

Research Project Name: Persona-Based Hurricane Evacuation Travel Demand Analysis to Support Transportation Planning in Rural Communities
Recipient/Grant (Contract) Number: 69A3552348321
Center Name: Rural Safe Efficient Advanced Transportation (R-SEAT) Center
Research Priority: Resilience and Transportation Safety
Principal Investigator(s): Juyeong Choi, Ph.D. (PI) and Roshan Panahi, Ph.D. (Co-PI)
Project Partners: Florida Department of Transportation
Research Project Funding: Federal fund amount: \$86,814.43, Non-federal matching fund amount:
Project Start and End Date: March 6, 2026, to March 5, 2027
Project Description: This project develops a large-language-model (LLM)–based persona analysis tool to simulate hurricane evacuation travel behavior in rural Florida Panhandle communities. Using a targeted household survey and behavioral modeling (KAP/TPB, SEM, clustering), the team will create representative personas and LLM agents that mimic real evacuation decisions. A web-based application will allow transportation planners to explore “what-if” evacuation scenarios and integrate the results into existing travel demand and evacuation models.
US DOT Priorities*:
Outputs: There are four expected outputs of this project: (i) Rural Florida Panhandle evacuation survey instrument and anonymized dataset; (ii) Persona clustering model and LLM-based evacuation persona analysis model; (iii) Validation studies comparing simulated and observed behaviors; (iv) A web-based application for planners to query evacuation behavior and visualize outcomes (e.g., heatmaps); and (v) Technical documentation, user manuals, and stakeholder briefings/workshops.
Outcomes/Impacts: The project will provide a deeper, behaviorally realistic understanding of how rural households make evacuation decisions under hurricane threats. Transportation planners and emergency managers will gain more accurate, adaptable evacuation demand inputs, leading to better route planning, clearance-time estimates, and resource allocation. Ultimately, this will enhance evacuation effectiveness and safety for rural communities and improve resilience to major hurricanes in Florida and other similar regions.
Final Research Report: N/A

** Section left blank until USDOT's new priorities and RD&T strategic goals are available in Spring 2026*