METHODS AND ETHICS IN HAZARDS AND DISASTER RESEARCH

Lori Peek, Ph.D.

Professor, Department of Sociology

Director, Natural Hazards Center

PI, CONVERGE, SSEER, and ISEEER

University of Colorado Boulder

NATURAL HAZARDS CENTER

CONVERGE NHERI

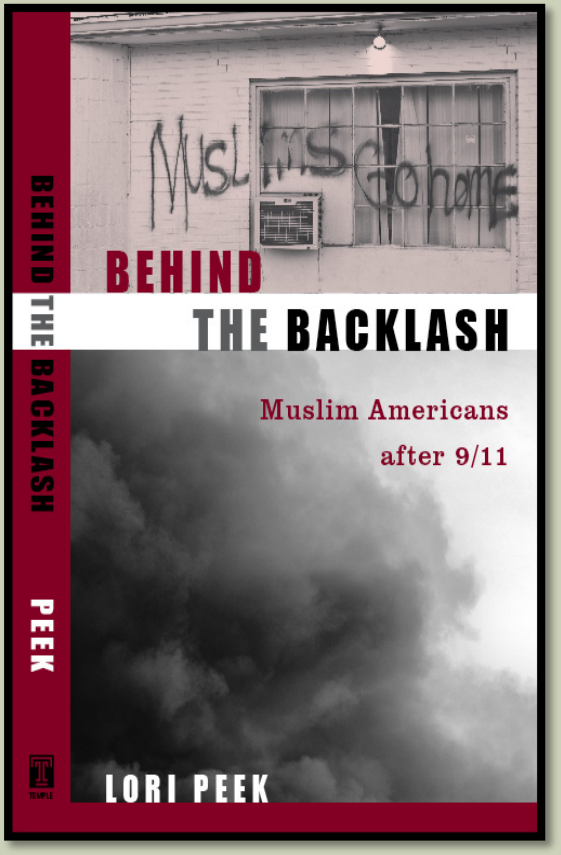
NSF

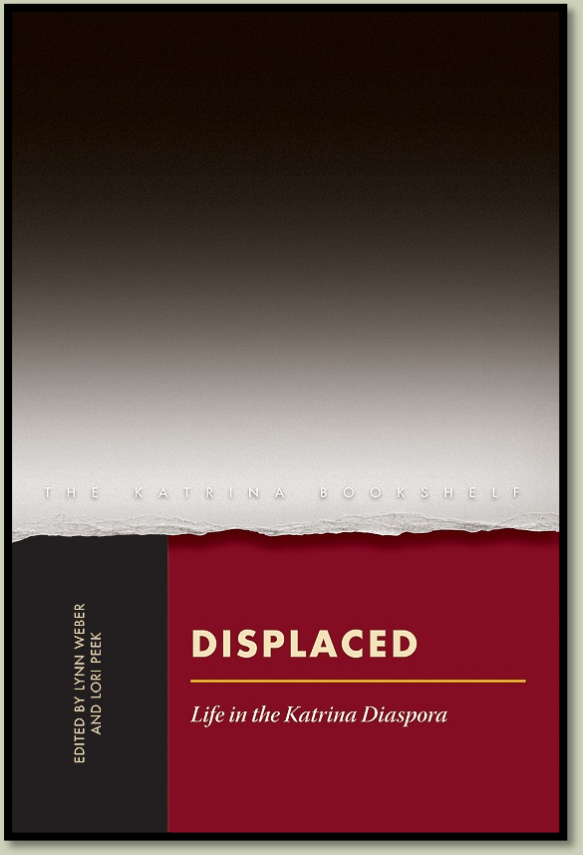
University of Colorado Boulder

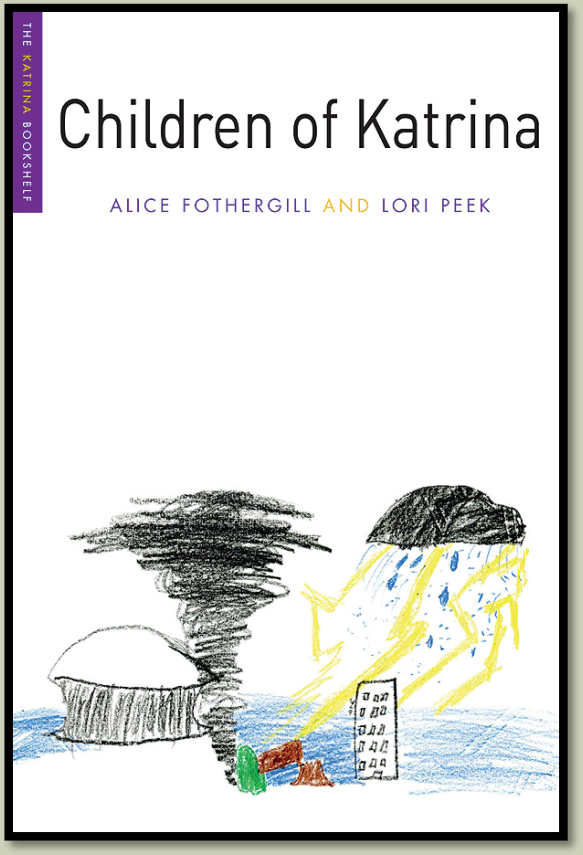

Emergency
Main Entrance
Admitting
Physician Parking
Visitor Parking
Out Patients


ET NOVA
ET VETERA


HOPE
HIGH SCHOOL


BEHIND THE BACKLASH
Muslim Americans after 9/11
LORI PEEK
BEHIND THE BACKLASH PEEK
TEMPLE


THE KATRINA BOOKSHELF
EDITED BY LYNN WEBER AND LORI PEEK
DISPLACED
Life in the Katrina Diaspora


THE KATRINA BOOKSHELF
Children of Katrina
ALICE FOTHERGILL AND LORI PEEK

OVERVIEW

- The Emergence of Social Science Disaster Research
- Research Methods and Ethics
- Interdisciplinary Methods and Approaches
- Stories
- Convergence Science and CONVERGE

THE EMERGENCE OF SOCIAL SCIENCE DISASTER RESEARCH

- First Empirical Study
  - Samuel Henry Prince Dissertation, *Catastrophe and Social Change* (1920)

THE HALIFAX HERALD

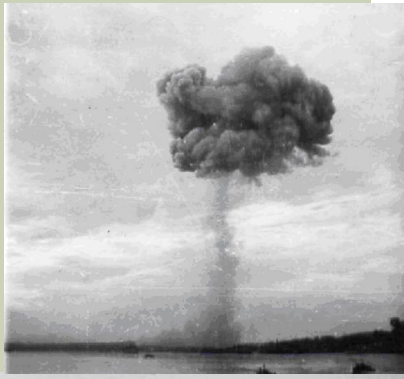
HALIFAX WRECKED

More Than One Thousand Killed In This City, Many Thousands Are Injured And Homeless.

MORE than one thousand dead and probably five thousand injured, many of them fatally, is the result of the explosion yesterday of French steamship Mont Blanc, loaded with nitroglycerine and trinitrotuol. All of Halifax north and west of the depot is a mass of ruins and many thousands of people are homeless. The Belgian Relief steamer, ...

THE wounded and homeless are in different institutions and homes over the city. The Halifax Herald is collecting information regarding the casualties, and citizens who have victims of the disaster at their homes are requested to telephone to The Herald office. Hundreds of the bodies which were taken from the ruins are unrecognizable and morgues have been opened in ...

Military and naval patrols are keeping order ...

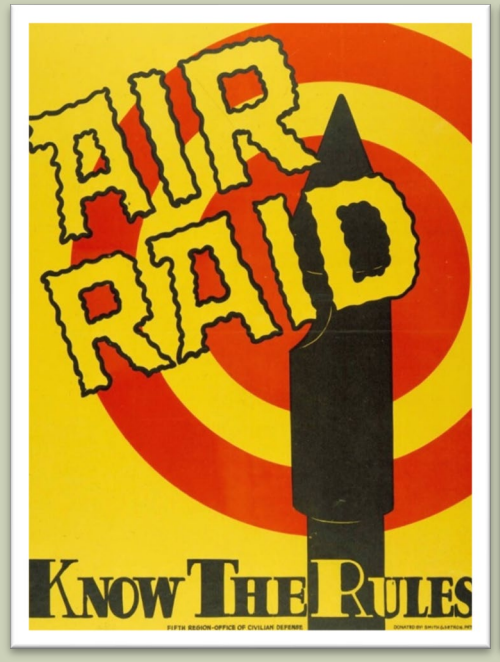


THE EMERGENCE OF SOCIAL SCIENCE DISASTER RESEARCH

- First Empirical Study
  - Prince Dissertation (1920)
- Initial Field Research Teams (1949-1954)
  - University-Based
  - Sociologists Predominated
  - Military Funding

THE EMERGENCE OF SOCIAL SCIENCE DISASTER RESEARCH

- The military had very practical concerns about wartime situations…
- Disasters as a “natural experiment”
- What would happen to society?
  - Panic?
  - Demoralized civilians?
  - Civil unrest?
  - Social control?

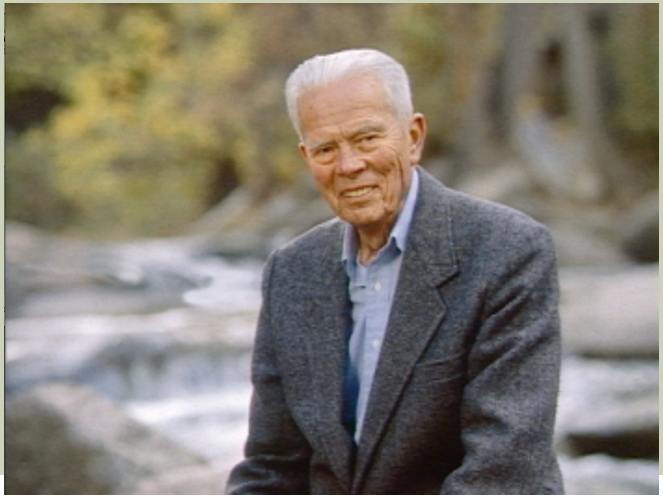


THE EMERGENCE OF SOCIAL SCIENCE DISASTER RESEARCH

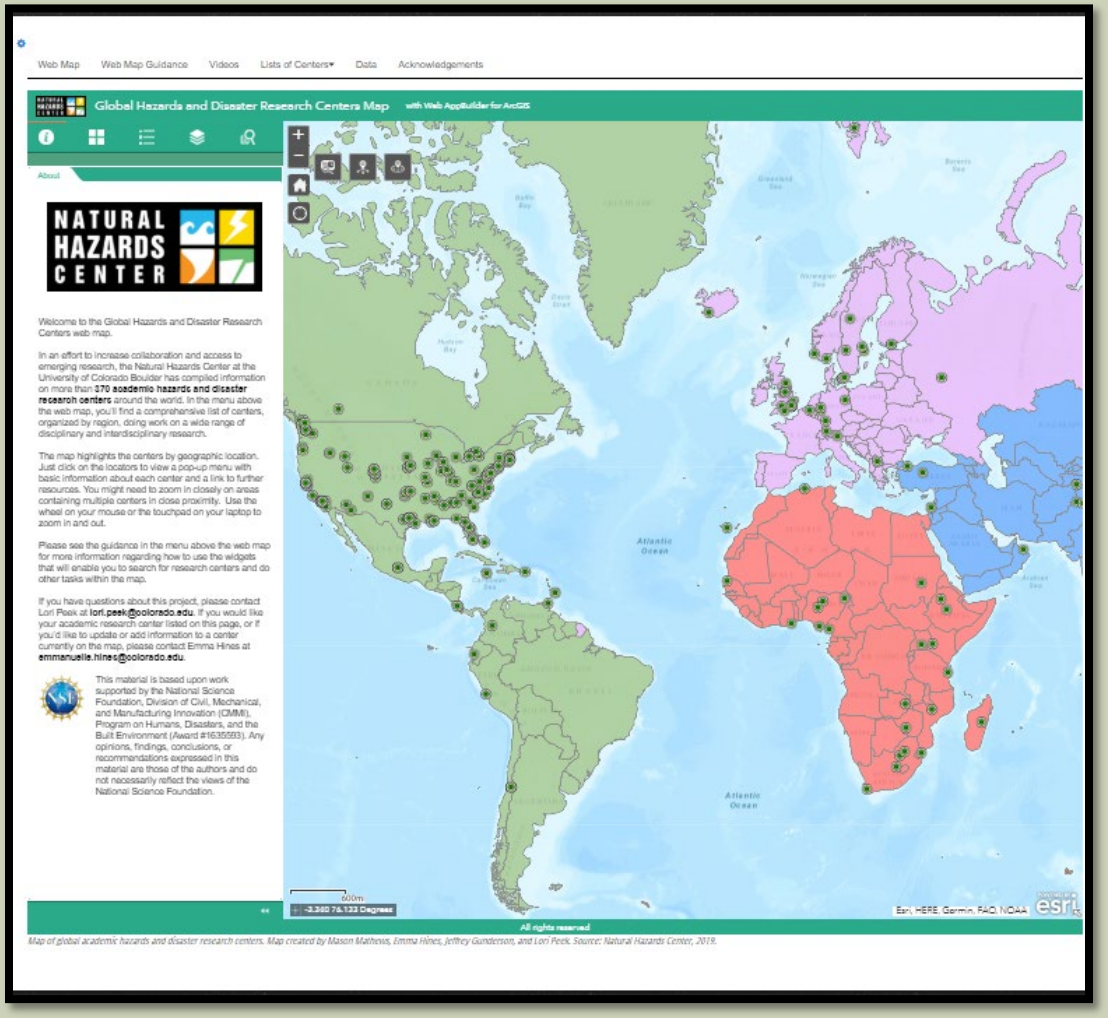
- The military had very practical concerns about wartime situations…
- Disasters as a "natural experiment"
- What would happen to society?
  - ~~Panic?~~
  - Demoralized civilians?
  - Civil unrest?
  - Social control?

THE EMERGENCE OF SOCIAL SCIENCE DISASTER RESEARCH

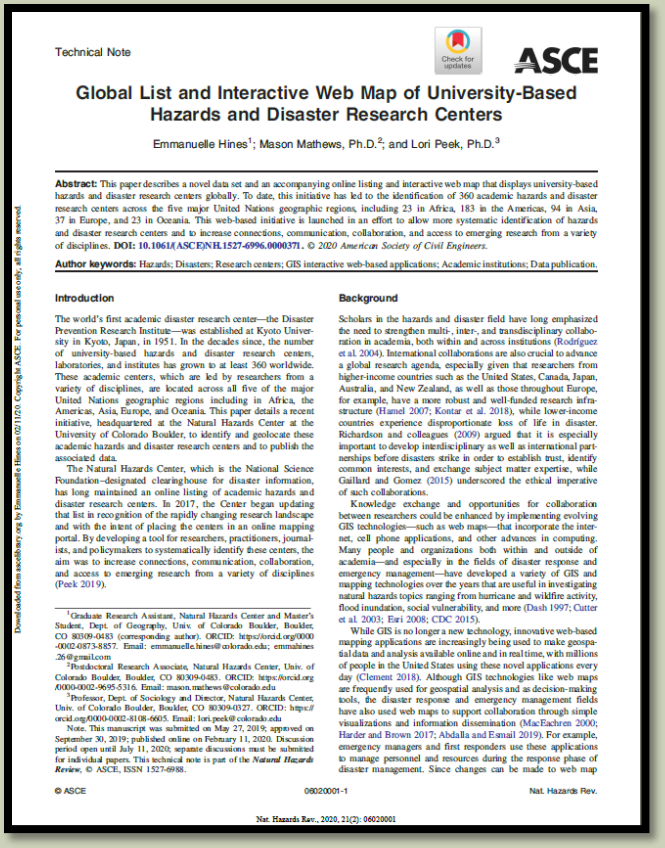
- First Empirical Study (1920)
- Initial Field Research Teams (1949-1954)
- National Academy of Sciences Committee on Disaster Studies (1951-1962)
  - Disaster Research Center* (1963)
- National Science Foundation – *Assessment of Research on Natural Hazards*
  - Natural Hazards Center* (1976)



HAZARDS.COLORADO.EDU/RESOURCES/RESEARCH-CENTERS



Map of global academic hazards and disaster research centers. Map created by Mason Mathews, Emma Hines, Jeffrey Gunderson, and Lori Peek. Source: Natural Hazards Center, 2019.



Technical Note

ASCE

Global List and Interactive Web Map of University-Based Hazards and Disaster Research Centers

Emmanuelle Hines[1]; Mason Mathews, Ph.D.[2]; and Lori Peek, Ph.D.[3]

Abstract: This paper describes a novel data set and an accompanying online listing and interactive web map that displays university-based hazards and disaster research centers globally. To date, this initiative has led to the identification of 360 academic hazards and disaster research centers across the five major United Nations geographic regions, including 23 in Africa, 183 in the Americas, 94 in Asia, 37 in Europe, and 23 in Oceania. This web-based initiative is launched in an effort to allow more systematic identification of hazards and disaster research centers and to increase connections, communication, collaboration, and access to emerging research from a variety of disciplines. **DOI: 10.1061/(ASCE)NH.1527-6996.0000371.** © 2020 American Society of Civil Engineers.

Author keywords: Hazards; Disasters; Research centers; GIS interactive web-based applications; Academic institutions; Data publication.

Introduction

The world's first academic disaster research center—the Disaster Prevention Research Institute—was established at Kyoto University in Kyoto, Japan, in 1951. In the decades since, the number of university-based hazards and disaster research centers, laboratories, and institutes has grown to at least 360 worldwide. These academic centers, which are led by researchers from a variety of disciplines, are located across all five of the major United Nations geographic regions including in Africa, the Americas, Asia, Europe, and Oceania. This paper details a recent initiative, headquartered at the Natural Hazards Center at the University of Colorado Boulder, to identify and geolocate these academic hazards and disaster research centers and to publish the associated data.

The Natural Hazards Center, which is the National Science Foundation–designated clearinghouse for disaster information, has long maintained an online listing of academic hazards and disaster research centers. In 2017, the Center began updating that list in recognition of the rapidly changing research landscape and with the intent of placing the centers in an online mapping portal. By developing a tool for researchers, practitioners, journalists, and policymakers to systematically identify these centers, the aim was to increase connections, communication, collaboration, and access to emerging research from a variety of disciplines (Peek 2019).

Background

Scholars in the hazards and disaster field have long emphasized the need to strengthen multi-, inter-, and transdisciplinary collaboration in academia, both within and across institutions (Rodríguez et al. 2004). International collaborations are also crucial to advance a global research agenda, especially given that researchers from higher-income countries such as the United States, Canada, Japan, Australia, and New Zealand, as well as those throughout Europe, for example, have a more robust and well-funded research infrastructure (Hamel 2007; Kontar et al. 2018), while lower-income countries experience disproportionate loss of life in disaster. Richardson and colleagues (2009) argued that it is especially important to develop interdisciplinary as well as international partnerships before disasters strike in order to establish trust, identify common interests, and exchange subject matter expertise, while Gaillard and Gomez (2015) underscored the ethical imperative of such collaborations.

Knowledge exchange and opportunities for collaboration between researchers could be enhanced by implementing evolving GIS technologies—such as web maps—that incorporate the internet, cell phone applications, and other advances in computing. Many people and organizations both within and outside of academia—and especially in the fields of disaster response and emergency management—have developed a variety of GIS and mapping technologies over the years that are useful in investigating natural hazards topics ranging from hurricane and wildfire activity, flood inundation, social vulnerability, and more (Dash 1997; Cutter et al. 2003; Esri 2008; CDC 2015).

While GIS is no longer a new technology, innovative web-based mapping applications are increasingly being used to make geospatial data and analysis available online and in real time, with millions of people in the United States using these novel applications every day (Clement 2018). Although GIS technologies like web maps are frequently used for geospatial analysis and as decision-making tools, the disaster response and emergency management fields have also used web maps to support collaboration through simple visualizations and information dissemination (MacEachren 2000; Harder and Brown 2017; Abdalla and Esmail 2019). For example, emergency managers and first responders use these applications to manage personnel and resources during the response phase of disaster management. Since changes can be made to web map

[1]Graduate Research Assistant, Natural Hazards Center and Master's Student, Dept. of Geography, Univ. of Colorado Boulder, Boulder, CO 80309-0483 (corresponding author). ORCID: https://orcid.org/0000-0002-0873-8857. Email: emmanuelle.hines@colorado.edu; emmahines.26@gmail.com
[2]Postdoctoral Research Associate, Natural Hazards Center, Univ. of Colorado Boulder, Boulder, CO 80309-0483. ORCID: https://orcid.org/0000-0002-9695-5316. Email: mason.mathews@colorado.edu
[3]Professor, Dept. of Sociology and Director, Natural Hazards Center, Univ. of Colorado Boulder, Boulder, CO 80309-0327. ORCID: https://orcid.org/0000-0002-8108-6605. Email: lori.peek@colorado.edu

Note. This manuscript was submitted on May 27, 2019; approved on September 30, 2019; published online on February 11, 2020. Discussion period open until July 11, 2020; separate discussions must be submitted for individual papers. This technical note is part of the *Natural Hazards Review*, © ASCE, ISSN 1527-6988.

Nat. Hazards Rev., 2020, 21(2): 06020001

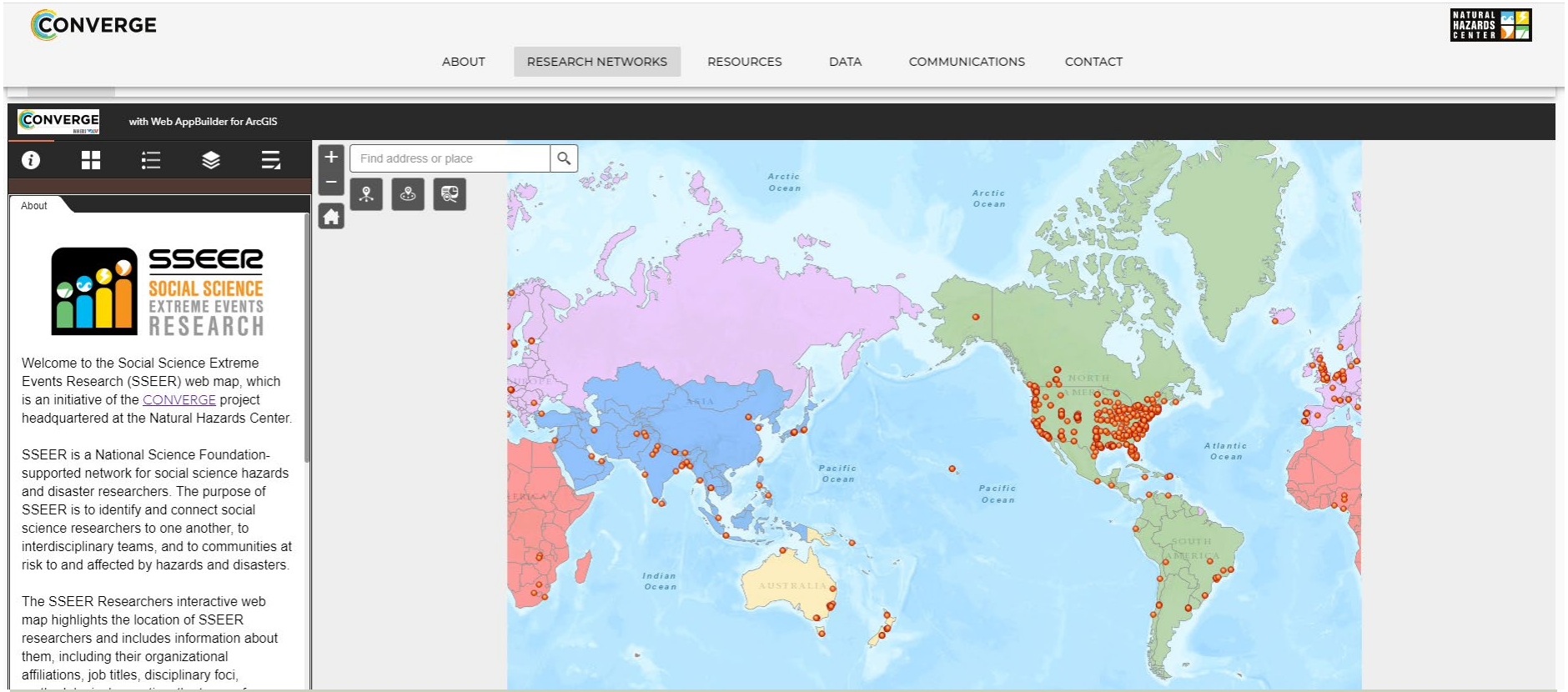
THE EMERGENCE OF SOCIAL SCIENCE DISASTER RESEARCH

- What is a disaster?
  - "An event, concentrated in time and space, that causes significant disruption to society." –Fritz, 1961
  - "A disaster is a potentially traumatic event that is collectively experienced, has an acute onset, and is time-delimited; disasters may be attributed to natural, technological, or human causes." –Norris et al., 2006

DEFINITIONAL CONSEQUENCES

- What is a disaster?
  - "An event, concentrated in time and space, that causes significant disruption to society." –Fritz, 1961
  - "A disaster is a potentially traumatic event that is collectively experienced, has an acute onset, and is time-delimited; disasters may be attributed to natural, technological, or human causes." –Norris et al., 2006
- *What* do social scientists often study?
  - Large-scale disasters
  - Rapid-onset disasters
  - Developed countries, large urban areas

CONVERGE.COLORADO.EDU/RESEARCH-NETWORKS/SSEER



DEFINITIONAL CONSEQUENCES

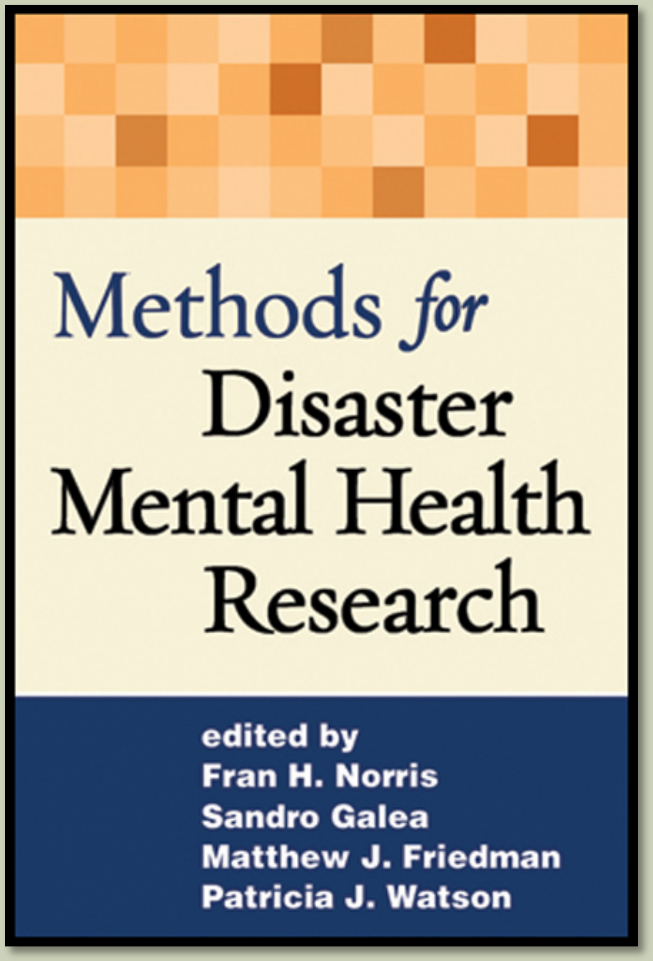
- What is a disaster?
  - "An event, concentrated in time and space, that causes significant disruption to society." –Fritz, 1961
  - "A disaster is a potentially traumatic event that is collectively experienced, has an acute onset, and is time-delimited; disasters may be attributed to natural, technological, or human causes." – Norris et al., 2006
- What do social scientists often study?
  - Large-scale disasters
  - Rapid-onset disasters
  - Developed countries, large urban areas
- *How* do social scientists conduct hazards and disaster research?

METHODOLOGICAL APPROACHES

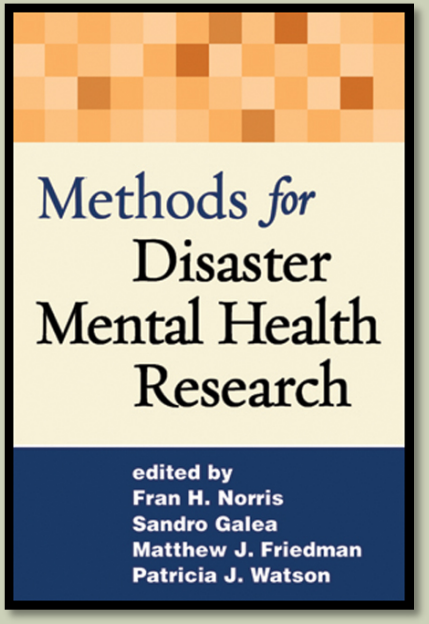
- From a methodological perspective, disaster research is hardly distinguishable from the general sociological enterprise. Indeed, the types of data collection techniques used in social science research on disasters—for example, survey questionnaires, document analysis, observation, and in-depth interviews—are not unique. (Mileti, 1987)

- What makes disaster research distinct is the *circumstances* in which otherwise conventional methods are employed. Put differently, it is the *context* of research, not the methods of research, that makes disaster research unique and challenging in particular ways. (Stallings, 2002)

RESEARCH METHODS



RESEARCH ETHICS



International Journal of Mass Emergencies and Disasters
March 2014, Vol. 32, No. 1, pp. 82–120.

Beyond the IRB:
An Ethical Toolkit for Long-Term Disaster Research

Katherine E. Browne
Department of Anthropology
Center for Disaster and Risk Analysis
Colorado State University

and

Lori Peek
Department of Sociology
Center for Disaster and Risk Analysis
Colorado State University

Email: kate.browne@colostate.edu

This article argues for expanding the ethical frame of concern in disaster research from the early phases of site access to longer-term issues that may arise in the field. Drawing on ethical theory, these arguments are developed in five sections. First, we identify the philosophical roots of ethical principles used in social science research. Second, we discuss how ethical concerns span the entire lifecycle of disaster-related research projects but are not fully addressed in the initial protocols for gaining Institutional Research Board (IRB) approval. Third, we introduce the idea of the philosophically informed "ethical toolkit," established to help build awareness of moral obligations and to provide ways to navigate ethical confusion to reach sound research decisions. Specifically, we use the work of W. D. Ross to introduce a template of moral considerations that include ***fidelity, reparation, gratitude, justice, beneficence, self-improvement****, and* ***non-maleficence****. We suggest that in the absence of a clear framework that researchers can use to think through ethical dilemmas as they arise, Ross' pluralist approach to ethical problem solving offers flexibility and clarity and, at the same time, leaves space to apply our own understanding of the context in question. Fourth, we draw on six examples from our research studies conducted following Hurricane Katrina. Using these examples, we discuss how, in retrospect, we can apply Ross' moral considerations to the ethical issues raised including: (1) shifting vulnerability among disaster survivors, (2) the expectations of participants, and (3) concerns about reciprocity in long-term*

Setting the agenda in research

Comment

A collapsed building in the city of Palu in Sulawesi, Indonesia, after a magnitude-7.5 earthquake hit the region in September 2018.

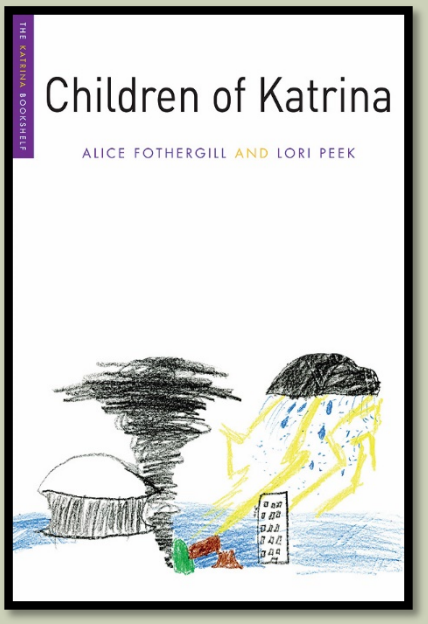
Disaster-zone research needs a code of conduct

JC Gaillard & Lori Peek

Study the effects of earthquakes, floods and other natural hazards with sensitivity to ethical dilemmas and power imbalances.

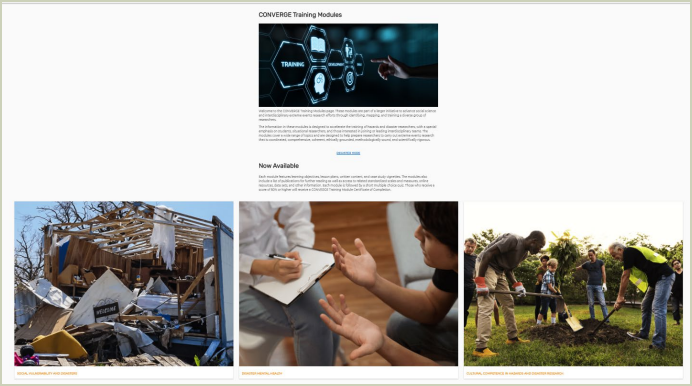
A magnitude 7.0 earthquake rocked Anchorage, Alaska, in late November 2018. Roads buckled and chimneys tumbled from rooftops. Business operations were disrupted. Schools were damaged across the district. This was the largest earthquake to shake the region in a generation, and there was much to learn. What was the state of the infrastructure? Might further quakes occur? How did people respond? Teams of scientists and engineers from across the United States mobilized to conduct field reconnaissance in partnership with local researchers and practitioners. These efforts were coordinated through the clearing house set up by the Earthquake Engineering Research Institute in Oakland, California, which provided daily in-person and online briefings, as well as a web portal for sharing data.

But researchers are not always so welcome in disaster zones. After the deadly Indian Ocean earthquake and tsunami on 26 December 2004, hundreds of academics from countries including Japan, Russia, France and the United States rushed to the region to collect perishable data. This influx of foreign scientists angered and fatigued some locals; many declined researchers' requests for interviews. The former governor of Aceh province, Indonesia, where more than 128,000 people died, described foreign researchers as "guerrillas applying hit-and-run tactics".



CONVERGE
NHERI

NSF



CONVERGE Training Modules

Now Available

RESEARCH ETHICS

Ethical clarity achieved through reliance on IRB; relaxing ethical radar after IRB approval is gained

Ethical clarity achieved through deliberate research design and shared research decisions with participants

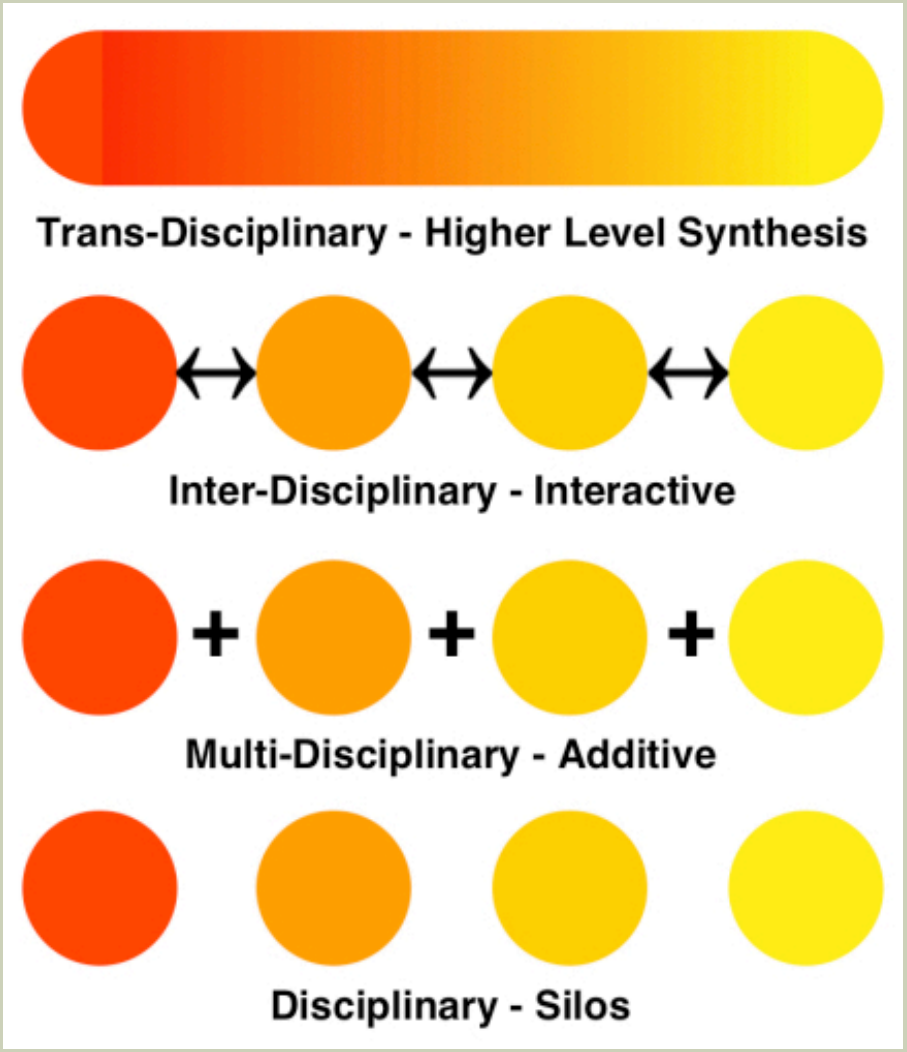
RESEARCH ETHICS

Ethics-as-IRB	Ethics in Practice	Ethics-as-All
Ethical clarity achieved through reliance on IRB; relaxing ethical radar after IRB approval is gained	**Ethical uncertainty arises in course of research; researcher acutely aware of their moral responsibilities to participants**	Ethical clarity achieved through deliberate research design and shared research decisions with participants

INTERDISCIPLINARY METHODS AND APPROACHES

- **Inventory** interdisciplinary methods and associated epistemological and theoretical underpinnings used across the disaster life-cycle;
- **Assess** the approaches used to form and sustain interdisciplinary teams;
- **Identify** the *major challenges* associated with interdisciplinary research and the *unique contributions* of interdisciplinary methods and teams;
- **Explore** interdisciplinary research, teaching, and next generation mentoring needed in the future.

INTERDISCIPLINARY METHODS AND APPROACHES



NSF

UNIVERSITY OF MICHIGAN

NATURAL HAZARDS CENTER

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

NSF
UNIVERSITY OF MICHIGAN
NATURAL HAZARDS CENTER

Trends and Developments

Behrendt, Adam, Kathryn Lukasiewicz, Daniel Seaberg, and Jun Zhuang. 2019. “Trends in Multidisciplinary Hazard and Disaster Research: A 1982–2017 Case Study.” Risk Analysis. doi.org/10.1111/risa.13308

Peek, Lori, Jessica Austin, and Roger Pulwarty. 2019. “Researching Fast and Slow: The Need for More Interdisciplinary Research on Slow Onset and Chronic Disasters.” Risk Analysis.

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

NSF
UNIVERSITY OF MICHIGAN
NATURAL HAZARDS CENTER

Theory

Sherman-Morris, Kathleen, J. Brian Houston, and Jishnu Subedi. 2018. “Theoretical Matters: On the Need for Hazard and Disaster Theory Developed Through Interdisciplinary Research and Collaboration.” Risk Analysis. doi.org/10.1111/risa.13223

Sutley, Elaina J. 2018. “An Approach for Guiding the Development and Assessing the Interdisciplinarity of New Methodologies for Community Disaster Resilience.” Risk Analysis. doi.org/10.1111/risa.13253

Subedi, Jishnu, J. Brian Houston, and Kathleen Sherman-Morris. 2018. “Interdisciplinary Research as an Iterative Process to Build Disaster Systems Knowledge.” Risk Analysis. doi.org/10.1111/risa.13244

Mostafavi, Ali, and N. Emel Ganapati. 2019. “Toward Convergence Disaster Research: Building Integrative Theories Using Simulation.” Risk Analysis. doi.org/10.1111/risa.13303

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

NSF
UNIVERSITY OF MICHIGAN
NATURAL HAZARDS CENTER

Methods

Reilly, Allison C., Robin L. Dillon, and Seth D. Guikema. 2018. "Agent-Based Models as an Integrating Boundary Object for Interdisciplinary Research." Risk Analysis. doi.org/10.1111/risa.13134

DeRouen, JoAnne and Kari Smith. 2020. "Reflective Listening Visualization: Enhancing Interdisciplinary Disaster Research Through the Use of Visualization Techniques." Risk Analysis.

Gharaibeh, Nasir, Isaac Oti, Michelle Meyer, Marccus Hendricks, and Shannon Van Zandt. 2019. "Potential of Citizen Science for Enhancing Infrastructure Monitoring Data and Decision-Support Models for Local Communities." Risk Analysis. doi.org/10.1111/risa.13256

Mitsova, Diana. 2018. "Integrative Interdisciplinary Approaches to Critical Infrastructure Interdependency Analysis." Risk Analysis. doi.org/10.1111/risa.13129

Wong-Parodi, Gabrielle, and Mitchell J. Small. 2019. "A Decision-Centered Method to Evaluate Natural Hazards Decision Aids by Interdisciplinary Research Teams." Risk Analysis. doi.org/10.1111/risa.13261

Nateghi, Roshanak, Jeannette Sutton, and Pamela Murray-Tuite. 2019. "The Frontiers of Uncertainty Estimation and Communication in Interdisciplinary Disaster Research and Practice" Risk Analysis. doi.org/10.1111/risa.13337

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

NSF
UNIVERSITY OF MICHIGAN
NATURAL HAZARDS CENTER

Approaches

Ganapati, N. Emel, and Ali Mostafavi. 2018. "Cultivating Metacognition in Each of Us: Thinking About 'Thinking' in Interdisciplinary Disaster Research." Risk Analysis. doi.org/10.1111/risa.13226

Ge, Yue "Gurt," Christopher W. Zobel, Pamela Murray-Tuite, Roshanak Nateghi, and Haizhong Wang. 2019. "Building an Interdisciplinary Team for Disaster Response Research: A Data-Driven Approach." Risk Analysis. doi.org/10.1111/risa.13280

Morss, Rebecca E., Heather Lazrus, and Julie L. Demuth. 2018. "The 'Inter' Within Interdisciplinary Research: Strategies for Building Integration Across Fields." Risk Analysis. doi.org/10.1111/risa.13246

Hardy, R. Dean. 2018. "A Sharing Meanings Approach for Interdisciplinary Hazards Research." Risk Analysis. doi.org/10.1111/risa.13216

Gilligan, Jonathan. 2019. "Expertise Across Disciplines: Establishing Common Ground in Interdisciplinary Disaster Research Teams." Risk Analysis. doi.org/10.1111/risa.13407

Moezzi, Mithra and Lori Peek. 2019. "Stories for Interdisciplinary Disaster Research Collaboration." Risk Analysis. doi.org/10.1111/risa.13424

Tate, Eric, Valerie Decker, and Craig Just. 2018. "Evaluating Collaborative Readiness for Interdisciplinary Flood Research." Risk Analysis. doi.org/10.1111/risa.13249

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

NSF
UNIVERSITY OF MICHIGAN
NATURAL HAZARDS CENTER

Interdisciplinary Research Projects

Peek, Lori, Jennifer Tobin, John van de Lindt, and Anne Andrews. 2019. "Getting Interdisciplinary Teams into the Field: Institutional Review Board (IRB) Approval and Institutional Agreements for Rapid Response Disaster Research." Risk Analysis.

Kim, Amy A. and Dorothy A. Reed. 2020. "Interdisciplinary Approach to Building Functionality for Weather Hazards." Risk Analysis. doi.org/10.1111/risa.13450

Murray-Tuite, Pamela, Yue "Gurt" Ge, Christopher W. Zobel, Roshanak Nateghi, and Haizhong Wang. 2019. "Critical Time, Space, and Decision-Making Agent Considerations in Human-Centered Interdisciplinary Hurricane-Related Research." Risk Analysis. doi.org/10.1111/risa.13380

Esnard, Ann-Margaret, and Betty Lai. 2018. "Interdisciplinary Approaches to Examining Postdisaster School Recovery." Risk Analysis. doi.org/10.1111/risa.13137

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

NSF
UNIVERSITY OF MICHIGAN
NATURAL HAZARDS CENTER

Applications

Sapat, Alka. 2018. “Lost in Translation? Integrating Interdisciplinary Disaster Research with Policy Praxis.” Risk Analysis. doi.org/10.1111/risa.13198

Johnson, David R. 2019. “Integrated Risk Assessment and Management Methods Are Necessary for Effective Implementation of Natural Hazards Policy.” Risk Analysis. doi.org/10.1111/risa.13268

Berke, Philip, Steven M. Quiring, Francisco Olivera, and Jennifer A. Horney. 2018. “Addressing Challenges to Building Resilience Through Interdisciplinary Research and Engagement.” Risk Analysis. doi.org/10.1111/risa.13202

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

Stories for Interdisciplinary Disaster Research Collaboration

Moezzi, Mithra and Lori Peek. 2019. *Risk Analysis.*

INTERDISCIPLINARY METHODS AND APPROACHES

Risk Analysis
AN INTERNATIONAL JOURNAL

Stories for Interdisciplinary Disaster Research Collaboration

Moezzi, Mithra and Lori Peek. 2019. *Risk Analysis.*

"**Experience stories** [are] stories that individuals tell about something that happened during the research process, generally combining descriptive observation, some level of interpretation, and embellishment." (Moezzi and Peek, 2019)

Convergence builds upon principles of *interdisciplinary research* and relies on webs of partnerships.

Social Sciences

Engineering

Government

Academia

Industry

Natural Sciences

Public Health

Arts and Humanities

Why convergence science?

- Start with a complex problem that *requires* interdisciplinary collaboration
- Work toward applications and solutions

converge.colorado.edu

Visit the CONVERGE website for:

- free online training modules
- guidance for the ethical conduct of research
- webinars and virtual forums
- access to NSF-supported Extreme Events Research and Reconnaissance networks
- data collection, publication, and data sharing information

Thank you!

Lori Peek, Ph.D.
Department of Sociology
Natural Hazards Center
CONVERGE
University of Colorado Boulder
Lori.Peek@Colorado.edu

hazards.colorado.edu/signup

converge.colorado.edu/signup