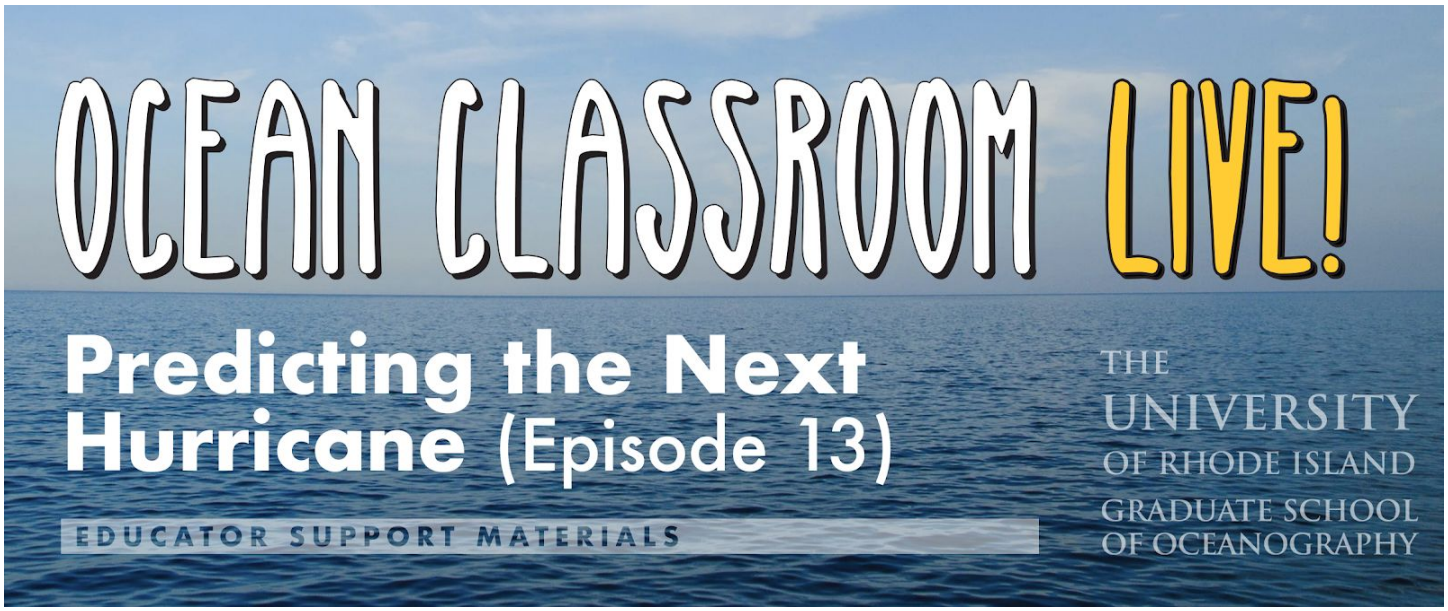

Scientists are using increasingly accurate computer models to help predict when and where hurricanes might strike. These models are also helping us understand the impacts of these extreme storms. Join URI Graduate School of Oceanography student Mansur Ali Jisan and host Holly Morin of the Inner Space Center for a discussion about how scientists are improving their ability to predict storms, and how we can all use this information to stay prepared.

Discussion Questions

- What technologies are used to predict hurricanes?
- How does the ocean influence the intensity of hurricanes?
- What is a hurricane's life cycle?

Resources

Graduate School of Oceanography
As one of the nation's premier academic oceanographic institutions, the University of Rhode Island's Graduate School of Oceanography (GSO) educates marine scientists, students, policymakers, business leaders and citizens and helps develop the knowledge and skills necessary to address present and future marine challenges.

- GSO: https://web.uri.edu/gso/
- Inner Space Center: http://innerspacecenter.org/
- Rhode Island Teachers At Sea: https://web.uri.edu/gso/research/outreach/rhode-island-teachers-at-sea-program/
- Narragansett Bay Classroom: https://web.uri.edu/gso/research/outreach/narragansett-bay-classroom/
- GSO Facebook: https://www.facebook.com/URIGSO/
- GSO YouTube: https://www.youtube.com/c/URIGraduateSchoolofOceanography
- Hurricanes: Science and Society- http://www.hurricanescience.org/
- Meet Mansur Ali Jisan: http://jisan-mansur.com
- Learn about the URI Hurricane Research Group: https://web.uri.edu/hurricane-research/

Other Resources

- National Hurricane Center FAQ: https://www.nhc.noaa.gov/faq.shtml
- Global Warming and Hurricanes: https://www.gfdl.noaa.gov/global-warming-and-hurricanes/
- NOAA real-time water level information: https://tidesandcurrents.noaa.gov/stations.html?type=Water+Levels
- NOAA National Storm Surge Hazard Maps: https://noaa.maps.arcgis.com/apps/MapSeries/index.html?appid=d9ed7904dbec441a9c4dd7b277935fad&entry=1
- National Hurricane Center Storm Surge Overview: https://www.nhc.noaa.gov/surge/
- NOAA Office of Marine and Aviation Operations: https://www.omao.noaa.gov/learn/aircraft-operations
- National Hurricane Center Storm Surge Intro: https://www.nhc.noaa.gov/surge/surge_intro.pdf
- National Hurricane Center Track and Intensity Forecast Model Summary: https://www.nhc.noaa.gov/modelsummary.shtml
- NOAA's National Buoy Data Center: https://www.ndbc.noaa.gov/
- National Hurricane Center Marine Products: https://www.nhc.noaa.gov/abouttafbprod.shtml
- NHC Tropical Cyclone Graphical Product Descriptions: https://www.nhc.noaa.gov/aboutnhcgraphics.shtml
- Know your Zone (evacuation zone): https://flash.org/2017EvacuationZones.pdf

Suggested Standards

Next Generation Science Standards *K-12 Performance Expectations relating to collecting data, ecosystems/animals.*

Elementary School

K: Earth's Systems

- K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.

K: Earth and Human Activity

- K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

Grade 2: Earth's Systems

- 2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Grade 3: Earth's Systems

- 3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
- 3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

Grade 3: Earth and Human Activity

- 3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

Grade 5: Earth and Human Activity

- 5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Middle School

MS: Matter and Its Interactions

- MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed

MS: Earth Systems

- MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

MS: Earth & Human Activity

- MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects

MS Engineering Design

- MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
- MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
- MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

High School

HS: Earth and Human Activity

- HS-ESS3-1. Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.

HS Engineering Design

- HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

Ocean Literacy Principles

OLP3: The Ocean is a major influence on weather and climate