

<b>UTC Project Information</b>	
Project Title	MPC-593 – Probabilistic Modeling of Landslide Hazards to Improve the Resilience of Transportation Infrastructure
University	Colorado State University
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Funding Source(s) and Amounts Provided (by each agency or organization)	USDOT, Research and Innovative Technology Administration \$56,000  Faculty time and effort \$56,000
Total Project Cost	\$112,000
Agency ID or Contract Number	69A3551747108
Start and End Dates	February 26, 2019 to July 31, 2024
Brief Description of Research Project	In steep or mountainous terrain, natural disasters such as wildfire, or severe weather and flooding, are often followed by landslides and debris flows. Roads and highways, which traverse a wide range of potential landslide hazards, are particularly susceptible to damage from mass wasting events. In this project, we will use a probabilistic process-based model for landslide initiation to quantify the probability of landslide hazard across the landscape, and map these hazards onto the road and highway network to determine probabilities of landslide hazard continuously throughout the transportation network. Uncertainty in hydroclimatological forcing, soils, and vegetation parameters will be accounted for through Monte Carlo simulation. Initial model development and application will focus on Colorado; in particular, the September 2013 Front Range floods which triggered over 1,100 debris flows.
Describe Implementation of Research Outcomes (or why not implemented)  Place Any Photos Here	Our model has not been implemented in an operational capacity yet, as the data requirements and preparation can be extensive. However, the general observations from the model showing the importance of slope, aspect, and vegetation cover on hillslope stability may provide insight and guidance to decision makers.
Impacts/Benefits of Implementation (actual, not anticipated)	Probabilistic modeling of landslide initiation allows us to quantify potential landslide risk across the landscape, given uncertain input data. Our study suggests that vegetation changes due to climate change could result in major shifts in the people and infrastructure susceptible to landslides in the Colorado Front Range.

	<p>Our method of using critical slope and slope persistence to predict runout endpoints is a promising opportunity for landslide hazard mapping at large spatial extents.</p>
<p>Web Links</p> <ul style="list-style-type: none"><li>• Reports</li><li>• Project Website</li></ul>	<ul style="list-style-type: none"><li>• MPC Research Report – <a href="#">Probabilistic Modeling of Landslide Hazards to Improve the Resilience of Transportation Infrastructure</a></li></ul>