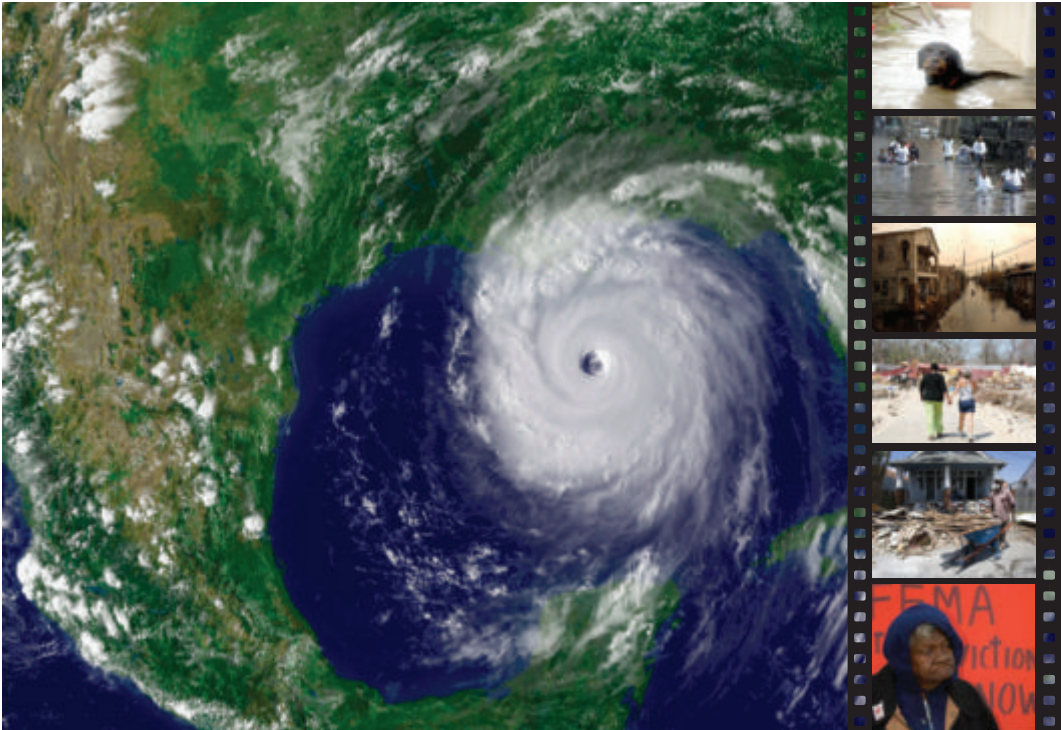
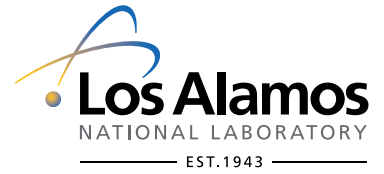


CIP: Critical Infrastructure Protection

Decision Support System (DSS)—Katrina, a Case Study



Making the best decisions in the wake of catastrophic disasters is the key to a successful response rate for saving critical infrastructure. LANL's model incorporates the human behavioral component, a key element for risk management scenarios.

Left: Hurricane Katrina makes its landfall

Inset: Katrina's social impact is the focus of our study—how to model human behavioral response.

Background

Decision makers need to understand the consequences of policy and investment options before they enact solutions. The most effective way is to utilize a decision support system that incorporates threat information, vulnerability assessments, and disruption consequences in quantitative analyses through advanced modeling and simulation. LANL has been developing a system dynamics model with the human component in mind—a critical element in determining the outcome of natural catastrophes—using the Hurricane Katrina evacuation as the control.

Capabilities

We use a hybrid approach coupling a system dynamics model with an agent-based model. This approach allows us to capture the two different scales present in this multiscale problem—macroscopic and microscopic. The infrastructures and their interdependencies were modeled at a macroscopic level. The human behavioral component was modeled at a microscopic level using an agent-based simulation representing different social networks.

Future Applications

This behavioral model can be extended and adapted to many scenarios and domains where human behavior and mechanism of information diffusion and adaptation are involved.

Contact

Donatella Pasqualini
MS D452
Los Alamos National Laboratory
P.O. Box 1663
Los Alamos, NM 87545 USA
505 667 0701
dondy@lanl.gov

Right: The light blue bars show the actual traffic evacuation during Hurricane Katrina. Our simulation (blue circles) closely mimics the real data.

