Summary

1. Speaker Information:

- **Name:** Dr. Eleftheria Kontou, Assistant Professor, University of Illinois Urbana-Champaign
- **Research Area:** Sustainable transportation systems, electric vehicles, energy-transport resilience, evacuation modeling

2. The Seminar Covered Three Main Research Topics:

(1) Evacuation Route Planning for Alternative Fuel Vehicles

- Modeling evacuation under charging/refueling constraints
- Optimization-based routing and infrastructure planning

(2) EVs as Backup Power Solutions During Outages

- Vehicle-to-home (V2H) strategies
- Household energy resilience across different US climate regions

(3) Energy Supply Logistics for Humanitarian Response

- Energy delivery using electric vehicles (ground and aerial)
- Location-routing optimization for emergency energy distribution

Summary

3. Participant Statistics:

- Total participants: 15 (Academia: 10; Industry/Others: 5).

4. Key Questions Discussions:

(1) Barriers to EV-based resilience implementation

The main challenges include uneven EV adoption driven by individual decisions, high upfront costs for using EVs as household backup power, and lack of incentives leading to equity concerns. In addition, a critical barrier is the need for cross-sector coordination among transportation planners, energy providers, and emergency management agencies. Limited awareness of EV-related constraints among planning authorities further complicates implementation.

(2) Use of fixed SOC vs. SOC distribution in evacuation modeling

While using a distribution of state-of-charge (SOC) would better reflect real-world conditions, current limitations in EV data—particularly travel behavior and SOC patterns—make it difficult to estimate reliable distributions. Therefore, studies often rely on simplified assumptions (for example, fully charged vs. partially charged scenarios) to represent different preparedness levels during evacuations.

Summary

(3) Impact of charging speed on evacuation behavior and routing

Charging speed significantly affects evacuation efficiency by reducing downtime. Faster chargers (for example, superchargers) are expected to be preferred by EV users. Routing decisions are influenced by multiple factors, including travel time, charging time, queuing time, and SOC levels. Preliminary findings suggest that charging and queuing times are especially critical in shaping evacuation routing behavior.

5. Plan for the Second Webinar:

- **Name:** Dr. Catalina González-Dueñas, Assistant Professor, George Mason University
- **Research Area:** Multi-hazard risk analysis, AI-integrated infrastructure modeling, resilience and uncertainty quantification
- **Topic:** Physics-Guided AI for Multi-Hazard Cascading Risk Analysis
- **Date:** April 7, 2026, 11:00-12:00 ET (45-minute presentation, 15-minute Q&A session)
- **Objective of the webinar:** to extend the focus from transportation resilience to multi-hazard infrastructure systems, introduce AI and physics-integrated modeling frameworks, and strengthen interdisciplinary collaboration across transportation, energy, and infrastructure systems.