

UTC Project Information	
Project Title	MPC-650 – Improving Deep Learning Models for Bridge Management Using Physics-Based Deep Learning
University	University of Colorado Denver
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Funding Source(s) and Amounts Provided (by each agency or organization)	<p>USDOT, Office of the Assistant Secretary for Research and Technology \$60,000</p> <p>University of Colorado Denver \$60,000</p>
Total Project Cost	\$120,000
Agency ID or Contract Number	69A3551747108
Start and End Dates	March 26, 2021 to July 31, 2022
Brief Description of Research Project	<p>While various data-driven models are proposed in the literature to forecast bridge deterioration, these models either suffer from low accuracy or are too complex to be applicable in practice. With our prior work, we have demonstrated that deep learning (DL) can significantly outperform other analytical modeling methodologies in bridge deterioration forecasting. However, such models solely rely on data, and unlike physics-based models, cannot benefit from the vast knowledge and experience of bridge engineers encoded in existing physics-based models. As a result, accuracy and efficiency of these models are suboptimal. With this proposal, we intend to develop hybrid physics-based DL models that can benefit from both effectiveness of DL and the prior knowledge encoded in physics-based bridge models. Such hybrid models are expected to outperform the DL-only models in terms of accuracy and efficiency; hence, enabling further enhanced bridge management.</p>

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	
Impacts/Benefits of Implementation (actual, not anticipated)	
Web Links <ul style="list-style-type: none">• Reports• Project Website	