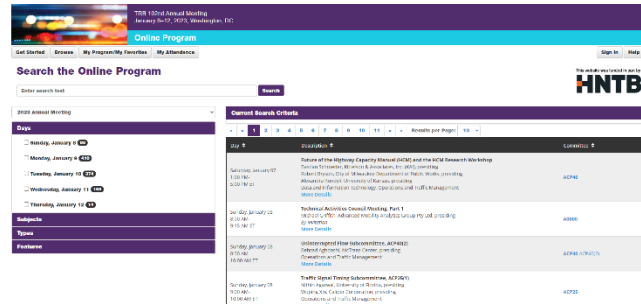




# Maintenance Research at the 2023 TRB Annual Meeting

## Resource Spotlight: Transportation Research Board Annual Meeting Online Portal

If you're searching for the latest research on a transportation topic, be sure to visit the [TRB Annual Meeting Online Program](#). The portal includes papers, posters and presentation materials from the 2023 Annual Meeting.



The [No Boundaries Transportation Maintenance Innovations pooled fund](#) has compiled links to selected posters, presentations and papers related to maintenance presented at the 2023 Annual Meeting. **Registration, attendance, and access to materials is free for employees of state DOTs and other TRB Sponsor organizations.** If you have trouble accessing the papers, check with your DOT or other transportation library.

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## Asset Management

This section includes pavement management, bridge management and managing other assets.

### Pavement Management

#### **23-00937 Accounting for Traffic Dynamics in Pavement Maintenance Scheduling**

[Poster Session](#) with [presentation](#)

Abhishek Kumar Prajapati, Agnimitra Sengupta, S. Guler

*Penn State: The Pennsylvania State University*

#### **23-02513 Comparative Study on the Performance of Single Stage Object Detection Models on Norwegian Roads Damage Detection**

[Poster Session](#) with abstract and [presentation](#) and [full paper](#)

Madhavendra Sharma, Muneer Al-Hammadi, Alex Klein-Paste, Helge Mork, Mamoon Shami

*Norwegian University of Science and Technology (NTNU)*

#### **23-04222 Concrete Pavement Joint Damage Quantification with Computer Vision**

[Poster Session](#) with abstract

Jeffery Roesler, Quang Tran

*University of Illinois, Urbana-Champaign; Harvard University*

#### **23-02862 Facilitating Pavement Management and Maintenance Using Crowdsourced Data**

[Lectern Session](#) with abstract

Yongsong Gu, Yuandong Liu, Diyi Liu, Lee Han

*University of Tennessee, Knoxville; Oak Ridge National Laboratory*

#### **23-20265 Latest Advances in Data-Driven Maintenance Recommendations Based on Predictive Analytics**

[Lectern Session](#) with [presentation](#)

Ivan Pagano Aragona

*ENSCO, Inc.*

**23-02653 Low-Cost Automated Pavement Diagnostic System to Network Pavement Management Systems**

[Poster Session](#) with abstract and [presentation](#)

Aline Espindola, Mujib Rahman, Senthana Mathavan, Ernesto Nobre Júnior

*Universidade Federal de Alagoas; Aston University; Nottingham Trent University; Universidade Federal do Ceara*

**23-00979 Multi-Objective Optimization of Maintenance, Rehabilitation, and Reconstruction Decision Making Considering Safety**

[Poster Session](#) with [presentation](#)

Muyang Lu, S. Guler, Vikash Gayah

*Pennsylvania State University, University Park*

**23-01937 Pavement Quality Evaluation Using Connected Vehicle Data**

[Poster Session](#) with abstract

Justin Mahlberg, Howell Li, Björn Zachrisson, Dustin Leslie, Darcy Bullock

*Purdue University; NIRA Dynamics AB; Indiana Department of Transportation*

**23-04988 Prioritization of Highway Routine Maintenance Activities: A Comparative Analysis of Network and Hierarchical Processes**

[Poster Session](#) with abstract and [presentation](#)

Md Al Amin

*University of Texas, Austin*

**23-05264 The Use of Autonomous Vehicles for Detection of Edge Lane Marking Deficiencies**

[Poster Session](#) with abstract

Munir Nazzal, Alfarooq Al Oide, Mohammad Karasneh

*University of Cincinnati*

**Bridge Management**

**23-05095 Bridge Maintenance Strategy Based on Long-Term Durability and Performance Deterioration Prediction: A Case Study of Urban Bridges in Shanghai**

[Poster Session](#) with abstract

Yu Fang, Lijun Sun, Shoushan Cheng, Han Wei, Yueshan Zhang, Jie Guo

*Research Institute of Highway Ministry of Transport; Ministry of Transport Research Institute of Highway, China; Tongji University*

**23-00511 Bridge Project Prioritization: Development and Implementation of an Index**

[Poster Session](#) with abstract

Bryan Gibson, Chris Van Dyke, Sudhir Palle, Ryan Griffith, Doug Kreis

*Kentucky Transportation Cabinet; Kentucky Transportation Center*

**23-01413 Climate-Based, Data-Driven Models for Bridge Condition Assessment**

[Lectern Session](#) with [presentation](#) and [full paper](#)

Soheil Heidarian Radbakhsh, Amr Allam, Shrouk Gharib, Bowen Xu, Mazdak Nik-Bakht

*Concordia University*

**23-21190 InfoBridge: What Is New**

[Lectern Session](#) with presentation

Shri Bhide, Jerry Shen, Daniel Muller

*Federal Highway Administration (FHWA); North Carolina Department of Transportation*

**23-04779 Physics-Guided Neural Networks for Bridge Deterioration Forecasting**

[Poster Session](#) with abstract and [presentation](#)

Tobby Lie, Kevin Rens, Farnoush Banaei-Kashani

*University of Colorado Denver*

**23-04669 Unsupervised Detection of Anomalous Bridge Performance**

[Lectern Session](#) with abstract

Ryan Cheng, Jimmy Kim, Farnoush Banaei-Kashani

*University of Colorado, Denver*

**Managing Other Assets**

**23-20046 Advancements in the Non-Destructive Evaluation of Foundational Condition and Capacity for Transportation Assets**

[Lectern Session](#) with [presentation](#)

Ahmad A. Alhasan

*Applied Research Associates, Inc. (ARA)*

**23-04078 An Automated Guardrail Face Dentation Identification Method Using Mobile LiDAR Data**

[Poster Session](#) with abstract

Qing Hou, Chengbo Ai

*University of Massachusetts, Amherst*

**23-00827 Detecting Abnormality of Traffic Signs in Real-Time Using an Improved YOLOv5 Model**

[Lectern session](#) with abstract

Ziang Chen, Tangyi Guo, Liyan Sui, Yang Zhou, Xin Chen

*NanJing University of Science and Technology*

**23-20047 Geotechnical Asset Management: From There to Here and Onward**

[Lectern Session](#) with [presentation](#)

Vernon Schaefer

*Iowa State University*

**23-03100 Highway Sign Support Systems: Condition Assessment, Deterioration Models, and Asset Management**

[Poster Session](#) with [full paper](#)

Myungjin Chae, Lucas Voghell, Talat Salama, Drew Voghel, Jacob Booth

*Central Connecticut State University; Connecticut Department of Transportation*

**23-03511 Lane Marking Quality Assessment Using Connected Vehicle Data**

[Lectern session](#) with [presentation](#)

Donald Grimm, Fahim Ahmed

*General Motors Company; General Motors Research and Development Center*

**23-02701 Local Anomaly Detection on Slopes Using Point Cloud Data**

[Poster Session](#) with abstract

Taichi Ishikawa, Kiyoyuki Kaito, Kiyoshi Kobayashi

*Osaka University; Kyoto University*

**23-01779 Machine Learning-Based Framework for Prediction of Retroreflectivity Degradation of Pavement Markings Across the United States**

[Poster Session](#) with abstract

Ipshit Idris, Momen Mousa

*Sam Houston State University; Louisiana State University*

**23-01430 Modeling of Restriping of Waterborne Paints Using Transverse Test Deck Data in Hot and Humid Climate**

[Poster Session](#) with abstract and [presentation](#)

Elise Mansour, Momen Mousa, Marwa Hassan

*Sam Houston State University; Louisiana State University*

**23-20044 New Jersey's Geotechnical Asset Management: The Vision**

[Lectern Session](#) with [presentation](#)

Mohab Hussein

*New Jersey Department of Transportation*

**23-02100 Pavement Marking Conditions Assessment Using Mobile Phone-Based on YOLO and Similarity Detection**

[Lectern session](#) with [presentation](#)

Biao Kuang, Jianli Chen, Xianfeng Yang, Sayantan Tarafdar

*University of Utah; University of Maryland, College Park*

## Bridge Preservation and Rehabilitation

This section includes repair methods, preservation practices and bridge inspection.

### Repair Methods

**23-03685 Assessment of Innovative Repair Methods for Corroded Steel Girder Bridges Using House of Quality Matrix**

[Lectern Session](#) with [presentation](#)

Anna Tarasova, Deven Kanakamedala, Amit Varma, Jungil Seo, Robert Connor

*Purdue University*

**23-00843 Experimental Investigation of Reinforced Concrete Beams Damaged by Corrosion and Retrofitted by Ultra-High Performance Concrete**

[Lectern Session](#) with abstract

Harshdutta Pandya, William Riddell, Douglas Cleary, Gilson Lomboy  
*Rowan University*

**23-02196 Pneumatic Spray of Ultra-High Performance Concrete for Bridge Repair Applications**

[Lectern Session](#) with abstract and [presentation](#)

R. Morgan Dickinson, Muhammad Afzal, Islam Mantawy, Atorod Azizinamini  
*Florida International University; Rowan University*

**23-20135 Region 3: Repair and Strengthening of Bridges in Indiana Using Fiber Reinforced Polymer Systems (Indiana DOT)**

[Poster Session](#) with abstract

Timothy Wells  
*Indiana Department of Transportation*

**23-03568 Rehabilitation of Corroded Steel Bridge Girder Ends Using Partial Height Ultra-High Performance Concrete Encasement**

[Lectern Session](#) with abstract and [full paper](#)

Brian Lassy, Alexandra Hain, Arash Esmaili Zoghi, Zoltan Kanyo, Bao Chuong, Andrew Cardinali  
*University of Connecticut; Connecticut Department of Transportation*

**23-01341 Superstructure Load Rating Criteria and Field Applications of a Prestressed Mechanically Fastened Fiber-Reinforced Polymer Retrofit for Deteriorated Prestressed Concrete Beams**

[Lectern Session](#) with abstract and [presentation](#)

Sheng-Hsuan Lin, Brad McCoy, Gregory Lucier, Rudolf Seracino, Nicholas Pierce  
*Simpson Strong-Tie; United States Military Academy at West Point; North Carolina State University; North Carolina Department of Transportation*

**Preservation Practices**

**23-00679 Pack Rust Mitigation Strategies for Flange Splice Connections in Steel Bridges**

[Lectern Session](#) with abstract

Edgar Soriano Somarriba, Mark Bowman  
*Clark Dietz, Inc.; Purdue University*

**Bridge Inspection**

**23-01285 Automated Uncrewed Aerial Vehicle–Based Bridge Deck Delamination Detection and Quantification**

[Poster Session](#) with abstract

Qianyun Zhang, Sun Ro, Zhe Wan, Saeed Babanajad, Kaveh Barri, Amir Alavi  
*New Mexico State University; Rutgers University; Rutgers University, New Brunswick; Wiss, Janney, Elstner Associates; University of Pittsburgh*

**23-03816 Calibrating Bridge Element-Level Condition Ratings Through Weighted Inspection Analysis Behavior**

[Poster Session](#) with abstract and [presentation](#)

Pengkun Liu, Ying Shi, Ruoxin Xiong, Pingbo Tang  
*Carnegie Mellon University*

**23-02926 Challenges of 360° Inspection of Bridge Infrastructure Using Unmanned Aerial Vehicles**

[Poster Session](#) with abstract

Surya Sarat Chandra Congress, Jesse Escamilla III, Hiramani Chimaurya, Anand Puppala  
*North Dakota State University; Alaska Department of Transportation and Public Facilities; Texas A&M University*

**23-00470 Deterioration Models for Texas Bridges and Culverts**

[Lectern Session](#) with abstract and [presentation](#) and [full paper](#)

Jose Weissmann, Angela Weissmann, Arturo Montoya  
*University of Texas, San Antonio*

**23-05099 Developing a Field Concrete Carbonation Depth Model of Urban Bridges Using Historical Inspection Data**

[Poster Session](#) with abstract

Yu Fangearch, Lijun Sun, Shoushan Cheng, Han Wei, Yueshan Zhang, Jie Guo  
*Ministry of Transport Research Institute of Highway, China; Tongji University*

**23-00036 Evaluation of Steel Bridge Details for Susceptibility to Constraint-Induced Fracture**

[Lectern Session](#) with [presentation](#)

Domenic Coletti, Anthony Ream, Brandon Chavel  
*HDR; Michael Baker International, Inc.*

**23-04067 Experimental Validation of Wireless Expansion Joint Sensors for an In-Service Bridge**

[Lectern Session](#) with [presentation](#)

Daisy Ren, Pierredens Fils, Shinae Jang  
*University of Connecticut*

**23-20375 Guidelines for Risk-Based Inspection and Strength Evaluation of Suspension Bridge Main Cable Systems**

[Lectern Session](#) with [presentation](#)

Blaise Blabac  
*Modjeski and Masters*

**23-04675 Improving Granularity of Prestressed Concrete I-Beam Element Level Inspection Data for Improving Bridge Maintenance Strategies**

[Poster Session](#) with abstract

Kanchani Basnayake, Harsha Amunugama, Upul Attanayake  
*Western Michigan University*

**23-03937 A Multi-Task Deep Learning Model for Parsing Bridge Elements and Segmenting Defect in Bridge Inspection Images**

[Lectern Session](#) with abstract

Chenyu Zhang, Muhammad Karim, Ruwen Qin  
*Stony Brook University*

**23-00308 New Technologies for Bridge Inspection and Monitoring: A Perspective from European Union Research and Innovation**

[Lectern Session](#) with [presentation](#)

Konstantinos Gkoumas, Marcin Stepniak, Fabio dos Santos  
*European Commission Joint Research Centre*

**23-00915 Practical and Cost-Conscious Modeling of Bridges for Inspection**

[Poster Session](#) with abstract

Drew Garceau, Thomas Collins  
*Collins Engineers, Inc.*

**23-01830 Validating a Physics-Based Automatic Classification Scheme for Impact Echo Signals on Data Using a Concrete Slab with Known Defects**

[Lectern Session](#) with [presentation](#)

Agnimitra Sengupta, Hoda Azari, S. Guler, Parisa Shokouhi  
*Federal Highway Administration (FHWA); Pennsylvania State University*

## Culvert and Drainage Systems Maintenance

**23-20822 Assessing the Remaining Service Life of Corrugated Plastic Pipes Based on Post-Construction Inspection Data**

[Lectern Session](#) with [presentation](#)

Shawn Coombs, Michael Pluimer, Matt Ritchie  
*Advanced Drainage Systems, Inc. (ADS); Crossroads Engineering Services, LLC*

## Equipment and Facilities

**23-20341 Evaluation of New Technology for Highway Maintenance Functions: Truck-Mounted Attenuator Trucks**

[Lectern Session](#) with [presentation](#)

Bahram Ravani  
*University of California, Davis*

**23-03677 Formulation of Long-Range Plans and Budgets for Replacement of Highway Operations Equipment: Methodology and Case Example**

[Lectern Session](#) with abstract

Leila Hajibabai, Ali Hajbabaie, Henry Canipe  
*North Carolina State University; Mott MacDonald*



**23-00878 Functional Evaluation of the Autonomous Truck-Mounted Attenuators for Use in Active Work Zones**

[Poster Session](#) with abstract and [presentation](#)

Nithin Agarwal, Airton Kohls, Roozbeh Rahmani, Karla Rodrigues-Silva, Charles Brown  
*University of Florida; University of Tennessee, Knoxville*

## Work Zones and Maintenance Worker Safety

**23-03226 Designing and Evaluating the Effectiveness of Campaign Messages for Improving Work Zone Safety**

[Poster Session](#) with abstract and [presentation](#)

Prince Gyamfi, Nandhesh Subash, Krista Kelley, Stacey Connaughton, Ricardo Chahine, Wosang Cho, Konstantina Gkritza  
*Purdue University*

**23-02586 Development of Policy Guidance for Temporary Rumble Strips**

[Lectern Session](#) with abstract and [presentation](#)

Henry Brown, Praveen Edara, Carlos Sun, Qingzhong Zeng, Sungyop Kim, Jill Bernard Bracy  
*University of Missouri, Columbia; University of Missouri, Kansas City; University of Missouri-St Louis*

**23-01080 Effects of Speed Feedback Trailer Positioning and Presence of Law Enforcement on Driver Behavior in Freeway Work Zone Lane Closures**

[Lectern Session](#) with abstract and [presentation](#)

Md Shakir Mahmud, Hisham Jashami, Megat Usamah Megat Johari, Nischal Gupta, Anshu Bamney, Timothy Gates, Peter Savolainen  
*VHB; Oregon State University; Michigan State University; University of Connecticut*

**23-05177 Empirical Studies on Merging Characteristics in Temporary Highway Work Zones with Different Traffic States and Layouts**

[Poster Session](#) with abstract

Xiaoyue Zhu, Zheng Li, Xinkai Ji, Zhibin Li, Pan Liu  
*Southeast University*

**23-01073 Evaluation of Auxiliary Signs for Use with Driveway Assistance Devices at Low-Volume Access Points within One-Lane, Bidirectional Work Zones**

[Lectern Session](#) with abstract and [presentation](#)

Jordan Hankin, Meghna Chakraborty, Timothy Gates, Peter Savolainen, Travis Holpuch, Matt Motz  
*Hubbell, Roth and Clark, Inc.; UNC Highway Safety Research Center; Michigan State University*

**23-00959 Evaluation of Temporary Orange Profile Pavement Markings in Two Work Zones**

[Lectern Session](#) with abstract and [presentation](#)

Melisa Finley, Adam Pike  
*Texas A&M Transportation Institute*

- 23-05144 Examination of Crash Rates and Injury Severity Before, During, and After Roadworks at High-Speed Regional Roads**  
[Poster Session](#) with abstract  
Dan McClure, Sajani Siriwardene, Ashim Debnath, Long Truong  
*Deakin University; La Trobe University*
- 23-03941 Examining Drivers' Perception and Responses to Work Zone Intrusion Alert Technologies**  
[Poster Session](#) with abstract and [presentation](#)  
Hrshikesh Pokharkar, Kyeongsuk Lee, Shiva Pooladvand, Sogand Hasanzadeh  
*Purdue University*
- 23-04244 Exploration of Work-Related Injuries and Their Associated Risk Variables Among Transportation Maintenance Workers in the United States**  
[Lectern Session](#) with [presentation](#)  
Xingzhou Guo, Yunfeng Chen, Jiansong Zhang  
*Purdue University*
- 23-00683 Field Evaluation of End-of-Queue Crash Countermeasures at Flagger Stations**  
[Poster Session](#) with abstract  
LuAnn Theiss, Melisa Finley, Gerald Ullman  
*Texas A&M Transportation Institute*
- 23-04055 A Methodology for Scheduling Within-Day Roadway Work Zones Using Deep Neural Networks and Active Learning**  
[Poster Session](#) with abstract  
Mostafa Saneii, Ali Kazemeini, Sania Esmaeilzadeh Seilabi, Mohammad Miralinaghi, Samuel Labi  
*Sharif University of Technology; University of British Columbia; Purdue University; Illinois Institute of Technology*
- 23-03859 Optimal Work Zones on Two-Lane Highways with Managed Lanes**  
[Lectern Session](#) with [presentation](#)  
Ahmed Edrees, I jy Chien  
*New Jersey Institute of Technology*
- 23-20142 Region 3: Investigation of Autonomous and Connected Vehicles in Work Zones (Iowa DOT)**  
[Poster Session](#) with abstract  
Halil Ceylan  
*Iowa State University*
- 23-20133 Region 4: Evaluation of Work Zone Intrusion Alarm Systems (Caltrans)**  
[Poster Session](#) with abstract and [presentation](#)  
Ghazan Khan, Raven Cochrane  
*California State University, Sacramento*

**23-01917 A Simulation Study of Passing Drivers' Responses to the Automated Truck-Mounted Attenuator System in Road Maintenance**

[Lectern session](#) with [presentation](#)

Yu Li, Bill Wang, William Li, Ruwen Qin  
*Stony Brook University*

**23-02577 Simulator and Field Study of Effectiveness of Speed Management Method in Work Zones in Missouri**

[Poster Session](#) with abstract and [presentation](#)

Qingzhong Zeng, Henry Brown, Zhu Qing, Praveen Edara, Carlos Sun, Suzanna Long, Slade Engstrom, Shivraj Patil  
*University of Missouri, Columbia; University of Idaho; TranSystems Corporation*

## Pavement Monitoring and Evaluation

This section includes detecting, evaluating and monitoring pavement distress; and performance management.

### Detecting, Evaluating and Monitoring Pavement Distress

**23-04228 Application of Autonomous Vehicles for Automated Detection and Assessment of Potholes**

[Poster Session](#) with abstract

Sk Abu Talha, Mohammad Karasneh, Alfarooq Al Oide, Dmitry Manasreh, Munir Nazzal  
*University of Cincinnati*

**23-01313 Application of Machine Learning for Joint Detection of Concrete Pavements**

[Poster Session](#) with abstract and [presentation](#)

Christian Sabillon-Orellana, Joaquin Hernandez, Carlo Garcia, Ruohan Li, Jorge Prozzi  
*University of Texas, Austin*

**23-01236 An Approach to Combine Structural and Functional Testing to Optimize Condition Assessment of Flexible Pavements**

[Poster Session](#) with abstract and [presentation](#)

Christina Plati, Konstantinos Gkyrtis, Andreas Loizos  
*National Technical University of Athens (NTUA)*

**23-00538 An Approach to Estimate Time to Friction Loss in Pavement ME for the Florida Concrete Test Road**

[Poster Session](#) with abstract and [presentation](#)

Issa Issa, James Greene  
*Fugro USA Land, Inc.; Florida Department of Transportation*

**23-00631 Backcalculation of Rigid Pavement Properties from Traffic Speed Deflectometer Measurements**

[Lectern Session](#) with abstract and [presentation](#)

Jaime Hernandez  
*Marquette University*

- 23-00043 A Deep Learning Method of Pothole Detection Using the Improved YOLOv3 Network**  
[Poster Session](#) with abstract  
Danyu Wang, Zhen Liu, Xingyu Gu, Yihan Chen, Lutai Wang  
*Southeast University*
- 23-03554 A Deeper Generative Adversarial Network for Pavement Crack Detection**  
[Poster Session](#) with abstract  
Jingtao Zhong, Ju Huyan, Weiguang Zhang, Xi Jiang, Baoshan Huang  
*University of Tennessee, Knoxville; Southeast University*
- 23-01631 Detectability of Concealed Cracks in the Asphalt Pavement Layer Using Air-Coupled, Ground Penetrating Radar**  
[Poster Session](#) with abstract  
Siqi Wang, Zhen Leng, Xin Sui  
*Hong Kong Polytechnic University*
- 23-02387 Dynamic Back-Calculation for Evaluating Structural Degradation of Transverse Joint in Concrete Pavement**  
[Poster Session](#) with abstract  
Tatsuo Nishizawa, Masaru Terada, Masayuki Yabu, Masashi Koyanagawa, Yasushi Takeuchi  
*Ishikawa National College of Technology; Public Works Research Center; Public Works Research Institute; Dokuritsu Gyosei Hojin Doboku Kenkyujo; Tokyo University*
- 23-05132 Evaluating the Feasibility of Using 3D Printing to Simulate Pavement Surface Texture and Features**  
[Lectern Session](#) with abstract and [presentation](#)  
Ryan Salameh, Pingzhou (Lucas) Yu, Yi-Chang Tsai  
*Georgia Institute of Technology (Georgia Tech)*
- 23-02090 Evaluation of Crack Development Through a Bituminous Interface Reinforced with Geosynthetic Materials by Using a Novel Approach**  
[Poster Session](#) with abstract  
Ehsan Solatiyan, Van Thang Ho, Nicolas Bueche, Michel Vaillancourt, Alan Carter  
*Ecole de Technologie Superieure, Montreal; Berner Fachhochschule*
- 23-01346 Field Validation of Falling Weight Deflectometer Deflection-Based Critical Strain Prediction Models for Full-Depth Asphalt Pavements**  
[Poster Session](#) with abstract and [presentation](#)  
Bongsuk Park, Seonghwan Cho, Tommy Nantung, John Haddock  
*Purdue University; Indiana Department of Transportation*
- 23-04695 Instance Segmentation of Pavement Distresses from Unmanned Aerial Vehicle-Based Vision Data: An Implementation of Mask R Convolutional Neural Network**  
[Poster Session](#) with abstract  
Zia Uddin Ahmed Zihan, Omar Smadi, Inya Nlenanya  
*Iowa State University*

- 23-02104 Mechanistic Assessment of Flexible Pavements in Wisconsin Using a Traffic Speed Deflection Device: Structural Evaluation and Comparison with a Falling Weight Deflectometer**  
[Lectern Session](#) with abstract and [presentation](#)  
Ali Morovatdar Tirupan Mandal, Ali Arabzadeh, Peter Kemp  
*Wisconsin Department of Transportation*
- 23-02283 Monitoring and Automatic Characterization of Cracks in Strain-Hardening Cementitious Composite Through Intelligent Interpretation of Photos**  
[Lectern Session](#) with abstract and [presentation](#)  
Pengwei Guo, Weina Meng, Yi Bao  
*Stevens Institute of Technology*
- 23-03344 Improved One-Stage Object Detection Model for Pavement Distress Detection Using 3D Pavement Surface Images**  
[Poster Session](#) with abstract  
Haitao Gong, Jueqiang Tao, Xiaohua Luo, Feng Wang  
*Texas State University, San Marcos*
- 23-01506 Pavement Crack Detection Using a Lightweight Network**  
[Poster Session](#) with abstract  
Yangcheng Tao, Huachun Tan, Fan Ding, Zoutao Wen  
*Southeast University*
- 23-01374 Pavement Health Monitoring and Residual Life Assessment Based on SmartRock Sensors**  
[Poster Session](#) with abstract  
Ning Wang, Chengjia Han, Zheng Tong, Tao Ma  
*Southeast University*
- 23-03909 Reporting Pavement Faulting with Precision and Confidence**  
[Poster Session](#) with abstract  
Ruohan Li, MooYeon Kim, Kevin Lam, Jorge Prozzi  
*University of Texas, Austin*
- 23-02908 Research on Evaluation Method of Road Structural Conditions Based on Ground Penetrating Radar and Falling Weight Deflectometer**  
[Poster Session](#) with abstract  
Zhen Liu, Xingyu Gu, Lutai Wang, Danyu Wang  
*Southeast University*
- 23-04166 Short-Term, Network-Level Pavement Distress Prediction Using the Adaptive Neuro-Fuzzy Inference System Approach: A Case Study in Louisiana**  
[Poster Session](#) with abstract  
Yilong Liu, Zhong Wu  
*Louisiana Department of Transportation and Development*

**23-01067 Short-Term Predictions of Asphalt Pavement Rutting Using Deep Learning Models**

[Poster Session](#) with abstract

Yong Deng, Xianming Shi

*Washington State University*

**23-02029 Study on Thermal Reflective Cracking of Asphalt Concrete Overlays on Concrete Pavements Under Moderate Temperature Variations Using a Finite Element Model**

[Poster Session](#) with abstract

Liya Jiao, John Harvey, Rongzong Wu, Hanyu Deng

*Atlas Technical Consultants; University of California, Davis*

**23-03160 Traffic Speed Deflectometer for Network-Level Pavement Management in Tennessee**

[Lectern Session](#) with abstract

Miaomiao Zhang, Xiaoyang Jia, Pawel Polaczyk, Yuetan Ma, Rui Xiao, Baoshan Huang

*University of Tennessee, Knoxville*

**Performance Management**

**23-01472 Differences Evaluation of Pavement Roughness in Lateral Distribution Based on LiDAR Data**

[Poster Session](#) with abstract

Qian Gao, Li Teng, Siyu Wei, Yuchuan Du, Chenglong Liu

*Tongji University; Shanghai Urban Construction City Operation (Group) Co., Ltd*

**23-02052 Evaluation of Pavement Performance Models Using Historical Condition Data for the U.S. National Parks Pavement Network**

[Poster Session](#) with abstract

James Bryce, Andrew Nichols, Mohammed Elias, Anthony Maloche, Nadarajah Sivaneswaran, Thomas Canick

*West Virginia University; Marshall University; Federal Highway Administration (FHWA); U.S. National Park Service*

**23-00100 Minimizing the Environmental Impact of Pavement Infrastructure Using Deep Reinforcement Learning**

[Poster Session](#) with abstract

Ali Kazemeini, Omar Swei

*University of British Columbia*

**23-00398 Multi-Benefits Evaluation of Pavement Maintenance Treatments Based on Performance and Evolutionary Game Analysis**

[Poster Session](#) with abstract

Yichang Xie, Yuanyuan Pan, Dongdong Han, Tao Yang, Yongli Zhao

*Southeast University*

**23-00992 Quantifying Uncertainty with Pavement Performance Models: Comparing Bayesian and Non-Parametric Methods**

[Poster Session](#) with [presentation](#)

Gnanadeepika Karanam, Boris Goenaga, Benjamin Underwood  
*North Carolina State University*

**23-21178 Third-Generation Long-Term Pavement Performance Data Analysis Plan**

[Lectern Session](#) with [presentation](#)

Larry Wiser  
*Federal Highway Administration (FHWA)*

## **Pavement Repair and Rehabilitation Methods**

This section includes papers on crack sealing; and chip seals, slurry seals and surface treatments.

### **Crack Sealing**

**23-02529 The Rheological Performance of Advanced Crack Sealing Materials**

[Poster Session](#) with [presentation](#) and [full paper](#)

Geoffrey Rowe, Joseph Drbohlav, Brian Majeska, Joseph Lorenc  
*Abatech, Inc.; Adventus Partners*

### **Chip Seals, Slurry Seals and Surface Treatments**

**23-02294 Asphalt Pavement Pothole Repair Using Pre-Heating Method: An Integrated Experiment and Modeling Study**

[Lectern Session](#) with [presentation](#)

Xiao Chen, Hao Wang, Giri Venkateela  
*Rutgers University; New Jersey Department of Transportation*

**23-01665 Assessing the Performance of Laser Scanning Crack Detection on Chip-Seal Surfaces**

[Poster Session](#) with [presentation](#)

Annisa Hasanah, Theunis Henning, Richard Fox-Ivey  
*University of Auckland; Pavemetrics Systems Inc.*

**23-04483 Data-Driven, Web-Based Patching Management Tool Using Multi-Sensor Pavement Structure Measurements**

[Lectern Session](#) with [presentation](#)

Sneha Jha, Yaguang Zhang, Bongsuk Park, Seonghwan Cho, Jim Krogmeier, Tandra Bagchi, John Haddock  
*Purdue University; Indiana Department of Transportation*

**23-02594 Diffusion Characteristics of Surface Treatment Emulsion in Aged Asphalt Mortar of Porous Asphalt Mixture Through Scanning Electron Microscopy with Energy Dispersive Spectroscopy Analysis**

[Lectern Session](#) with abstract

Bin Yang, Zhen Leng, Jiwang Jiang, Guoyang Lu, City Rui Li, Ruiqi Chen, Meizhao Han  
*Hong Kong Polytechnic University; Southeast University; University of Hong Kong; Harbin Institute of Technology*

**23-04846 Effect of Vehicles' Speed and Weight on Raveling of Chip Seal Made of Mineral and Crumb Rubber Aggregate**

[Lectern Session](#) with abstract

Mohamed ElGawady, Alireza Pourhassan, Ahmed Gheni  
*Missouri University of Science and Technology*

**23-02995 Evaluation of Aggregate Properties That Affect Micro Surfacing Mix Time**

[Lectern Session](#) with abstract and [presentation](#) and [full paper](#)

Stephane Charmot, Lin Song, Jiangsu Nick Yu  
*Ingevity Corporation; Rivendell Transportation Technology Co., Ltd*

**23-01416 Evaluation of Short-Term Field Performance of Proprietary Spray-On Rejuvenators**

[Poster Session](#) with [presentation](#)

Poornachandra Vaddy, Muhammed Emin Kutay, Michael Vrtis, Bora Cetin, Syed Haider  
*Michigan State University; Minnesota Department of Transportation*

**23-03497 Use of Chip Seal Treatments to Mitigate Pavement Roughness Progression in Cold Regions**

[Lectern Session](#) with [presentation](#)

Anthony Brenes-Calderón, Adriana Vargas-Nordbeck  
*Auburn University; National Center for Asphalt Technology (NCAT)*

## Roadside Maintenance

**23-20281 Case Studies: Applications of Lightweight Cellular Concrete to Landslide Remediation and Settlement Mitigation**

[Lectern Session](#) with [presentation](#)

Brad Dolton  
*CEMATRIX (Canada) Inc.*

**23-20043 Evaluate and Develop Post-Construction Groundcover That Meets Erosion and Sediment Goals and Is Beneficial to Pollinators**

[Poster Session](#) with abstract

Cheryl Daniels  
*Davey Resource Group*



- 23-04055 A Methodology for Scheduling Within-Day Roadway Work Zones Using Deep Neural Networks and Active Learning**  
[Poster Session](#) with abstract  
Mostafa Saneii, Ali Kazemeini, Sania Esmailzadeh Seilabi, Mohammad Miralinaghi, Samuel Labi  
*Sharif University of Technology; University of British Columbia; Purdue University; Illinois Institute of Technology*
- 23-20286 National Seed Strategy: Restoring Resilience**  
[Poster Session](#) with abstract and [presentation](#)  
Brian Smith, Elizabeth Krone, Patricia DeAngelis  
*Federal Highway Administration (FHWA); U.S. Fish and Wildlife Service*
- 23-20215 New York State Department of Transportation Pollinator Initiative**  
[Poster Session](#) with abstract  
Peter Dunleav  
*New York State Department of Transportation*
- 23-20041 NCHRP 25-59 Research Project Update**  
[Lectern Session](#) with abstract and [presentation](#)  
Jennifer Hopwood  
*Xerces Society for Invertebrate Conservation*
- 23-20042 Pollinator Research with the Idaho Department of Transportation**  
[Lectern Session](#) with abstract and [presentation](#)  
Robert Ament, Cathy Ford  
*Western Transportation Institute (WTI); Idaho Transportation Department*
- 23-04362 Quantifying Roadside Tree Removal Along the I-16 Corridor in Georgia Using High-Resolution Aerial Imagery**  
[Lectern Session](#) with abstract  
Ellen Oettinger White, Marcia Meixler  
*Rutgers University*
- 23-20054 The Ray Meadow Project: Establishing Perennial Wildflower Meadows in the Right of Way from Seed with No Irrigation**  
[Poster Session](#) with abstract  
Matthew Quirey  
*The Ray*
- 23-20053 The Ray Slope Project: Slope Stabilization Utilizing Native Plants, Humic Acid, and Biochar**  
[Poster Session](#) with abstract  
Matthew Quirey  
*The Ray*

**23-20062 Roadside as Nature-Based Solutions for Transportation Assets**

[Poster Session](#) with abstract and [presentation](#)

Raymond Willard

*Washington State Department of Transportation*

**23-20039 U.S. Fish & Wildlife Service Pollinator Conservation**

[Lectern Session](#) with abstract and [presentation](#)

Craig Czarnecki

*U.S. Fish and Wildlife Service*