

## Session 3

### Engineering a sustainable future: Climate, energy, and financial resilience

Wednesday, April 7 at noon

#### **Financial risks of flooding in Eastern North Carolina: Who is financially exposed?**

*Hope Thomson (MPH, 2021) – Advisor: Greg Characklis*

Abstract: Since 1980, flooding and hurricanes in the United States have caused over \$1 trillion in damages, and together these two types of events represent over 75% of nationwide losses from ‘Billion-Dollar Weather and Climate Disasters’. While attempts have been made to quantify the total value of flooding losses from these events, it is often less clear who these losses accrue to, and how such losses cascade through a community in the wake of an extreme event. This project focuses on characterizing these losses in eastern North Carolina to better inform mitigation of future disaster financial risk.

About Hope: In my program, I've been studying public health through a disaster-focused lens whenever possible. In the future, I'm interested in working on projects that inform the protection of human health and wellbeing in the face of climate change. Before I came to Gillings I was a traveling science educator with Morehead Planetarium and Science Center, and in that work, I visited over 50 counties in North Carolina.

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#### **At the Whims of the Weather: Power in the Pacific Northwest**

*Rosa Cuppari (PhD, 2024) – Advisor: Greg Characklis*

Abstract: Cheap hydropower comes with its costs: uncertain production based on weather conditions. Case studies in the Pacific Northwest illustrate producers' weather risk and management strategies.

About Rosa: Rosa is transitioning from her MS on co-locating solar power and agriculture to hydropower production in transboundary basins. She also helps manage the family bed and breakfast in Italy. This may be easier if she ends up working for the UN Food and Agriculture Organization.

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#### **Do Imports and Exports Improve Green Productivity? Reexamining Environmental Inequality Using Partially Linear Functional-coefficient Models**

*Ying Yu (PhD, 2025) – Advisor: Noah Kittner*

Abstract: Trade leads to economic development and environmental consequences. We investigate the impact of trade on green productivity and find that high-income economies benefit more from trade.

About Ying: I am interested in environmental economics & policy. A fun fact is that I have been to 26 countries. I want to be an environmental economist and find low-carbon transition paths to achieve the coordinated development of the economy and the environment in the future.

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## **How long duration energy storage could become the next key to unlock deep decarbonization**

*Rui Shan (PhD, 2023) – Advisor: Noah Kittner*

Abstract: When we move to a high-renewable penetrated electricity system, we will face huge fluctuations of electricity production at seasonal level. Flattening the seasonal fluctuation with long duration energy storage technologies would be critical to achieve a carbon free electricity system. Moreover, these technologies like hydrogen can open doors for decarbonization in other sectors beyond the electricity system.

About Rui: Scholarly expertise: energy system modeling

Fun fact: play Chinese bamboo flute

Future interest: technology innovation system