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## ***Researching Hazards: keeping pace with changing contexts***

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This special issue on ‘hazards in context’ emerges from a symposium held at Rutgers University on March 2<sup>nd</sup> 2016 to celebrate the scholarship and career of James K. Mitchell and to reflect on his many contributions to the field of hazards research. Reflecting both Mitchell’s wishes for the symposium and his approach towards the study of hazards, this special issue looks both backwards and forwards. It reflects on what has been achieved in hazards scholarship to date and considers directions for future research. Featuring contributions from both established scholars and early career researchers, the commentaries that make up this special issue often straddle the boundaries between personal reflections and professional analysis. They combine personal experiences with a sharp analysis of pressing issues in the field of hazards research. They call for alternative approaches, new ways of thinking and innovative engagement with the social, economic, cultural, political and environmental challenges that hazards and extreme events present for an ever changing society.

Hazards research is now a well-established interdisciplinary field of scholarship with several notable characteristics. Hazards research aims to be holistic by adopting a genuinely interdisciplinary approach in order to examine the physical, social, political, economic and cultural aspects of risk production, experiences and responses (Chatterjee and Mitchell, 2014; Jeffers, 2014; Leckner, et. al. 2016). For hazards scholars the research objective is often pragmatic and driven towards applicable solutions ranging from technological to philosophical (Chatterjee, 2010; Jeffers, 2013; Kendra and Nigg, 2014; Mitchell, 2016; Zoleta-Nantes, et. al., 2008). Much progress has been made to advance the central objectives of hazards research in recent decades. However despite all of the knowledge produced, efforts made towards improved policy and decision-making, hazards and disasters continue to bring high levels of death, injury, destruction to infrastructure, and loss in various forms. This is partially due to limited recognition of context in designing hazard and extreme event risk reduction policies.

James K. Mitchell's work on hazards, has sought to differentiate the components of disaster and to establish the importance of maintaining a balanced approach that links physical, social, political, economic and cultural aspects of hazard (Mitchell, et. al. 1989; Mitchell and Cutter, 1999; Mitchell, 2003a) in not only the context of traditional risks but also in that of emerging risks from technological and cultural changes (Mitchell, 1994; Mitchell, 1996, Mitchell, 2003b). His work has also demonstrated ways of merging quantitative and qualitative approaches (Mitchell, 1992; Mitchell, 2017), a particularly important contribution when data gaps are a perpetual problem in studying hazards and building a broader perspective is critical to design response mechanisms. In addition Mitchell's work has introduced innovative ways of interpreting the interactions between environment and society that helps with understanding world (Mitchell, 2006; Mitchell, 2015) around us and also in bringing about real change in policy, decision-making and governance.

One important contribution of hazard research, also evident in the pieces of this special issue, is that it engages with the concept of context in a variety of ways. In the opening paper of this special issue James K. Mitchell challenges hazards researchers to embrace an on-going reinvention of hazards research. He draws upon personal experiences and professional engagements from throughout his career to direct us towards deeper exploration of the concepts of encounter, context and ambiguity. By tracing his personal encounters with hazards in Ireland, North America and beyond, he demonstrates how these unexpected and sometimes destabilising interactions often play a crucial role in shaping how people perceive, understand and react to the events and processes we label as hazards. In showing how the concepts of context and ambiguity shape understandings and interpretations of hazards, he also points to the critical importance of acknowledging positionality and diverse ways of knowing. Ultimately he calls for a continuing effort to draw upon a wider array of both expert and non-expert knowledges in hazards research and decision-making, arguing that this is essential to the ultimate aim of hazards research, which in his view, is the pursuit of the most acceptable fit between the goals of human society and the dynamic environments with which we live.

Susan Cutter's paper also seeks to challenge and inspire hazards researchers and policy-makers to reflect on the successes and failures of what has been achieved to date and to consider radical alternatives to current policy and practice. Through an exploration of the South Carolina Floods in 2015, Hurricane Katrina in New Orleans in 2005 and the impacts of Hurricane Sandy in New Jersey and New York in 2012, she demonstrates how extreme events will not always produce extreme impacts, and impacts defined as extreme can result from events that might not be considered extreme. She emphasises that hazards and disaster policy and decision-making can never be successful without a critical sensitivity to societal transformations and the surprises these may create. Risk and hazards must always be evaluated within the wider context of the social goals of sustainability, equity and fairness.

In his contribution James Jeffers also reflects on recent hazards scholarship and considers avenues for future research. Adopting James K. Mitchell's (2006) call for new research directions in the aftermath of Hurricane Katrina as his starting point, he evaluates progress in hazards research over the past decade. Broadening the focus from the subfield of hazards to include work on climate and climate change, he explores how scholarship on cultural contexts has illuminated the multiple and often contested ways in which hazards and disasters can be framed and understood. He also explores how co-production approaches to knowledge production and policy making have offered tools for working through divergent interpretations of risk and hazard. However he cautions that both of these contributions also pose significant questions that hazards researchers must now consider. Echoing the contributions of Mitchell and Cutter he suggests that further innovation in hazards research will be required.

Monalisa Chatterjee explores key concepts from hazard research and Mitchell's work that are useful in identifying and evaluating climate change adaptation options and avoid maladaptive strategies. She emphasizes that while a lot of interdisciplinary research is moving towards developing tools to make decisions about adaptation, more efforts should be put into the evaluations of implemented adaptation techniques. She argues for efficient ways of examining the context in which these strategies are implemented. Furthermore, she emphasises the need to evaluate outcomes to ensure changes are producing positive results for climate change impact risk reduction and broader goals of human and ecological welfare.

Juah Uitto's paper also seeks to draw links between hazards research and the broader socio-ecological challenges presented by global environmental change. In a commentary that weaves together personal reflections and professional experiences he recounts working alongside James K. Mitchell to examine the consequences of industrial disasters and to evaluate hazards in global megacities. He emphasises the contributions that research on hazards and disasters can make to achieving the goals of sustainable development. In doing so he points to the need for hazards researchers to be cognisant of both global processes and local impacts.

Continuing the theme of integrating personal experiences with professional engagement, Mark Barnes explores an often neglected aspect of hazards research by turning his attention to pedagogy in the university classroom. While hazards research and its links to policy and decision-making communities has been the subject of considerable reflection by hazards scholars, our roles as teachers has received less attention. Through reflections on his personal experiences as a graduate student and later as an early career university teacher he considers how the principles and values of contextual studies of hazard can inform student learning.

Mark Mauriello concludes this special issue by providing a policy-making perspective on the value of academic research to environmental decision-making. Tracing the contributions of early work by James K. Mitchell and other researchers to knowledge of sea level rise and coastal hazards in New Jersey he demonstrates how academic research has informed local policy. He reflects on progress to date in local and state level hazards management and points to many challenges that still need to be addressed.

In conclusion we must acknowledge that we owe a debt of gratitude to many people who made this special issue possible. The most obvious thanks go to all of the authors whose work is featured here alongside our own; James K. Mitchell, Susan Cutter, Juho Uitto, Mark Barnes and Mark Mauriello. Special thanks is also owed to the other members of the scientific steering committee who organised the MaGrann Symposium at Rutgers University including: James Kendra, Mariana Leckner, David Robinson and Khai Hoan Ngyuen, as well as to the Symposium sponsors: Mark MaGrann, Rutgers University Department of Geography, Rutgers University School of Arts and Sciences, Rutgers University Dean of Social and Behavioural Sciences, Rutgers Climate Institute and the Journal of Extreme Events. We must also thank the reviewers who provided insightful comments on the papers submitted and William D. Solecki, Jorn Birkman and Philly Lima at the Journal of Extreme Events for their support throughout the process.

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