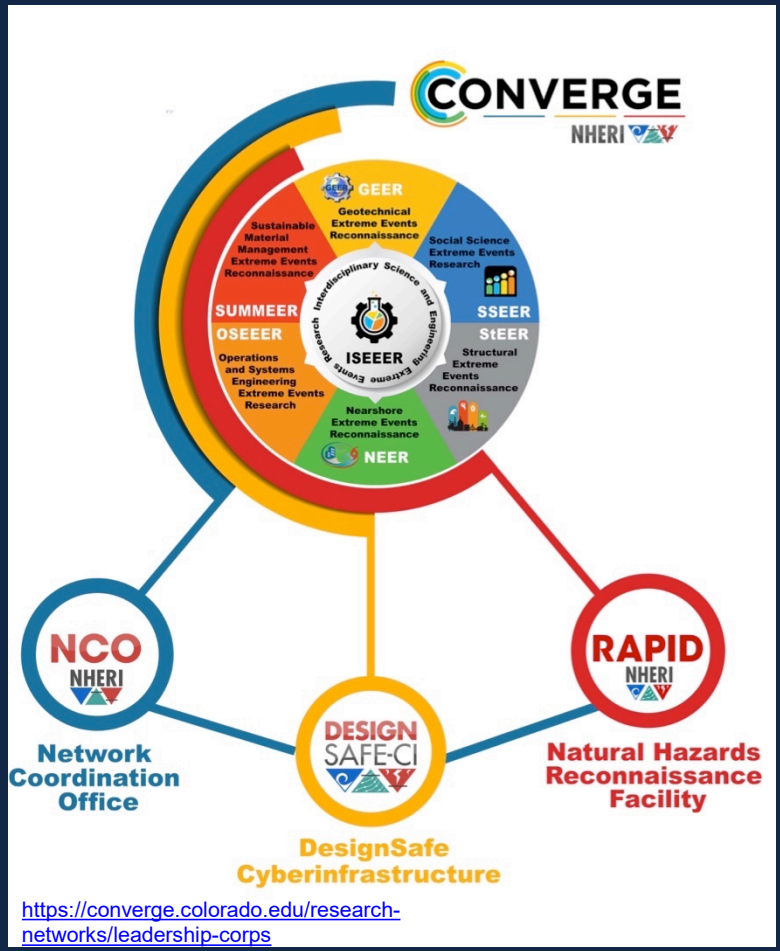
Nina Stark
Coastal geotechnical engineer
VIRGINIA TECH



https://converge.colorado.edu/research-networks/leadership-corps

http://www.geerassociation.org/index.php/component/geer_reports/?view=geerreports&layout=build&id=83
http://www.geerassociation.org/index.php/component/geer_reports/?view=geerreports&layout=build&id=81

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Laura Moore
Coastal geomorphologist

THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

Pre- and Post- storm beach-dune and vegetation surveys:

- Improve & parameterize models of beach-dune-backbarrier dynamics
- Contribute to understanding of coupled human-natural dynamics
- Predict long-term recovery and evolution of the H-N coastal system
- Integrate across disciplines: geomorphologists, oceanographers, ecologists, engineers, *economists, behavioral scientists, demographers*
- Leverage complementary efforts, to extend reach and interactions

C-CoAST
Collaboratory for Coastal Adaptation over Space & Time

VCR LTER

CSDMS
community surface dynamics modeling system

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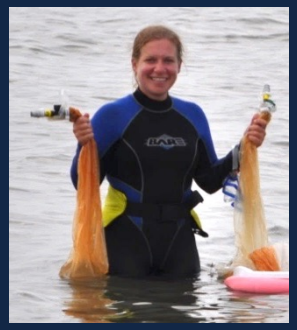
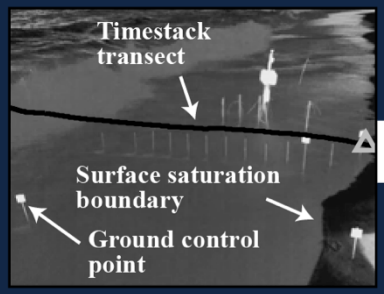
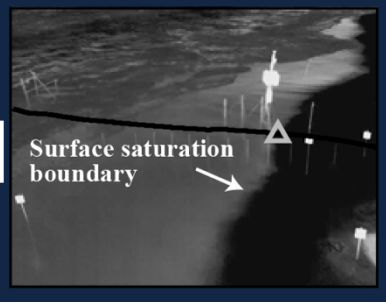
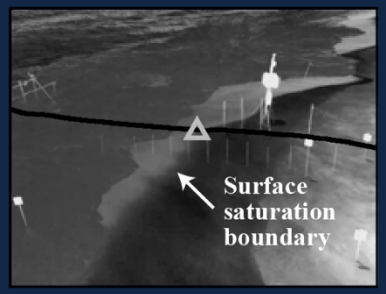


Holly Michael
Coastal Hydrogeologist

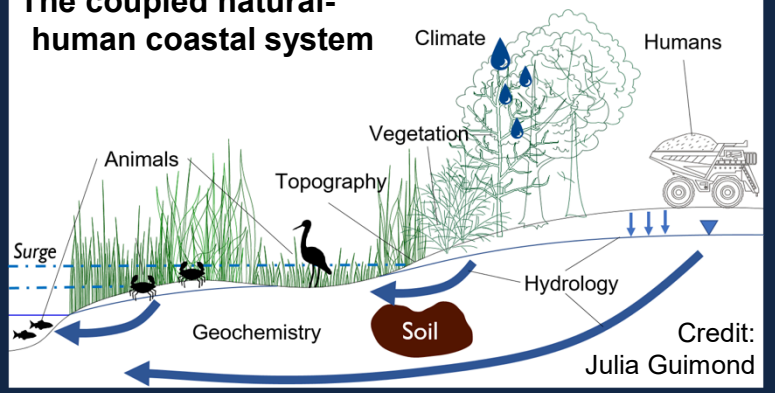
UNIVERSITY OF DELAWARE







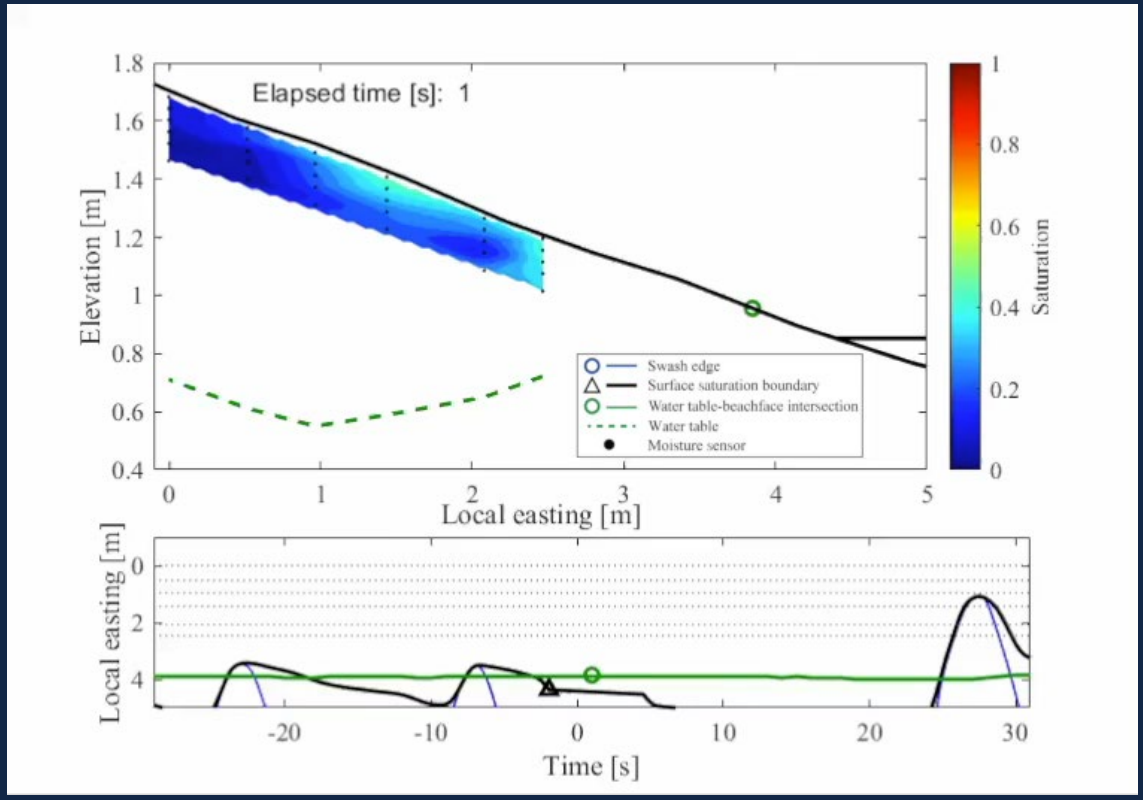
The coupled natural-human coastal system



Credit: Julia Guimond

Groundwater feedbacks with:

- Surface hydrology
- Sediment transport
- Geomorphology
- Biogeochemistry
- Land-sea fluxes
- Ecosystems (forest, wetlands)
- Management & decisions



Heiss, Michael, & Puleo, HPEYE, 2020

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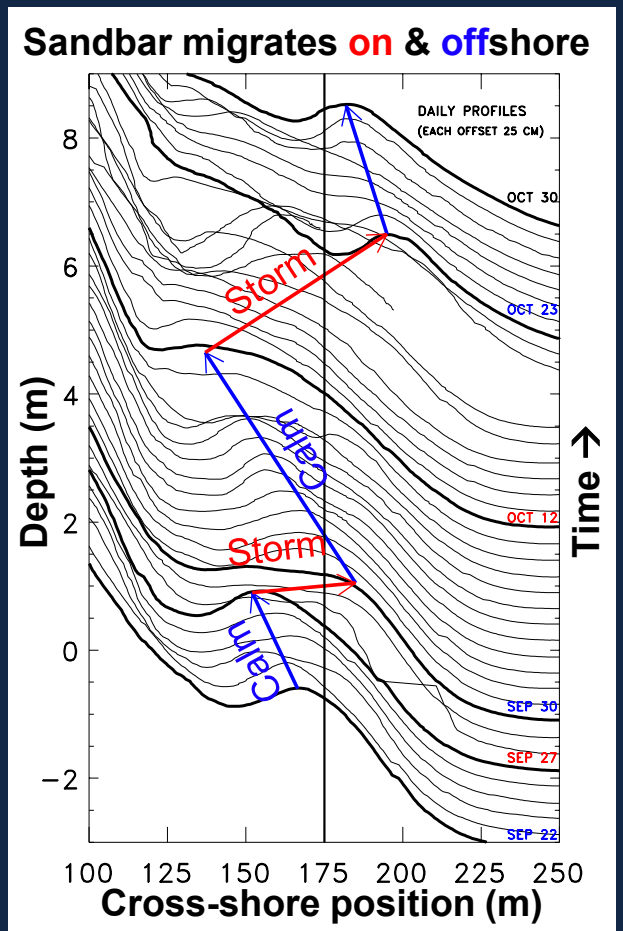
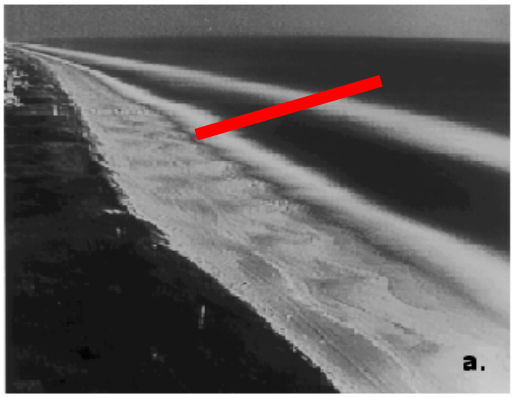
Steve Elgar
Physical oceanographer

Woods Hole Oceanographic Institution 1930

- During storms, sand bar moves offshore and beaches erode.
- After storms, sand bar moves onshore and beaches accrete





Hydrodynamics and geotechical processes affect post-storm recovery.

Do storms change geotechnical properties enabling easier sand movement?

NEER enables new collaborations, and pre-storm measurements to study recovery

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Qin Jim Chen
Coastal engineer
Northeastern University
College of Engineering

- Coastal wetlands exert vegetal drag on flows, reducing storm surge and waves.
- NEER and RAPID enable the study of TS Cristobal's impact to Louisiana marshes.

Home Team (HT, NU) worked with Field Team (FT) at LSU developed a rapid deployment plan.

HT & RAPID Facility shipped equipment to FT overnight.

LSU Field Team deployed & retried an array of sensors, and did surveys.

HT & FT are jointly analyzing the data.

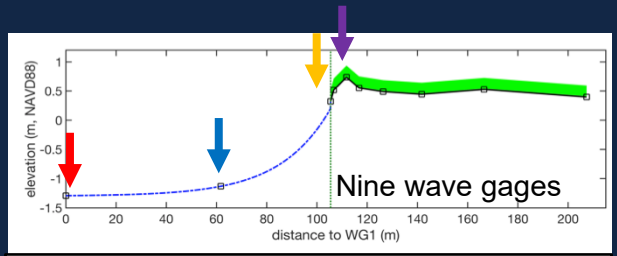
LSU Field Team led by **Navid Jafari**

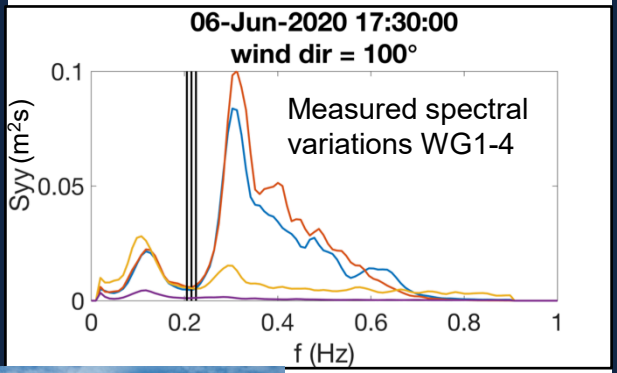
- Deployment decision made on June 3rd

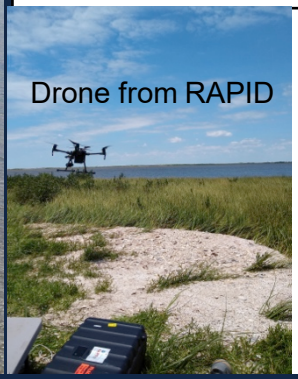
- Deployed sensors by airboat on June 5th
- Cristobal made landfall on June 8th.

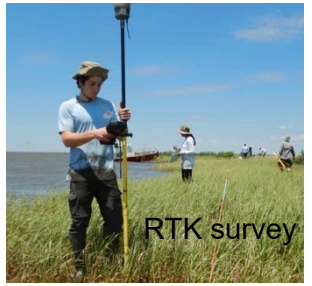
- Sensor retrieval & surveys on June 12

Wave gages, sediment traps, cameras, Pore pressure gages, penetrometers, RTK, Drone (DJI Matrice 210), etc.









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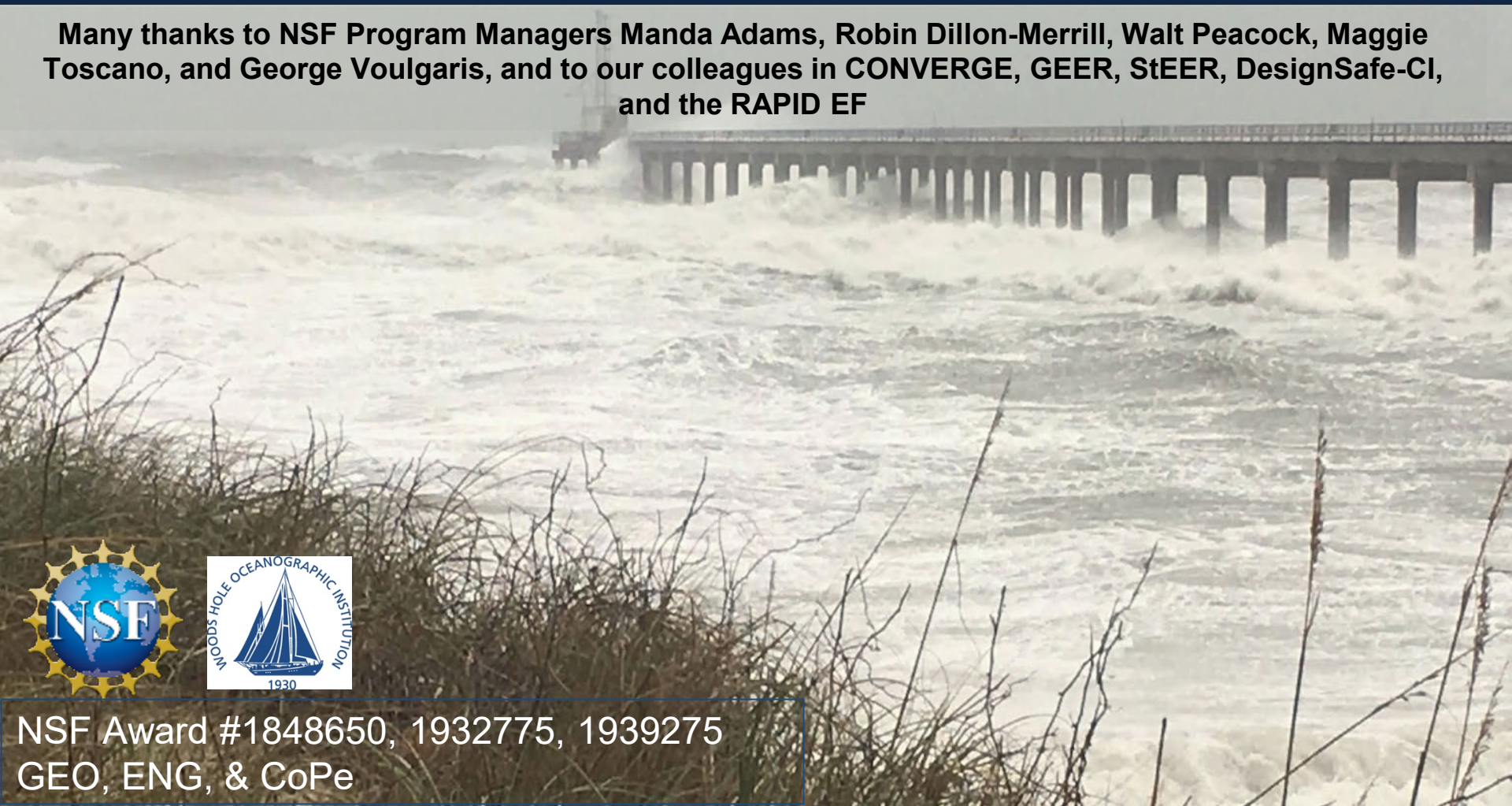
Thank you, and hope you join us!

Many thanks to NSF Program Managers Manda Adams, Robin Dillon-Merrill, Walt Peacock, Maggie Toscano, and George Voulgaris, and to our colleagues in CONVERGE, GEER, StEER, DesignSafe-CI, and the RAPID EF



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