Guest Lecture: Tristan Dyer

What's storm surge?
- Use software to simulate the process of a hurricane approaching land; test forecasting and structures
- Easier to test this with software - ADCIRC
  - Model properties of the Earth such as surface roughness

What is finite element analysis?
- A method for solving complex systems of partial differential equations
- Break down complex physical problem
  - Used to test out anything governed by physics
- Convert an equation into a format that the computer is good at solving

Use triangular mesh to represent deep ocean and affected coastlines
- Meshes need to be big enough to accurately capture the physics involved in a hurricane

How does LfS fit in?
- Need to evaluate multiple scenarios when evaluating a structure such as a levy
- Record a state at the boundaries of a situation, then make changes in the mesh for subsequent simulations, so that you don't have to rerun the entire simulation every time
- How do we know that this is giving us the same answers a full run would?
  - Show that results of the subdomain are equivalent to the results given by the full domain

Dynamics: Wetting and drying
- Wetting and drying is one step in an ADCIRC timestep
- All elements start off wet
- Determine whether each node is wet or dry
- There are a lot of dependencies between nodes and elements
  - Wet/dry state of an element depends on its incident nodes
  - Node's wet/dry state depends on its incident element