Havidán Rodríguez
havidan@udel.edu

Havidán Rodríguez is the Deputy Provost, Professor in the Department of Sociology and Criminal Justice, and a core faculty member, and former Director, of the Disaster Research Center at the University of Delaware. He obtained his Ph.D. in Sociology from the University of Wisconsin.

Rodríguez has served on a number of disaster-related committees for the National Academies of Science. He has received funding from NSF, FEMA, the U.S. Army Corps of Engineers, the Department of Defense, and the Sea Grant Program for research projects focusing on the social science aspects of disasters. His recent projects include population composition, geographic distribution, natural hazards, and vulnerability in the coastal regions of Puerto Rico; Engineering Research Center for Collaborative Adaptive Sensing of the Atmosphere; Social Science research team of the Mid-America Earthquake Center; and he is the principal investigator for the Research Experience for Undergraduates: Training the Next Generation of Disaster Researchers.

Dr. Rodríguez has led a number of field research projects, including to Honduras, following Hurricane Mitch; India and Sri Lanka, following the Indian Ocean Tsunami; and the Gulf Coast, following Hurricane Katrina. He has published extensively in the field of disasters and is the co-editor (with Enrico Quarantelli and Russell Dynes) of the *Handbook of Disaster Research*.

Hávidan Rodríguez

havidan@udel.edu

University of Delaware

Disaster Research Center

US-Taiwan Workshop: Advancement of Societal Responses to Mega-Disasters Afflicting Mega-Cities

Recent large-scale disaster events, including the Indian Ocean Tsunami (2004), Hurricane Katrina (2005), the massive earthquakes in Sichuan, China (2008) and in Haiti (2010), as well Typhoon Morakot in Taiwan (2009) have raised our awareness regarding the impact and consequences of these events on a global scale. Moreover, they have brought to the forefront the imperative need to develop effective mitigation and preparedness strategies, including enhancing societal response at all levels, aimed at reducing or alleviating the consequences of such events. Risk and disasters are socially constructed phenomenon; they are influenced by the social and political structure, the availability of resources, stratification and inequality, population pressures (i.e., population growth, density, and distribution), and environmental degradation, among other factors. There are a number of important research areas, which warrant our immediate attention, especially when focusing on the impact of mega-disasters on mega-cities, as outlined below.

Changing Demographic Patterns: The changing demographic landscape, on a global scale, calls for a reassessment regarding our understanding of the societal impacts and consequences of disasters. During the past 60 years, the world population has experienced significant growth, reaching 6.8 billion inhabitants in 2009. Population movements have resulted in expanding settlements in regions with greater exposure to disasters. Also, mega-cities experience unique vulnerabilities including weaker social networks, limited escape routes, and high levels of poverty, especially in developing countries. Significant population influx to major urban areas impacts societies' ability to cope with disasters, generating difficulties in providing shelter and supplying food, water, and medicine to disaster victims. Surges in population density can also result in transformations in the natural landscape (e.g., deforestation), putting populations at greater risk. Population groups mostly settle near coastal regions, in poorly-managed

floodplains, and other hazardous zones, thus increasing their vulnerability to disasters. However, researchers have paid limited attention to the interface between changing demographic patterns and disaster impacts and outcomes.

Impact of Disasters on Business Closure and Relocation: Disasters can have an intense and devastating impact on local economies, particularly if businesses do not receive the necessary economic support and disaster relief aid from governments, or do not have adequate insurance coverage. Extensive research is needed to better understand the indicators of business vulnerability and resiliency, as well as the characteristics that impact disaster preparedness and recovery among business owners; on how business closure and relocation vary according to the business sector and the characteristics of business owners, such as class, race/ethnicity, sex, age, household structure, and available resources; and on the role of government in providing resources and support to businesses, focusing not only on disaster response and recovery, but also on mitigation and preparedness.

New and Emerging Technology and Disasters: The successful design and implementation of new technology to better predict and respond to hazard events will ultimately depend on our ability to respond to and integrate the feedback of end-users, including community organizations and leaders. Technology matters, but what *really* matters is the application of the substantive knowledge that we generate regarding how individuals respond (or not) to severe hazard events, and how can we improve their response in order to minimize the devastating impacts associated with these events. Further research is needed on how we can actively engage end-users in identifying their risks, in disaster planning and management, in the development of new technology, and in the communication process. Moreover, we must respond to the needs, interests, and the limitations that end-user communities confront, if we are to minimize the loss of life, injuries, and damage to property.

Risk Communication: Most communication interoperability issues before, during, and after disasters are not technical. The National Research Council (2005:2) argues that better human organization, willingness to cooperate, and the willingness of government to listen to those at local levels are critical factors in making better use of information technology for disaster management. It is also important to highlight that access to multiple sources of information can create confusion and uncertainty among the public,

particularly given inconsistent, contradictory, and inaccurate information. There are also technological failures or malfunctions that impact communication of risk information, which adversely impacts public response. Moreover, system interdependency and cascading events increase the population's vulnerability to disasters. The communication of risk information must take into account the societal context and processes in which these events occur. We must continue to expand our knowledge regarding how people and organizations perceive and respond to forecasts, warnings, and risk information, especially in an international context.

Developing Integrated Warning Systems: With continued improvements in monitoring, detection, and mass communication technology, the social and organizational features of integrated warning systems are of paramount importance in saving lives and reducing property damage. These systems should focus on emphasizing communication, education, and raising awareness, as well as responding to the needs of the population at risk (e.g., "people-centered" warning systems). This will also require enhancing communities' economic capacity and paying particular attention to issues such as poverty, inequality, and sustainable development.

***Enhancing Resiliency of the Health Care System*:** Hospitals are in the business of handling emergencies, crises, and disasters and yet major disasters (such as Katrina and the earthquake in Haiti) reveal the vulnerabilities of already deteriorating health care systems. Moreover, these disasters present extraordinary sets of demands, which health care systems are not able to manage or respond to. However, disaster research focusing on the impact and consequences of major disasters on health care systems is limited, especially in the context of mega-disasters in mega-cities. Disaster planning and management strategies must consider how medical and health care facilities will maintain their operations and functionality in the absence of essential services and during the disruption of their inter-organizational systems. Planning, access to adequate resources, networking, effective communication and coordination, as well as training and education of medical staff is essential if we are to develop a resilient health care infrastructure that will be able to provide the much needed medical services to populations impacted by disasters. There is also an immediate need to focus on the physical and structural aspects of hospital buildings, including compliance with building codes that will increase their resiliency to high winds, floods, and earthquakes.

Governmental Response to Disasters: Many major disaster events, such as those mentioned above, bring to the forefront the inefficiency of governments in dealing with events of such magnitude. These situations also highlight the reactive rather than proactive nature of governments, placing emphasis on disaster relief rather than on mitigation and preparedness. Additional research is needed not only focusing on government preparedness and response, but on their role in building disaster resilient communities.