

SMSS First Year Graduate Student Seminar

Whitney Huang



January 14, 2020

Who am I?

- ▶ **First year** Assistant Professor of Applied Statistics and Data Science

- ▶ Born in Laramie, Wyoming, grew up in Taiwan



- ▶ Got a B.S. in Mechanical Engineering, switched to Statistics

in graduate school

- ▶ Ph.D. in Statistics, 2017, Purdue; SAMSI/CANSSI Postdoc
2017-2019



samsi
NSF Duke NCSU UNC



**University
of Victoria**

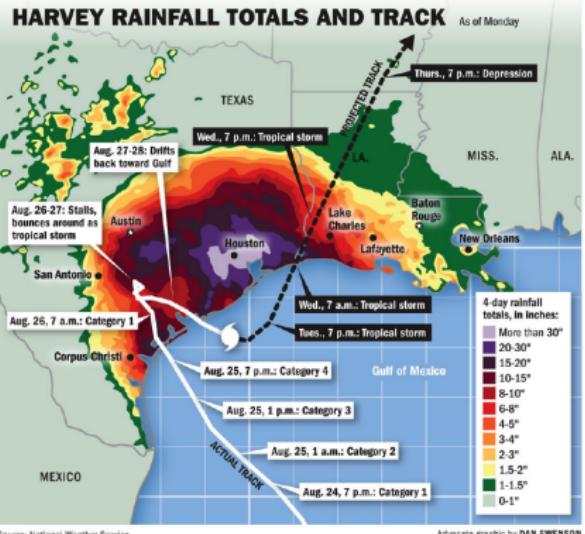
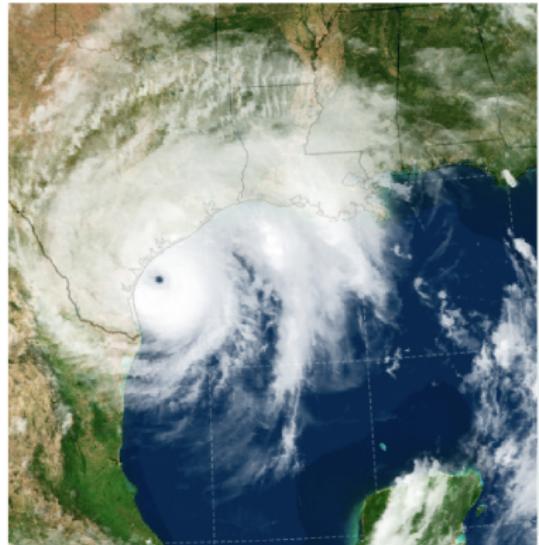


Modeling Spatio-Temporal Data

Research Overview

- ▶ Extreme Value Analysis
- ▶ Spatio-Temporal Statistics
- ▶ Design & Analysis of Computer Experiments

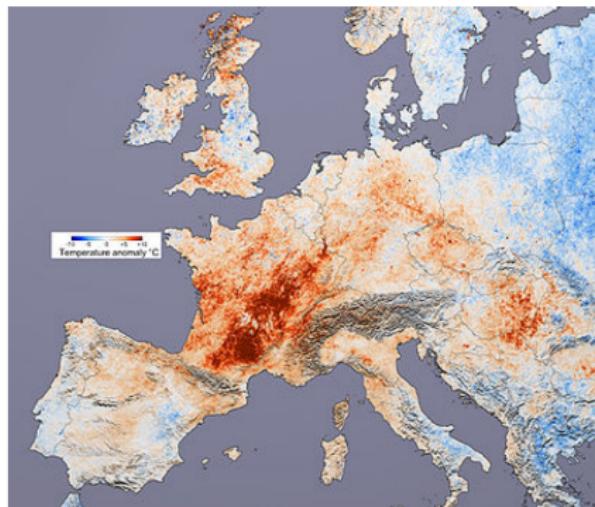
Extreme Rainfall During Hurricane Harvey



Source: NASA (Left); National Weather Service (Right)

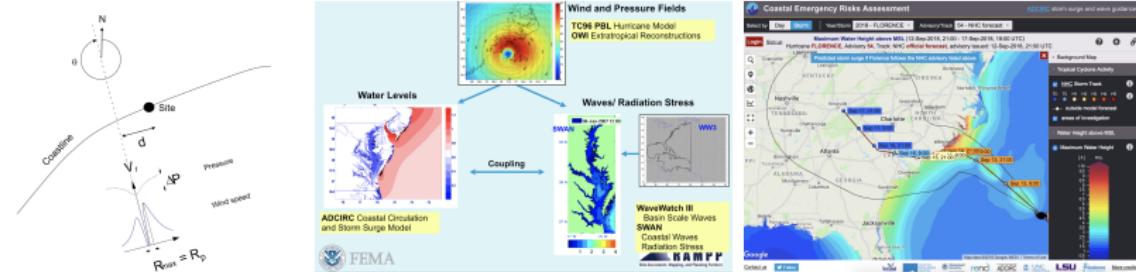
- “A storm forces Houston, the limitless city, to consider its limits” – The New York Times (8.31.17)

Environmental Extremes: Heatwaves, storm surges, etc.



- ▶ **Heat wave:** The 2003 European heat wave led to the hottest summer on record in Europe since 1540 that resulted in at least **30,000 deaths**
- ▶ **Storm Surge:** Hurricane Katrina produced the highest storm surge ever recorded (**27.8 feet**) on the U.S. coast

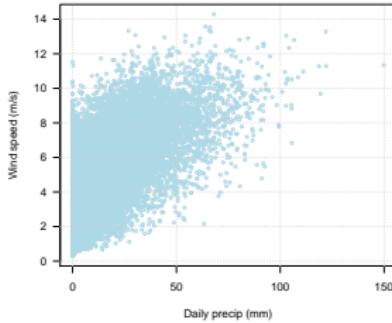
Integrate Physical and Statistical Models to Estimating Storm Surge Risk



Research questions: How to estimate the magnitude of extreme surge heights (e.g., 50-year surge height along the SC coastal region)?

1. Estimate the “input” (i.e., storm characteristics) distribution
2. Approximate the input/output relationship of the model
3. “Combine” 1 and 2 to estimate the storm surge risk

Modeling Concurrent Extremes Using Large Climate Simulations



Goal: To develop a statistical framework for estimating **concurrent extremes** (i.e., the “simultaneous” occurrence of multiple extremes)

- ▶ “Big Data” problem:
 - ▶ 20,150 grid cells, each with ~ 1 million data points
 - ▶ **Challenges:** Spatial-temporal dependence/non-stationarity

Reading/Working Groups

- ▶ Extreme Value Analysis (EVA): joint with Dr. Brook Russell
- ▶ Uncertainty Quantification (UQ): joint with Drs. Andrew Brown and Qiong Zhang
- ▶ Statistics for Climate/Environmental Research

My Advising Experience

- ▶ Quiyi Wu

- ▶ A former SAMSI visiting student, now a first year Ph.D. at University of Rochester
- ▶ Summer research intern with [Argonne National Lab](#) (Mathematics and Computer Science Division (MCS) & Environmental Science Division (EVS))

- ▶ Andrew Bellucco

- ▶ MS project on "*Estimating Financial Risk*" (Co-advised with Dr. Colin Gallagher, Graduated Dec. 2019)
- ▶ Will join Bank of America as Analyst

Some Advice On Attending Seminars/Workshops/Confer- ences

Attend Seminars!

- ▶ Graduate Student Seminars
<http://siam.people.clemson.edu/gss/schedule.php>
- ▶ Research Seminars
- ▶ School Colloquia

Attend Workshops!

- ▶ NSF-CBMS Regional Research Conferences in the Mathematical Sciences
<https://www.cbmsweb.org/regional-conferences/>
- ▶ National Science Foundation (NSF) funded mathematical sciences institutes <https://mathinstitutes.org/>

Attend Conferences!

- ▶ Joint Mathematics Meetings (JMM): [January](#)
- ▶ Society for Industrial and Applied Mathematics (SIAM) Annual Meeting: [July](#)
- ▶ Institute for Operations Research and the Management Sciences (INFORMS) Annual Meeting: [October or November](#)
- ▶ Joint Statistical Meetings (JSM): [Late July or early August](#)
- ▶ Neural Information Processing Systems (NIPS) Conference: [December](#)

How to React Me?

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- ▶ **Office:** O-221 Martin Hall



Go Tigers!

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