

DSPS

Data Science for Pavements
Symposium 2022

March 22 Morning - Opening Session

9:00	Opening Remarks	Dr. Cheryl Richter, FHWA
9:20	Keynote Address	Dr. William Buttlar, U. of Missouri

March 22 Morning - Technical Session 1

	Materials 1	Pavement Management 1	Pavement Management 2
10:05	Application of Data science and Machine Learning: Case Examples and Vision from FHWA's Asphalt Materials Research Program	The Approach of Machine Learning to Analyze and Evaluation of Pavements Data	Physics-Informed Machine Learning to Augment Standard Condition Monitoring with Data from Connected Vehicles
10:45	Applying Principal Component Analysis to ATR-FTIR spectra, obtained from bitumen during oxidation, in recognition of bituminous binders of varying origins and grades	Use of machine learning for estimation of missing pavement data	Smart Pavement Condition Evaluation and Visualization via Deep Learning Approach
11:10	Assessment of the Degree of binder Activity of Reclaimed Asphalt Pavement using Support Vector Regression and Clustering	Advancing the State of the Practice in Pavement Engineering and Management via Integration of Emerging Data Science Tools	Effect of Climate Change on Performance of Highway Pavements: A Year-Long Pavement Sensing Data Study in the Phoenix Region
11:35	Optimisation of the mechanical performance of asphalt mixture using fabric tensors and gray relational analysis	Computational modelling of Tire-Pervious Pavement Skid Resistance using Digital Image Processing	Lessons Learned from Curation of Three Decades of MnROAD Data

March 22 Afternoon - Technical Session 2

	Materials 2	Pavement Design 1	Pavement Management 3
13:00	Modelling of Asphalt Mixture Viscoelasticity using Mix Design Information	Neural Network Modeling to Predict Critical Pavement Responses: A Synthetic Approach	Pavement Performance Modeling for Composite Pavements in the LTPP Wet Freeze Climate Region Incorporating Maintenance and Rehabilitation
13:40	Application of Soft Computing to Predict Stiffness Modulus of Asphalt Concrete	Evaluation and prediction of asphalt concrete back-calculated layer modulus for mechanical-empirical rehabilitation analysis	Making the Most of Today's Pavement Data Collection Capabilities
14:20	Repeatability and reproducibility analysis for Asphalt Mixture Performance Tester (AMPT) cyclic fatigue test results	Fatigue Life Estimation using Falling Weight Deflectometer in an Instrumented Pavement Section	Influences of PCC Mixture Properties and Strength on Performance of PCC Pavements Maintenance and Rehabilitation
14:45	Understanding Pavement Design through Data Analysis in Accelerated Pavement Testing Experiments	Artificial Neural Networks Based Assessment Tool and Design Alternative for AASHTO-ME Concrete Pavements Design	Integrating Maintenance and Rehabilitation History into the Roughness Modeling using Artificial Neural Network
15:10	Development of Subgrade Resilient Modulus Prediction Model Based on Historical Field Database Using Artificial Neural Network Analysis		Predicting the long-term effectiveness of preventive pavement maintenance treatments on the Pavement Condition Index

March 23 Morning - Technical Session 3

	Materials 3	Pavement Management 4	Asset Management 1
8:30	Development of Curing Prediction Model for Cold Recycled Asphalt Mixtures	Application of split and merge signal segmentation process in pavement engineering	Data Driven Processes for Transportation Decisions
9:10	Balancing fracture and fatigue performance in asphalt pavements: A hybrid mechanistic and statistical modelling approach	Pavement disease reconstruction and visual display based on BIM and GIS platform	Opportunities and Challenges for Machine Learning in Concrete Science
9:35	Genetic Programming and Artificial Neural Network Models for Estimation of Target Stiffness for Unbound Materials Using Intelligent Compaction Technology	Deep learning based real-time automatic hyperbola detection on GPR data for buried utility network mapping	Leveraging Pavement Performance Analytics for Data-Driven Decision-Making

March 23 Morning - Student Data Competition

Students' Spotlight		
10:15	Importance of Data Augmentation in Pavement Distress Detection using YOLOv5	
10:55	Pavement Defects Detection Based on YOLOv5 and Generative Adversarial Network	
11:25	Data-Centric Modelling to Improve the Prediction of Pavement Condition	

March 23 Afternoon - Technical Session 4

	Pavement Design 2	Pavement Management 5	Asset Management 2
13:00	Truck Platooning's Impact on Pavement Fatigue Life based on Material Characterization with Various Rest Periods and Artificial Neural Networks Modeling	Estimating Pavement Condition using Synthetic Aperture Radar Data	A spatially and temporally detailed evaluation of user costs of urban road work sites
13:40	Numerical parametric study to classify and estimate pavement characteristics using GPR and machine learning methods	Pavement Surface Crack Detection Using an Integrated Convolutional Neural Network	Detection of anomalies in bridge waterproof membrane using artificial intelligence applied to GPR
14:20	Machine Learning Solutions for Top-Down Cracking Design of Airport Rigid Pavement	Predicting Asphalt Pavement Roughness with an Ensemble Learning Approach	Forward Strain Backcalculation using ANN
14:45	Fatigue Stresses Caused by Superload Vehicles in Concrete Pavements	Geospatial hot spot analysis of asphalt pavement distresses using LTPP data	UAV-Hyperspectral-Image based Pavement Condition Assessment via Machine Learning Method
15:10	Gene Expression Programming-based expression to predict response of a four layered structure	Formula-based predictive models of asphalt pavement distresses using artificial intelligence algorithms	

March 24

8:30	Roundtable: Gaps, Successes, and Strategies	Matthew Corrigan, FHWA
12:30	Vision Planning: Charting a Path Forward	Dr. William Buttlar, U. of Missouri

