



**RAPID** NHERI  
Natural Hazards Reconnaissance



**SSEER**  
SOCIAL SCIENCE  
EXTREME EVENTS  
RESEARCH

# Leveraging University of Washington RAPID Facility Resources to Support Social Science Extreme Event and Reconnaissance Research

**Jamie Vickery & Nicole Errett**  
RAPID Facility  
University of Washington



NHERI 

**Social Science Fridays**  
**April 7<sup>th</sup> 2023**

**NSF Award Number: CMMI 1611820**



# NATURAL HAZARDS ENGINEERING RESEARCH INFRASTRUCTURE (NHERI)



**PURDUE UNIVERSITY**  
Network Coordination Office  
NSF Award #2129782

**UNIVERSITY OF COLORADO BOULDER**  
CONVERGE  
Social Science/Interdisciplinary Resources  
NSF Award #1841338



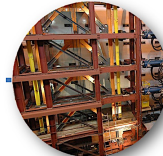
**UNIVERSITY OF CALIFORNIA, BERKELEY**  
SimCenter  
Computational Modeling and Simulation  
NSF Award #2131111

**UNIVERSITY OF WASHINGTON**  
Natural Hazard  
Reconnaissance (RAPID) Facility  
NSF Award #2130997



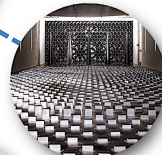
**UNIVERSITY OF TEXAS, AUSTIN**  
DesignSafe  
Community Cyberinfrastructure  
NSF Award #2022469

**OREGON STATE UNIVERSITY**  
Large Wave Flume and  
Directional Wave Basin  
NSF Award #2037914



**LEHIGH UNIVERSITY**  
Large-Scale Multi-Directional  
Hybrid Simulation Testing  
NSF Award #2037771

**UNIVERSITY OF TEXAS, AUSTIN**  
Mobile Field Shakers  
NSF Award #2037900



**UNIVERSITY OF FLORIDA**  
Boundary Layer Wind Tunnel  
NSF Award #2037725

**UNIVERSITY OF CALIFORNIA, DAVIS**  
Geotechnical Centrifuges  
NSF Award #2037883



**FLORIDA INTERNATIONAL UNIVERSITY**  
Wind Simulation  
NSF Award #2037899

**UNIVERSITY OF CALIFORNIA, SAN DIEGO**  
Large High-Performance Outdoor Shaker Table  
NSF Award #1520904



**NICHE**  
Planning for the new, shared-used National  
Full-Scale Testing infrastructure for Community Hardening  
in Extreme Wind, Wave and Surge Events  
NSF Award #2131961

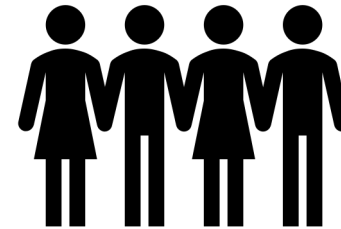
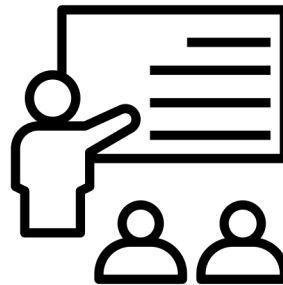
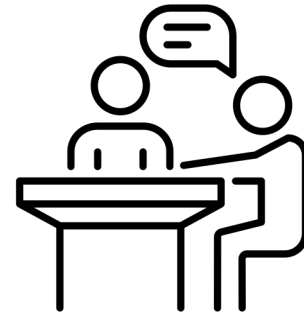
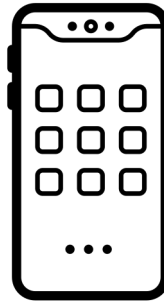
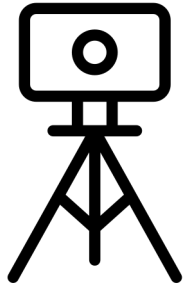
For more information, visit the  
NHERI DesignSafe website: [DesignSafe-ci.org](http://DesignSafe-ci.org)

# RAPID Facility Mission and Values

*The RAPID Facility enables transformative research by providing investigators with the instrumentation, software, and support needed to collect, process, and analyze perishable data from natural hazard events and from disasters.*

*It promotes reconnaissance-based science, shared resources, open data, convergence research, community engagement, and innovation to reduce the adverse impacts of natural hazards.*

# RAPID Facility Strategic Activities



# Facility Resources

- ◆ Advanced Geomatics Technologies
- ◆ Seismic Instrumentation
- ◆ Wind and Storm Surge Instrumentation
- ◆ **Social Science Reconnaissance Equipment**
- ◆ Ground Investigation
- ◆ Imaging Equipment
- ◆ Software tools
- ◆ Full list:  
<https://rapid.designsafe-ci.org>



# RApp

- ◆ iPad App developed for reconnaissance community
- ◆ Questionnaires, checklists, photos, videos, scans, KML, and more
- ◆ Advanced questionnaires
  - Branching & display logic
  - Matrix questions
  - Location feature
  - Shareable questionnaire templates
- ◆ Automatically syncs data from RApp to DesignSafe + additional data users wish to upload
- ◆ RApp Lite forthcoming
  - iPhone App optimized for smaller displays
  - Customizable interface
  - Automatically syncs data to DesignSafe



# RApp Case Study:

## Sheltering Behavior and Shelter Access in the Southeastern United States

**Team:** John Mathias, Eren Ozguven, Tisha Holmes, and Tyler McCreary (Florida State University)

***The goals of the study are to:***

Identify the social and physical factors that may constrain tornado shelter access and/or use

Develop improved modeling for shelter siting

Produce recommendations for how sheltering systems can be improved

*The Weather Ready Research Award program is based on work supported by the National Science Foundation (NSF Award #1635593) through supplemental funding from the National Oceanic and Atmospheric Administration (NOAA) Weather Program Office.*

# RApp Case Study:

## Sheltering Behavior and Shelter Access in the Southeastern United States

*“It’s pretty intuitive to use the RApp for surveying. It was easy for me to show the other people on the team how to use the app. Mostly we filled out the surveys ourselves, but sometimes we also gave the iPad to the person to fill out on their own. People, in my experience, found it pretty intuitive as well.”*

– John Mathias, PhD (Study PI)



Photo Credit: Matt Stone, *Courier Journal*



# Streetview



- ◆ Streetview camera systems with car and backback mounts
- ◆ Collects 360 images (similar to Google streetview)
- ◆ Can cover 100s of km/day
- ◆ In-house data processing

# Streetview Case Study #1

## Using Streetview to Assess Community-Level Impacts and Recovery from a Global Public Health Emergency

***Team:** Joseph Wartman, Nicole Errett, Youngjun Choe, and Scott Miles  
(University of Washington)*

***The goals of the study are to:***

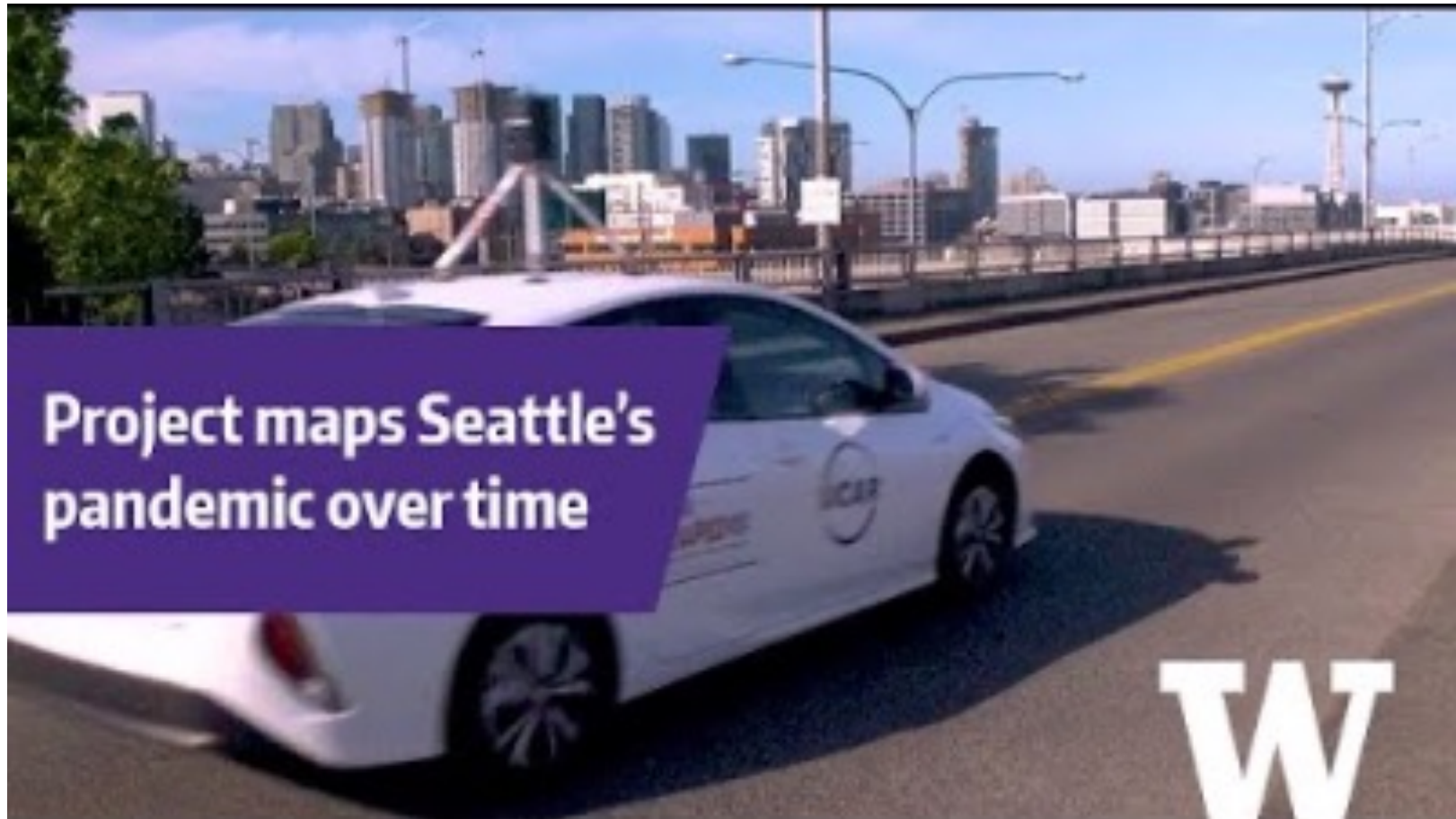
Capture crisis impacts on business operations, transportation networks, and other community assets

Assess the rate/quality of recovery following "shelter-in-place," and how this varies based on a community's socioeconomic characteristics

Understand the impact of "shelter-in-place" policy relaxation on communities following a major crisis

NSF Award #: 2031119

# Streetview Case Study #1



# Streetview Case Study:

## Seattle Assessment for Public Health Preparedness (SASPER) Duwamish Valley Pilot Study

### *The objectives of the study are to:*

1. Assess household- and community-level knowledge of and access to information, resources, and infrastructure to support adaptation to climate change impacts/other natural hazards;
2. Describe climate change health impacts experienced by community members
3. Create opportunities for community members to participate in and provide feedback on community-based and local government efforts to improve resilience and preparedness;
4. Develop a tool and approach for conducting a rapid community needs assessment in the aftermath of climate-induced flooding and/or other natural hazards

Public Health  
Seattle & King County



# W



  
City of Seattle

  
Washington State Department of  
**Health**

  
Duwamish Valley  
Youth Corps  
EMPOWERED VOICES FOR CHANG

  
**RAPID** NHERI

# Streetview Case Study:

## Seattle Assessment for Public Health Preparedness (SASPER) Duwamish Valley Pilot Study

- ◆ Captured “street view” imagery data throughout the Duwamish Valley
  - November 17, 2022
  - December 28, 2022

<https://deohs.washington.edu/edge/duwamish-valley-resilience-planning>



Photo credit: Erika Shultz, *The Seattle Times*

# Who can use the RAPID? (You can!)

- ◆ Open to *anyone*:
  - Academics, government agencies, private industry, etc.
  - Different rates for NSF vs. non-NSF supported users (RAPID equipment is subsidized by NSF)
  - Equipment requests
  - **We aim to accommodate all requests**
- ◆ NSF Grants:
  - RAPID equipment can be requested for any NSF research
  - Reconnaissance possibilities:
    - RAPID grants
    - NSF supported reconnaissance organizations
    - Other NSF proposals



<https://rapid.designsafe-ci.org/>

# Please take our survey!

- ◆ **RAPID Facility Assessment of Social Sciences Research Support Needs:**



# RAPID Facility Support

- ◆ Guidance on use of RAPID equipment and data for social science research
- ◆ RAPID Technical Assistance for research proposals
- ◆ Development of case studies for RAPID social science applications

## Contact Information

Dr. Nicole Errett  
*Social Sciences Lead*  
([nerrett@uw.edu](mailto:nerrett@uw.edu))

Dr. Jamie Vickery  
*Social Sciences Specialist*  
([vickeryj@uw.edu](mailto:vickeryj@uw.edu))

Dr. Joseph Wartman  
*Director*  
([Wartman@uw.edu](mailto:Wartman@uw.edu))

Dr. Jeffrey Berman  
*Site Operations Director*  
([jwberman@uw.edu](mailto:jwberman@uw.edu))



# Discussion

- ◆ Do you have any questions or suggestions for improvement for how the RAPID Facility could be more inclusive of/attentive to the needs of social science researchers?
- ◆ How might you see using RAPID Facility resources in your own work?
- ◆ If we hosted a social sciences-focused RAPID Facility training, what topics – aside from instrumentation overviews - would be useful to you/your team?