

## Presentation Abstracts – Concurrent Session 7

\*Presenters and their associations are highlighted.

- ❖ **Youngjib Ham, Department of Construction Science, TAMU**  
*Disaster Data Science and Data-driven Disaster Management for Risk-informed Decision-Making*  
Abstract:  
This research seeks to address the challenges faced by communities to build resilience to extreme events by improving computational tools, methods, and mechanisms for data collection, interpretation, and synthesis through unmanned aerial systems, participatory sensing, computer vision and machine learning. Specifically, the presentation will cover the two research thrusts: (1) Uncovering Potential Risks of Wind-induced Cascading Damages to Construction Projects and Neighboring Communities: This research will create and validate a new streamlined Imaging-to-Simulation framework to prevent wind hazard events from causing catastrophic damage to construction projects and neighboring communities; and (2) Participatory Sensing and Digital Twin City for Risk-informed Decision-Making: This research will construct and test digital twin models of communities in the context of local vulnerability in order to identify where, why, and to what extent people and critical infrastructures are vulnerable to potential natural disasters.
  
- ❖ **Wenlin Yao, Cheng Zhang, Shiva Saravanan, Ruihong Huang, Ali Mostafavi**  
**Department of Computer Science & Engineering, TAMU**  
*Weakly-supervised Fine-grained Event Recognition on Social Media for Disaster Management*  
Abstract:  
People increasingly use social media to report emergencies, offer/seek help or share information during disasters, which makes social networks an important tool for disaster management. To meet the needs, we present a weakly supervised approach for rapidly building high-quality classifiers that label each individual Twitter message with fine-grained event categories. Specifically, to address the challenges of processing extremely noisy and often rather short user-generated messages, we propose to conduct quick clustering-assisted manual word sense disambiguation on event keyword identified noisy tweets as well as enrich tweet representations using preceding context tweets and reply tweets in building event recognition classifiers. The evaluation on the hurricane Harvey shows that the rapidly trained weakly supervised classifier outperforms supervised classifiers trained using more than ten thousand annotated tweets created over 50 person-hours. The evaluation on another hurricane disaster, Florence, shows that our approach is robust and generalizable.
  
- ❖ **Lei Zou, Nina Lam, Michelle Meyer, Dongying Li, Heng Cai**  
**Department of Geography, TAMU**  
*Mining Volunteered Geographic Information (VGI) for Disaster Resilience and Management*  
Abstract:

Disaster resilience is the capacity of a community to prepare for, absorb, recover from and adapt to disastrous events. A variety of resilience measurement models have been proposed, but most aim at developing standardized metrics. Although standardization can facilitate comparison and uniform disaster recovery policy, it hinders the development of place-based solutions that address the challenges and resilience goals of specific communities. As an operationalized concept, both the anticipated resilience goals and process to achieve the goals rely heavily on local contexts. Therefore, externally imposed and static resilience frameworks often fall short in stimulating local changes in disaster preparedness, response, and recovery. To fill these gaps, this research aims to mine volunteered geographic information (VGI), e.g. location-based social media and data from WebGIS applications, for identification of place-based threats, participatory goal setting, disaster resilience measurement, and smart disaster management.

- ❖ **Michelle Meyer, Brant Mitchell, Stuart Nolan, Kyle Breen, J. Carlee Purdum**  
**Department of Landscape Architecture & Urban Planning, TAMU**  
*Civilian Rescuing in Disaster: Organizational Emergence, Development, and Institutionalization*

Abstract:

Researchers have often sought to understand group behavior in disasters, including behavior in emergent, expanding, extending, and established organizations. While there has been significant research on these four types of organizations, there has been less research on volunteer emergent groups that quickly and effectively transitioned into expanding organizations that self-deployed to another state to provide lifesaving capabilities, as emergent rescue groups have recently. This research uses qualitative interviews with members of various civilian rescue groups to understand the motivations, processes, and resources they leveraged, as well as interviews with emergency management about the integration of spontaneous volunteers into formal relief efforts. The work contributes to theories on social organization, volunteer behavior and motivations, social capital, and technology and social media adoption. We present results from our National Science Foundation RAPID project and discuss our continuing participatory research with these groups.