



# **The Disaster Research Center (DRC)**

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University of Delaware**

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Director**

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The Dynamics of Societal Resilience Small Group Meeting  
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Defence Science and Technology Organisation  
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# About DRC

- Established in 1963 at Ohio State University; relocated to the University of Delaware in 1985
- The first and one of the leading research centers in the world devoted to the study of the social science aspects of disasters

# What does DRC research?

- The Center has conducted field and survey research on response to and recovery from natural and technological disasters as well as many other community-wide crises
- DRC focuses on large scale, rapid onset, geographically bound events
- The Center has carried out systematic studies on a broad range of disaster agents, including hurricanes, floods, earthquakes, tornadoes, tsunamis, hazardous chemical incidents, plane crashes, civil disturbances and riots, and terrorist events

# What does DRC research?

- Disasters at the group, organizational, and community level
- DRC's research initiatives have a multi- or inter-disciplinary focus

# Who makes up DRC?

- DRC currently has four full-time faculty members:
  - Havidán Rodríguez- Director
  - Benigno Aguirre
  - Joanne Nigg
  - Tricia Wachtendorf
- As well as two Emeritus professors, the co-founders of DRC:
  - Russell R. Dynes
  - Enrico (Henry) L. Quarantelli

# Who makes up the DRC? (cont.)

- In addition to faculty, DRC employs students in several research positions:
  - Projects' Coordinator (Graduate Student – Joe Trainor)
  - Graduate Research Assistants (9)
  - Undergraduate Research Assistants (14)
- DRC also has two administrative staff members:
  - Administrative Assistant
  - Resource Collection Coordinator

# Funding Sources

Over the years, DRC has received funding from a variety of sources, including but not limited to:

- The National Institute of Mental Health
- The Federal Emergency Management Agency and its preceding agencies
- The NOAA Sea Grant Program
- The U.S. Geological Survey

Current research funding is provided by grants from:

- The National Science Foundation (NSF)
- The U.S. Department of Defense (DoD)
- The Public Entity Risk Institute (PERI)
- NOAA Sea Grant Program at the University of Puerto Rico-Mayagüez
- University of Delaware Institutional Funds

# Where do we do our work?

- Over 650 field studies have been conducted, traveling to communities throughout the United States and to a number of foreign countries, including Mexico, Canada, Japan, Italy, Turkey, Sri Lanka, and India
- Faculty and staff are also very active in the national and international disaster research communities



# Where do we do our work?

## ● Recent Quick Response Field Research:

- 9/11: Terrorist attacks on the World Trade Center
- 2004 Indian Ocean Tsunami (India and Sri Lanka)
- 2005 Hurricane Katrina: Louisiana, Mississippi, and Texas (Houston)
- 2006 Tornadoes in the Gulf Coast and the Mid-West

# Current Research Projects at DRC

- There are several exciting studies currently being conducted at the Center:
  - Multi-Organizational Coordination and Response System Emergence in the September 11<sup>th</sup> attacks on the World Trade Center (MCEER, PERI, NSF)
  - Social Science Insights into Pedestrian Evacuation Modeling (NSF)
  - Disaster Vulnerability in the Coastal Regions in Puerto Rico (NOAA Sea Grant College Program)

# Current Research Projects at DRC

- Inter-organizational coordination in Urban Search and Rescue (NSF)
- Collaborative Research: Improving USAR Preparedness Using Simulation Technology (NSF)
- Quantitative Models of Social and Economic Consequences (Mid-America Earthquake Center - NSF)

# Current Research Projects at DRC

- Technology, Warning Systems, and End-User Needs (Engineering Research Center – CASA - NSF)
- Characterization of the Supply Chains in the Aftermath of an Extreme Event: The Gulf Coast Experience (NSF)
- Collaborative Research on Improvisation and Sensemaking in Sudden Crisis (NSF)

# Research Experience for Undergraduates (REU)

## ● Objectives:

- Engage undergraduate students in hands-on research training to enhance their understanding of the social science aspects of disasters.
- Provide students with the necessary academic background, training, and relevant research experiences to prepare them to function as relatively independent research scholars.



**Funded by the National Science Foundation (NSF)  
and the U.S. Department of Defense (DoD)**

# Research Experience for Undergraduates (REU)

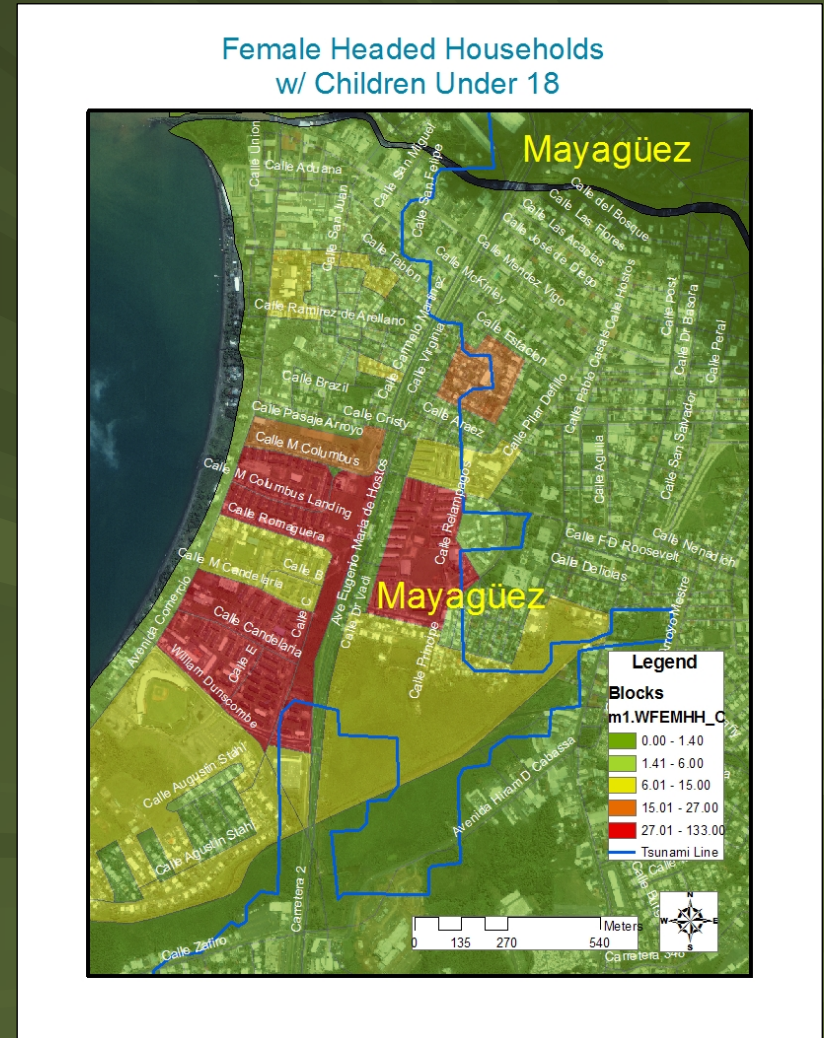
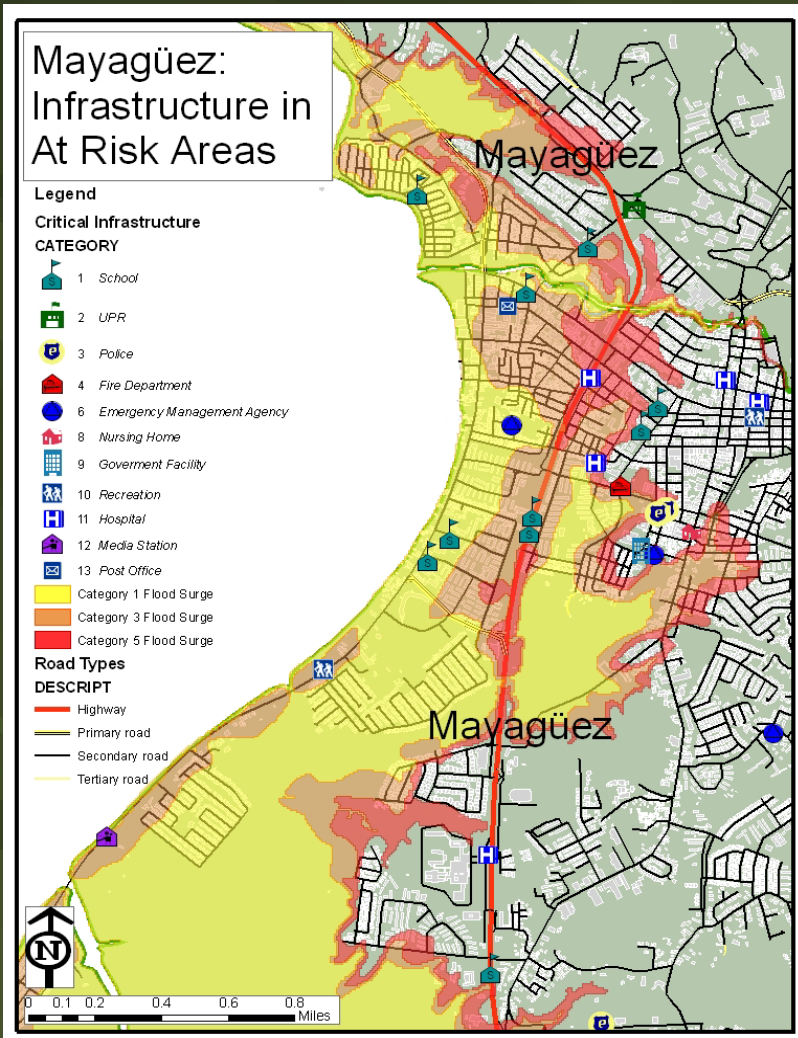
- Ten (10) undergraduate students (each year) selected nationally from a broad number of fields
- Each summer, a nine (9) week intensive research training institute focusing on social science aspects of disasters, including mitigation, preparedness, response, recovery, warnings and technology, vulnerability, and resilience
- REU trainees work with leading scholars and researchers in the field
- *Invited Speaker Series*, focusing on the contributions that other disciplines bring to the study of disasters
- Professional development workshops and social-cultural activities
- Participate in the Hazards Conference in Boulder; Disasters Roundtable of the National Academies of Science; field trips
- Principal Investigators: Havidán Rodríguez and Joanne Nigg



# **Population Composition, Geographic Distribution, and Natural Hazards: Vulnerability in the Coastal Regions of Puerto Rico**

- Explore and develop a vulnerability model focusing on the population residing in the coastal regions in Puerto Rico
- Generate GIS based maps of coastal areas in Puerto Rico integrating detailed socio-demographic data of the resident population with available aerial images and storm surge and tsunami flooding maps.
- Compare and examine the determinants of vulnerability in the coastal regions of Puerto Rico and determine how vulnerability has changed from 1990 to 2000
- Funded by NOAA Sea Grant Program: Havidán Rodríguez, Walter Diaz, and Aurelio Mercado – University of Puerto Rico-Mayaguez

# Population Composition, Geographic Distribution, and Natural Hazards: Vulnerability in the Coastal Regions of Puerto Rico



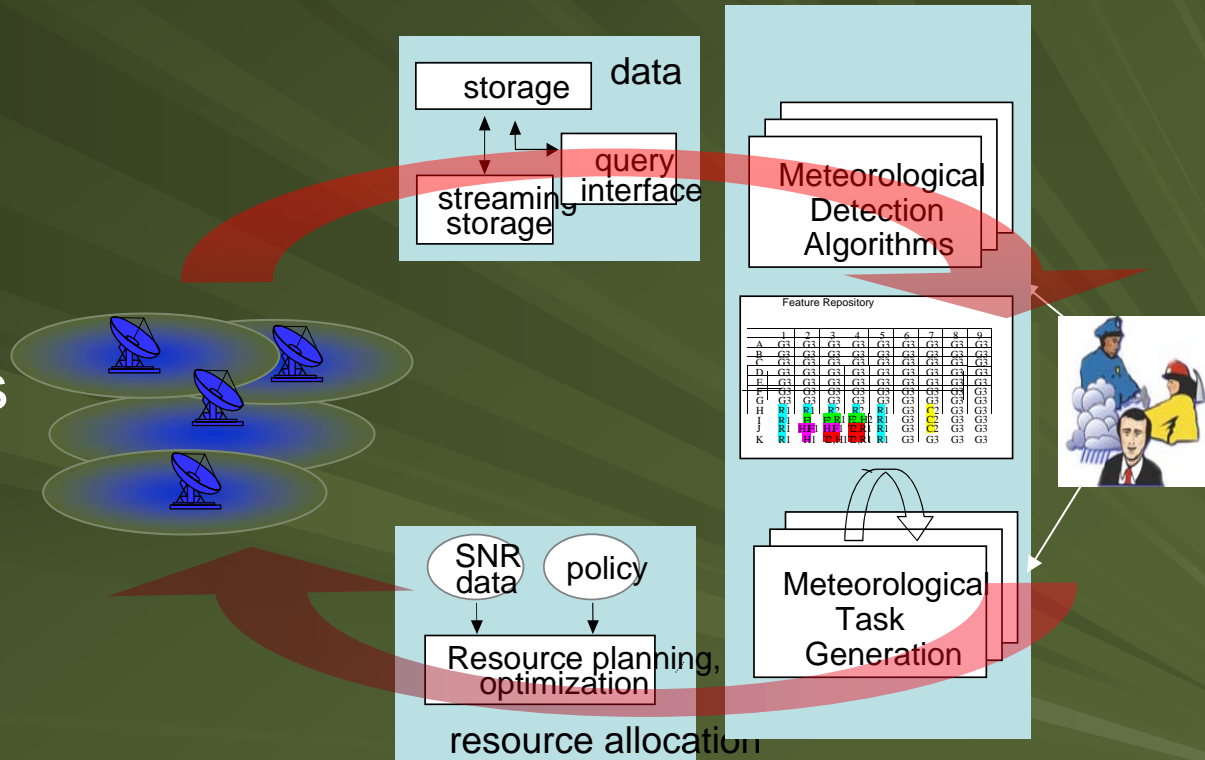


# Engineering Research Center (ERC) for Collaborative Adaptive Sensing of the Atmosphere (CASA)

- “Revolutionize our ability to observe the lower troposphere through Distributed Collaborative Adaptive Sensing (DCAS), vastly improving our ability to detect, understand, and predict severe storms, floods, and other atmospheric and airborne hazards”
- Funded by NSF (DRC PI: Havidán Rodríguez)

# CASA Collaborators & Partners

- Engineers
- Computer Scientists
- Meteorologists
- Social Scientists
- Graduate and undergraduate students
- Industry and government representatives



# End-User Team Objectives

- Incorporate end-user needs into the system design from day one
- Identify users' perceptions:
  - advantages & limitations of current weather observation and warning systems
  - how the media and public perceive, understand, and respond to weather forecasts and warning information
  - policy determinations and enhancing weather technology

# Urban Search and Rescue (USAR)

- The objective of this research is to examine the relationship among FEMA USAR taskforces, FEMA support personnel, local responders, state emergency managers, and other responders active in search and rescue efforts
- Researchers are also examining the relationship between civilian agencies and USAR with law enforcement agencies, EMS, and volunteers
- Funding for this effort has been provided by NSF (DRC PI: Benigno Aguirre)

# USAR Deployments

- DRC researchers completed a series of focus groups and in-depth interviews with members of FEMA's USAR teams that were deployed to ten incidents that form part of the research project:

- September 11th World Trade Center Attacks
- September 11<sup>th</sup> Pentagon Attacks
- Debruce Grain Elevator Collapse
- Hurricane Floyd
- Northridge Earthquake
- Space Shuttle Columbia Explosion
- Atlanta Summer Olympics Bombing
- Humberto Vidal Gas Explosion
- Hurricane Opel
- Oklahoma City Bombing

# Collaborative Research Proposal on Improvisation and Sensemaking in Sudden Crisis



- Principal Investigators
  - Tricia Wachtendorf, University of Delaware
  - James Kendra, University of North Texas
  - Jasmin Ruback, Ruback & Associates
- Interdisciplinary: sociology, geography, public administration, and social psychology
- Funding Agencies:
  - National Science Foundation
  - University of Delaware Research Foundation



# Collaborative Research Proposal on Improvisation and Sensemaking in Sudden Crisis

- Case study of 9/11 waterborne evacuation of a half million commuters by an ad hoc flotilla of ferries, tugs, workboats, dinner cruise boats and other assorted harbor craft
- Examination of self-organization, improvisation, and multi-organizational coordination under conditions of extreme environmental stress
- Methods include: in-depth interviews with evacuation participants, geo-spatial coding linking social processes to the physical environments of the disaster, and social network analysis of participating individuals, vessels, and organizations

# Characterization of Supply Chains in the Aftermath of an Extreme Event: the Gulf Coast Experience



- Principal Investigators
  - Tricia Wachtendorf, University of Delaware
  - Jose Holguin-Veras and Satish Ukkusuri, Rensselaer Polytechnic Institute
- Interdisciplinary: sociology, civil and transportation engineering
- Funding Agency:
  - National Science Foundation



# Characterization of Supply Chains in the Aftermath of an Extreme Event: the Gulf Coast Experience

- Small grant for exploratory research
- Case study of 2005 Hurricane Katrina
- Methods include: in-depth interviews, qualitative analysis, and mathematical modeling
- Identifies the basic features of the supply chains, logistics, and delivery of resources to the Gulf Coast, including both critical and non-critical supplies
- Documents lessons learned, both positive and negative

# The 2004 Indian Ocean Tsunami



Two-week field research in India and Sri Lanka yielded important data on disaster preparedness, response, and recovery from this devastating tsunami.

Objectives: Collect perishable data; identify communities particularly hard hit by tsunami; and establish contacts with local researchers and practitioners, among others

Funding provided by EERI-NSF (Rodriguez, Wachtendorf, Kendra, and Trainor)

# WTC Project

- This project explores the nature of organizational action and interaction during and after a terrorist attack on the USA, resulting in the destruction of World Trade Center towers on September 11, 2001
- The study allows for a systematic examination of the roles, effectiveness, and organizational structuring of emergent response groups; public perceptions of organizational response to disasters; and the dynamics of social organization over time and space
- Funding has been provided by NSF, MCEER, and PERI (Tierney, Aguirre, Wachtendorf)

# Data Collection

● Data for this project came from four sources:

- Rapid Field Deployment

- DRC staff were deployed and on-site at critical locations for the emergency response to this event

- Field Documents

- During field deployment, staff collected any and all printed material that was available for later analysis

- Newspaper reports

- DRC staff collected, catalogued, and coded over 2200 newspaper articles related to this event

- In-depth interviews with key decision makers

- DRC researchers conducted over 60 interviews with key players from response organizations

# DRC Conferences

- DRC has also organized several multinational research conferences focusing on disaster issues in Central America, Southern Asia, Europe, Japan, Russia, and the former Soviet Union.
- On April 30-May 1, 2004, DRC celebrated its 40th anniversary through a conference funded by NSF and the College of Arts and Sciences:
  - Platform to discuss current issues and new directions for disaster research from an international and interdisciplinary perspective
  - About one-hundred participants representing 18 countries
  - Researchers, practitioners, and students
  - 33 universities, 26 national and international agencies, and private sector organizations



# The DRC Resource Collection

- DRC serves as a repository for publications and materials, focusing on the social science of disasters
- DRC's specialized collection is the world's most complete - now numbering more than 55,000 items. This resource is open to both interested scholars and researchers and agencies involved in disasters and emergency management
- DRC also has its own book, monograph, and report series now numbering over 400 publications
- We also participate in DSpace, The University of Delaware's Morris Library Institutional Repository:  
<http://dspace.udel.edu>

# Future Directions

- Institutional Research Center
- Expansion of Interdisciplinary research
- Graduate Program in Disaster Research
- Continue to expand international focus of research

# For additional Information

- Visit the DRC facilities at:

87 E. Main Street, Newark, DE, USA

(302) 831-6618

(302) 831-2091 (fax)

- Visit the DRC webpage:

[www.udel.edu/DRC/](http://www.udel.edu/DRC/)