



**Transportation Research Board  
97th Annual Meeting**

**January 7–11, 2018 • Washington, D.C.**



**University of Illinois at Urbana - Champaign (UIUC)  
Rail Transportation and Engineering Center (RailTEC)**

**Guide to RailTEC Student, Faculty, Staff  
and Alumni Presentations  
TRB 97th Annual Meeting  
Washington, D.C.  
January 7-11, 2018**

**SUNDAY**.....Page 3

**Understanding and Managing the Complex World of Wheel–Rail Interaction, Part 1 (Part 2, Session 186)**

*Sunday 9:00 AM- 12:00 PM*

**Workshop 141 | Convention Center, 144B**

**MONDAY**.....Page 3

**Rail Transit Infrastructure Committee, AR055**

*Monday 8:00 AM – 9:45 AM*

**Marriott Marquis, Capitol (M4)**

**Commuter Rail Research Subcommittee, AP070(2)**

*Monday 8:00 AM – 9:45 AM*

**Marriott Marquis, Woodley Park (M3)**

**Railroad Track Substructure and Superstructure Interaction**

*Monday 8:00 AM – 9:45 AM*

**Lectern Session 234 | Convention Center, 144A**

**Train Energy Efficiency: Optimal Operating Strategies**

*Monday 8:00 AM – 9:45 AM*

**Lectern Session 232 | Convention Center, 143A**

**Technology to Improve the Effectiveness of Railroad Track Inspection and Maintenance**

*Monday 10:15 AM – 12:00 PM*

**Lectern Session 296 | Convention Center, 143A**

**Human Factors Rail Research Topics in Accidents and Derailments**

*Monday 10:15 AM – 12:00 PM*

**Lectern Session 297 | Convention Center, 144A**

**Analysis of Safety Concerns at Highway-Rail Grade Crossings**

*Monday 10:15 AM – 12:00 PM*

**Poster Session 324 | Convention Center, Hall E**

**How and When to Use Private Money for Transportation Infrastructure Projects**

*Monday 1:30 PM – 3:15 PM*

**Lectern Session 367 | Convention Center, 147B**

**Hazardous Materials Transportation Research**

*Monday 1:30 PM – 3:15 PM*

**Lectern Session 371 | Convention Center, 149**

**Innovations and Advances in Transportation Geotechnics**

*Monday 3:45 PM – 5:30 PM*

**Lectern Session 419 | Convention Center, 207A**

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## **Railway Capacity and Delay Modeling—Hybrid Session**

*Monday 3:45 PM – 5:30 PM*

**Lectern Session 435 | Convention Center, 150A**

## **Rail Group Executive Board**

*Monday 6:00 PM – 7:30 PM*

**Marriott Marquis, Capitol Hill (M3)**

## **TUESDAY.....Page 10**

### **Innovative Track Standards and Specifications to Meet the Challenges of the 21st-Century Economy**

*Tuesday 8:00 AM – 9:45 AM*

**Lectern Session 503 | Convention Center, 143B**

### **TRB's Rail Safety IDEA Program: Sponsoring Innovation to Improve Railroad Safety and Performance**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 579 | Convention Center, Hall E**

### **Research Trends in Railway Operating Technologies**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 581 | Convention Center, Hall E**

### **Current Research in Railroad Track Structure System Design**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 583 | Convention Center, Hall E**

### **Current Research in Railway Track Maintenance**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 584 | Convention Center, Hall E**

### **Railroad Track Structure System Design Committee, AR050**

*Tuesday 1:30 PM – 3:15 PM*

**Lectern Session 607 | Marriot Marquis, Capitol (M4)**

### **Freight Rail Propulsion: Where Does the Energy Come From?**

*Tuesday 1:30 PM – 3:15 PM*

**Lectern Session 624 | Convention Center, 143A**

### **Rail and Public Transportation Caucus (sponsored by BNSF)**

*Tuesday 6:00 PM – 7:30 PM*

**Convention Center, Ballroom south Pre-Function C**

### **Geological and Geoenvironmental Engineering Section Executive Board**

*Tuesday 6:00 PM – 9:30 PM*

**Marriott Marquis, Catholic University (M1)**

### **Rail Capacity, AR040(1), Joint Subcommittee of AR040, AR030, AP070, AT010, AR010**

*Tuesday 7:30 PM – 9:30 PM*

**Marriott Marquis, Treasury (M4)**

## SUNDAY.....

### **Understanding and Managing the Complex World of Wheel–Rail Interaction, Part 1 (Part 2, Session 186)**

Sunday 9:00 AM- 12:00 PM

Workshop 141 | Convention Center, 144B

J. Riley Edwards, University of Illinois, Urbana Champaign, presiding

*This workshop addresses challenges associated with one of the most complex rail issues: the prediction and management of wheel–rail interaction. Rail industry experts deliver technical presentations on new methods of managing the wheel–rail interface, analytical models, friction management, and other methods to reduce costs and risks. Participants will have the opportunity to engage in timely discussion on research needs and potential solutions.*

### **A New Type of Rail Corrugation? Investigation into Rail Corrugation on Light Rail Transit Systems**

William Moorhead, TRAMMCO, LLC

### **Automated VAMPIRE for Various Purposes Including Derailment Risk Identification and Derailment Investigation**

Cory Hogan, ENSCO, Inc.

### **Track Models and Coupling Procedures for Vehicle-Track-Soil Interaction Simulations**

Dimitris Rizos, University of South Carolina

### **Investigation of the Relationship between Train Speed and Bolted Rail Joint Fatigue Life Using Finite Element Analysis**

Yu Qian, University of Illinois, Urbana Champaign

## MONDAY.....

### **Rail Transit Infrastructure Committee, AR055**

Monday 8:00 AM – 9:45 AM

Marriott Marquis, Capitol (M4)

Anthony Bohara, HDR, presiding

### **A Rolling-Horizon Optimization Approach for Catenary Maintenance Identification and Assignment**

Yung-Cheng Lai, National Taiwan University

Ren-Hong Xu, National Taiwan University

Tzu-Hao Yan, National Taiwan University

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## **Quantification of Loading Environment and Flexural Demand Variability of Prestressed Concrete Crossties under Shared Corridor Operating Conditions**

Ricardo Quiros-Orozco, University of Illinois, Urbana Champaign

J. Riley Edwards, University of Illinois, Urbana Champaign

Marcus Dersch, University of Illinois, Urbana Champaign

Yu Qian, University of Illinois, Urbana Champaign

## **Commuter Rail Research Subcommittee, AP070(2)**

*Monday 8:00 AM- 9:45 AM*

**Marriott Marquis, Woodley Park (M3)**

Thomas Cornillie, Capitol Corridor Joint Powers Authority, presiding

## **Railroad Track Substructure and Superstructure Interaction**

*Monday 8:00 AM – 9:45 AM*

**Lectern Session 234 | Convention Center, 144A**

J. Riley Edwards, University of Illinois, Urbana Champaign, presiding

## **Application of a New Concept and a Method to Estimate the Vertical Impact Forces on Railway Tracks due to Variation of Track Stiffness**

N. Özgür Bezzin, Istanbul University

## **Evaluation of Ballast Behavior under Different Tie Support Conditions Using Discrete Element Modeling**

Wenting Hou, University of Illinois, Urbana Champaign

Bin Feng, University of Illinois, Urbana Champaign

Wei Li, Zhejiang University

Erol Tutumluer, University of Illinois, Urbana Champaign

## **Seeing the Effects of Track Substructure on Ride Quality**

James Hyslip, LORAM-HyGround Division

Hamed Kashani, LORAM-HyGround Division

## **Use of Track Geometry Car Data to Identify Problems in the Track Substructure**

Phil Sharpe, AECOM

## **Train Energy Efficiency: Optimal Operating Strategies**

*Monday 8:00 AM- 9:45 AM*

**Lectern Session 232 | Convention Center, 143A**

Adrian Hellman, OST-R/Volpe Center, presiding

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### **Feedforward Tactical Optimization for Energy-Efficient Operation of Freight Trains: Swiss Case**

Valerio De Martinis, ETHZ - Swiss Federal Institute of Technology  
Ambra Toletti, ETHZ - Swiss Federal Institute of Technology  
Francesco Corman, ETH Zurich  
Ulrich Weidmann, IVT ETH Zürich  
Andrew Nash, Emch+Berger AG Bern

### **An Integrated Micro–Macro Approach for High-Speed Railway Energy-Efficient Timetabling Problem**

Yan Xu, Beijing Jiaotong University  
Bin Jia, Beijing Jiaotong University  
Amir Ghiasi, University of South Florida  
[Xiaopeng \(Shaw\) Li, University of South Florida](#)  
Minghua Li, Beijing Urban Construction Design & Development Group Co., Limited

### **A Stochastic Simulation Model Developed to Determine Threshold of Railway Electrification Based on Critical Load Criteria Using a Case Study at Tehran–Mashhad Route**

Masoud Shakibayi, Iran University of Science and Technology  
Yosef Shafahi, Sharif University of Technology  
Mohammadadel Khodakarami, Texas A&M Transportation Institute  
Naiman Nikoo, Iran University of Science and Technology

## **Technology to Improve the Effectiveness of Railroad Track Inspection and Maintenance**

*Monday 10:15 AM – 12:00 PM*

### **Lectern Session 296 | Convention Center, 143A**

Joseph Smak, National Railroad Passenger Corporation (Amtrak), presiding

### **A Case Study of Using Advanced Measurement Technologies to Inspect Railway Track Condition**

Alireza Roghani, National Research Council Canada  
Robert Caldwell, National Research Council Canada  
Michael Hendry, University of Alberta

### **Modeling Progressive Settlement of a Railway Bridge Transition Zone**

Stephen Wilk, University of Illinois, Urbana Champaign  
Timothy Stark, University of Illinois, Urbana Champaign

### **Evaluation of Railway Ballast Permeability Using Machine Vision Based Degradation Analysis**

Haohang Huang, University of Illinois, Urbana Champaign  
Maziar Moaveni, University of Illinois, Urbana Champaign  
Scott Schmidt, University of Illinois, Urbana Champaign  
Erol Tutumluer, University of Illinois, Urbana Champaign  
John Hart, University of Illinois, Urbana Champaign

### **Measurement of Track Stiffness Irregularities – Correlation Between Stiffness Gradients and Track Geometry Defects**

Eric Berggren

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## Human Factors Rail Research Topics in Accidents and Derailments

Monday 10:15 AM – 12:00 PM

**Lectern Session 297 | Convention Center, 144A**

Ann Mills, Rail Safety and Standards Board (RSSB), presiding

### **The Train Driver's Attention and Accident Involvement**

Bahareh Hani Tabai, Iran University of Science and Technology

Morteza Bagheri

Vahid Sadeghi-Firoozabadi, Iran University of Science and Technology

Vahideh Shahidi, Wilfried Luier University

### **Major Factors Affecting Passenger Train Accident Occurrence and Severity in the United States: 1996 – 2015**

Chen-Yu Lin, University of Illinois, Urbana Champaign

Rapik Saat, Association of American Railroads (AAR)

Christopher Barkan, University of Illinois, Urbana Champaign

### **Comparison of Loaded and Empty Unit Train Derailment Characteristics**

Weixi Li, University of Illinois, Urbana Champaign

Geordie Roscoe, UIUC Railroad Engineering Program

Zhipeng Zhang, University of Illinois, Urbana Champaign

Rapik Saat, Association of American Railroads (AAR)

Christopher Barkan, University of Illinois, Urbana Champaign

## Analysis of Safety Concerns at Highway-Rail Grade Crossings

Monday 10:15 AM – 12:00 PM

**Poster Session 324 | Convention Center, Hall E**

Aemal Khattak, University of Nebraska, Lincoln, presiding

### **Injury Severity Analysis of Pedestrian and Bicyclist Trespassing Crashes at Non-Crossings: Application of Predictive Text Analytics**

Behram Wali, University of Tennessee, Knoxville

Asad Khattak, University of Tennessee, Knoxville

Meng Zhang, University of Tennessee, Knoxville

### **Modeling Hazardous Materials Release in Crashes at Highway-Rail Grade Crossings**

Amirfarrokh Iranitalab, University of Nebraska, Lincoln

Yashu Kang, University of Nebraska, Lincoln

Aemal Khattak, University of Nebraska, Lincoln

### **A Method for Better Estimation of Motor Vehicle Crash Exposure at Highway-Rail Grade Crossings**

Huiyuan Liu, University of Nebraska, Lincoln

Aemal Khattak, University of Nebraska, Lincoln

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### **Predicting Highway-Rail Grade Crossing (HRGC) Gate Violations Using Tree-Based Ensemble Techniques**

Li Zhao, University of Nebraska, Lincoln  
Laurence Rilett, University of Nebraska, Lincoln  
Cliff Spiegelman, Texas A&M Transportation Institute

### **Injury Severity of Truck Drivers in Crashes at Highway-Rail Grade Crossings in the United States**

Waleed Khan  
Aemal Khattak, University of Nebraska, Lincoln

### **Highway-Rail Grade Crossing Incident Consequence Analysis**

Lijun Zhang, University of Illinois, Urbana Champaign  
Samantha Chadwick, WSP  
Christopher Barkan, University of Illinois, Urbana Champaign

## **How and When to Use Private Money for Transportation Infrastructure Projects**

Monday 1:30 PM – 3:15 PM

**Lectern Session 367 | Convention Center, 147B**

[George Grimes, Patriot Rail Company, presiding](#)

*PPP's have great promise to help finance our infrastructure needs for different modes of transportation. Many PPP projects—such as the Denver Eagle P3 (DBFOM) commuter rail project—have been highly successful. But the history of PPP “... is littered with examples where privatization did not live up to its promises. Problems fall into three categories; the behavioral barriers that turn off consumers; political interests that often turn projects sour; and the difficulty of finding financial and incentive structures that align with the interests of all parties” ( The Economist, 4/22-28, 2017). This session will examine how/where/why PPP has worked—or not worked—for different modes of transportation and the insights learned as a result.*

### **Assessing Financial Viability: An Engineering Perspective**

Steve Clark, ARUP

### **Concession Opportunities and Regulatory Issues**

Dean Radeloff, Parsons

### **Private Financing Structuring Issues**

Peter O'Neill, Rubicon Infrastructure Advisors, Inc.

### **California Public–Private Partnership Projects**

Malcolm Dougherty, California Department of Transportation (CALTRANS)

### **P3 Panel Discussion**

[George Grimes, Patriot Rail Company](#)

Steve Clark, ARUP

Malcolm Dougherty, California Department of Transportation (CALTRANS)

Peter O'Neill, Rubicon Infrastructure Advisors, Inc.

Dean Radeloff, Parsons

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## Hazardous Materials Transportation Research

Monday 1:30 PM – 3:15 PM

### Lectern Session 371 | Convention Center, 149

David Willauer, Cambridge Systematics, Inc., presiding

#### **Train-Level and Tank Car-Level Modeling of Hazardous Materials Release in Railroad Incidents**

Amirfarrokh Iranitalab, University of Nebraska, Lincoln

Aemal Khattak, University of Nebraska, Lincoln

#### **Developing an Empirical Pipeline and Rail Crude Oil Freight Demand Model**

Adam Morrison, University of Waterloo

Chris Bachmann, University of Waterloo

Frank Saccomanno, University of Waterloo

#### **Investigation of United States Rail-Based Crude Oil Incidents-Types and Consequences of Crude Oil Release**

Amirfarrokh Iranitalab, University of Nebraska, Lincoln

Aemal Khattak, University of Nebraska, Lincoln

Eric Thompson

#### **Comparative Risks of Transporting Hazardous Materials by Unit Train and Manifest Train**

Weixi Li, University of Illinois, Urbana Champaign

Christopher Barkan, University of Illinois, Urbana Champaign

## Innovations and Advances in Transportation Geotechnics

Monday 3:45 PM – 5:30 PM

### Lectern Session 419 | Convention Center, 207A

Anand Puppala, University of Texas, Arlington, presiding

*This session covers four innovative areas and topics in the pavement geotechnics field. These topics include both pavement- and rail track-related technologies using bioinspired material improvements to unmanned aerial vehicle-based photogrammetry studies for enhancing and addressing the performance of geotechnical infrastructure assets.*

#### **Railway Geotechnics for High Speed Train Infrastructure**

Erol Tutumluer, University of Illinois, Urbana Champaign

#### **Applications of UAVs in Transportation Geotechnics**

Anand Puppala, University of Texas, Arlington

Surya Sarat Chandra Congress, University of Texas, Arlington

#### **Bio-Inspired Ground Improvement for Transportation Infrastructure**

J. David Frost, Georgia Institute of Technology (Georgia Tech)

#### **Remote Sensing Technologies for Highway Infrastructure Monitoring**

Thomas Oommen, Michigan Technological University

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## **Railway Capacity and Delay Modeling—Hybrid Session**

*Monday 3:45 PM – 5:30 PM*

**Lectern Session 435 | Convention Center, 143B**

Tyler Dick, University of Illinois, Urbana Champaign, presiding  
Rapik Saat, Association of American Railroads (AAR), presiding

### **Simulation-based Method of Capacity Utilization Evaluation to Account for Uncertainty in Recovery Time**

Yung-Cheng Lai, National Taiwan University  
Kuan-Ting Chen, National Taiwan University  
Tzu-Hao Yan, National Taiwan University  
Ming-Hua Li, National Taiwan University

### **Simultaneous Optimization of Railcar Itinerary and Train Formation Plan**

Boliang Lin, Beijing Jiaotong University  
Jiaxi Wang, Beijing Jiaotong University  
Ruixi Lin, CloudMinds  
Chang Liu, Beijing Jiaotong University  
Jie Xiao, Beijing Jiaotong University  
Siqi Liu, Beijing Jiaotong University  
Jianping Wu, Beijing Jiaotong University

### **A Data Driven Method for Delay Duration Estimation of High Speed Train**

Meng-Cheng (Jason) Ni, City University of Hong Kong  
K. L. Tsui, City University of Hong Kong  
Yang Zhao, City University of Hong Kong

### **Operational Schedule Flexibility, Train Velocity and the Performance Reliability of Single-Track Railways**

Taskin Sehitoglu, University of Illinois, Urbana Champaign  
Darkhan Mussanov, University of Illinois, Urbana Champaign  
Tyler Dick, University of Illinois, Urbana Champaign

### **Analysis of Causes and Effects of Primary Delays in a High-Speed Rail System**

Chao Wen, University of Waterloo  
ZhongCan Li, Southwest Jiaotong University  
Javad Lessan, University of Waterloo  
Liping Fu, University of Waterloo  
Ping Huang, Southwest Jiaotong University  
Chaozhe Jiang, Southwest Jiaotong University  
Matthew Muresan, University of Waterloo

### **Statistical Analysis of High-Speed Railway Capacity Utilization and Passenger Distribution in China: A Case Study of Wuhan-Guangzhou High-Speed Rail**

Jie Li, Southwest Jiaotong University  
Yuxiang Yang, Southwest Jiaotong University  
Jing Gan, Southwest Jiaotong University  
Chao Wen, University of Waterloo  
Ping Huang, Southwest Jiaotong University  
Qiyuan Peng, Southwest Jiaotong University

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**Societal Benefits in Capacity Allocation Mechanisms and Infrastructure Charging Systems for Vertically-Separated Railways: Incorporating Economic Assessment into Capacity Allocation and Infrastructure Charging Policies**

Aleksandr Prodan, CPCS Transcom Ltd.  
Paulo Teixeira, Instituto Superior Tecnico

**A Markov Chain Model for Measuring Robustness of Train Schedules**

Ismail Sahin, Yildiz Technical University

**Simultaneous Rerouting and Rescheduling on Rail Networks under Weather Impact**

Ying Wang,  
Ronghui Liu  
Raymond S. K. Kwan, University of Leeds

**Predicting Delay Occurrence at Freight Rail Sidings**

Juan Martinez Mori, University of Illinois, Urbana Champaign  
William Barbour, University of Illinois, Urbana Champaign  
Shankara Kuppa, CSX Corporation, Inc.  
Daniel Work, University of Illinois, Urbana Champaign

**Rail Group Executive Board**

*Monday 6:00 PM – 7:30 PM*

**Marriott Marquis, Capitol Hill (M3)**

George Grimes, Patriot Rail Company, presiding

**TUESDAY**.....

**Innovative Track Standards and Specifications to Meet the Challenges of the 21st-Century Economy**

*Tuesday 8:00 AM – 9:45 AM*

**Lectern Session 503 | Convention Center, 143B**

David Staplin, HNTB Corporation, presiding

**Introductions**

David Staplin, HNTB Corporation

**Current Developments in the Rail Industry Relating to Standards and Specifications**

Conrad Ruppert, University of Illinois, Urbana Champaign

**Successes and Challenges with Standards and Specifications: Freight Railroad Perspective**

Semih Kalay, Transportation Technology Center, Inc.

**Successes and Challenges with Standards and Specifications: Commuter Railroad Perspective**

Yifeng Mao, Long Island Railroad Company

**Successes and Challenges with Standards and Specifications: Intercity Railroad Perspective**

Brian Marquis, OST-R/Volpe Center

**Successes and Challenges with Standards and Specifications: Rail Transit Perspective**

William Moorhead, TRAMMCO, LLC

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## **TRB's Rail Safety IDEA Program: Sponsoring Innovation to Improve Railroad Safety and Performance**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 579 | Convention Center, Hall E**

Velvet Basemera-Fitzpatrick, Transportation Research Board, presiding

*This session presents status and findings from eight Rail Safety IDEA projects. The principal researchers for each project will be available to discuss their research in an informal setting.*

### **TRB's Rail Safety IDEA Program: Sponsoring Innovation to Improve Railroad Safety and Performance**

Velvet Basemera-Fitzpatrick, Transportation Research Board

**Rail Safety IDEA Project 27: Field Evaluation of Ballast Fouling Conditions Using Machine Vision**  
Erol Tutumluer, University of Illinois, Urbana Champaign

**Rail Safety IDEA Project 29: Self-Deicing LED Signals for Railroads and Highway Intersections**  
Hongyi Cai, University of Kansas

**Rail Safety IDEA Project 30: Development of Ballast Real Time Information System Based on "Smartrock"**  
Hai Huang, Pennsylvania State University

**Rail Safety IDEA Project 31: Modeling and Validation of Standards for a Sleeper Compartment on Accessible Passenger Rail Vehicles**  
Katharine Hunter-Zaworski, Oregon State University

**Rail Safety IDEA Project 32: Railroad Bridge Inspections for Maintenance and Replacement Prioritization Using Unmanned Aerial Vehicles (UAVs) with Laser Scanning Capabilities**  
Fernando Moreu, University of New Mexico

**Rail Safety IDEA Project 33: Adaptive Prestressing System for Concrete Crossties**  
Bassem Andrawes, University of Illinois, Urbana Champaign

**Rail Safety IDEA Project 34: Prototype System for Managing Enterprise Rail Transport Risk for Hazmat**  
Ravi Palakodeti, FACTOR, Inc.

**Rail Safety IDEA Project 35: Non-Contact Deflection Monitoring System for Timber Railroad Bridges**  
Sudhagar Nagarajan, Florida Atlantic University

## **Research Trends in Railway Operating Technologies**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 581 | Convention Center, Hall E**

Adrian Hellman, OST-R/Volpe Center, presiding

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### **Estimating Passenger Train Energy and Emissions Activity Data:**

#### **Rail Grade and Horizontal Curvature**

Nikhil Rastogi, North Carolina State University

H. Christopher Frey, North Carolina State University

### **An Integrated Optimization Model for Energy-Saving in Metro Operations**

Jiaxiao Feng, Southeast University

Zhirui Ye, Southeast University

Chao Wang, Southeast University

Mingtao Xu, Southeast University

Cheng Chang, Chang'an University

### **Scheduling a High-speed Railway Model with Explicit Consideration of Passenger Choices**

Jiemin Xie, University of Hong Kong

Shuguang Zhan, Southwest Jiaotong University

S.C. Wong, University of Hong Kong

S. M. Lo, City University of Hong Kong

### **Support Vector Regression Models for Influenced Time Prediction in High-Speed Rail System**

Yixiong Tang, Southwest Jiaotong University

Chao Wen, University of Waterloo

Ping Huang, Southwest Jiaotong University

Jie Li, Southwest Jiaotong University

Yuxiang Yang, Southwest Jiaotong University

### **Real-Time Monitoring and Management System of Intelligent Iron Shoes for Railway Rolling Stock**

Chaozhe Jiang, Southwest Jiaotong University

Yibo Xu, Cloud-Guizhou Big Data Science Application Research Center

[Dilin Chen, University of Illinois, Urbana Champaign](#)

Chao Wen, University of Waterloo

### **Optimizing the Train Dispatcher Desk Districting Problem in High-speed Railway Network**

Jun Zhao, Southwest Jiaotong University

Dian Wang, Southwest Jiaotong University

Qiyuan Peng, Southwest Jiaotong University

## **Current Research in Railroad Track Structure System Design**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 583 | Convention Center, Hall E**

[J. Riley Edwards, University of Illinois, Urbana Champaign, presiding](#)

### **Development of a Laboratory Test Method for Measuring Trackbed Pressures at the Tie/Ballast Interface**

Jerry Rose, University of Kentucky

David Clarke, University of Tennessee, Knoxville

Qingjie Liu, East China JiaoTong University

Travis Watts, University of Kentucky

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**Analysis of Track Responses to Train Braking**

Tulika Bose, Technical University of Denmark  
Eyal Levenberg, Technical University of Denmark  
Varvara Zania, Technical University of Denmark

**Effects of Pier Deformation on Train Operations within High Speed Railway Ballastless Track-Bridge Systems**

De Zhang, Tongji University  
Junhua Xiao, Tongji University  
Xiao Zhang, Tongji University

**Reserved Design, Implementation, and Evaluation of a High-Speed Railway Ballastless Track Embankment with Shield Tunnel Undercrossing: A Case Study**

Junhua Xiao, Tongji University  
Shengyu Ye, Tongji University  
Shunhua Zhou, Tongji University  
Binglong Wang, Tongji University  
Huiji Guo, Tongji University

**Comparative Study of Pretensioned Concrete Crosstie Performance using the Finite Element Method**

Hailing Yu, OST-R/Volpe Center  
Daniel Mortarelli, Worcester Polytechnic Institute

**Splitting/Bursting Performance of Prestressed Concrete Prisms**

Moochul Shin, Western New England University  
Hailing Yu, OST-R/Volpe Center

**Application Of Granular Material Pressure Cells To Measure Railroad Track Tie/Ballast Interfacial Pressures**

Jerry Rose, University of Kentucky  
David Clarke, University of Tennessee, Knoxville  
Qingjie Liu, East China JiaoTong University  
Travis Watts, University of Kentucky

**Application of a New Concept and a Method to Estimate the Vertical Impact Forces on Railway Tracks due to Vertical Variation of Track Horizontal Alignment**

N. Özgür Bezzgin, Istanbul University

**Numerical Study on Application of Full Cross-Section Asphalt Waterproof Layer in CRTSIII Slab Track**

Song Liu, Southeast University  
Valeri Markine, Delft University of Technology  
Xianhua Chen, Southeast University  
Jun Yang, Southeast University

**Decision-Making of Railway Maximum Design Gradient in Mountainous Terrain Using Deep Learning Algorithms**

Hao Pu, Central South University  
Hong Zhang, Central South University  
Wei Li, Central South University  
Lei Wang, Central South University

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### **Characterization of Ballast Particle Movement at Mud Spot**

Shushu Liu, Pennsylvania State University  
Hai Huang, Pennsylvania State University  
Tong Qiu, Pennsylvania State University  
Brad Kerchof, Norfolk Southern Corporation

### **Dynamic Response Modeling of High-speed Railroad Ballastless Track Over Piled Raft Foundation**

Yuanjie Xiao, Central South University  
Liuxin Chen, Central South University  
Keyang Zheng, Central South University

## **Current Research in Railway Track Maintenance**

*Tuesday 10:15 AM – 12:00 PM*

**Poster Session 584 | Convention Center, Hall E**

Hai Huang, Pennsylvania State University, presiding

### **Support Condition and Traffic Loading Patterns Influencing Laboratory Determination of Under Ballast Mat Bedding Modulus and Insertion Loss**

Arthur de Oliveira Lima, University of Illinois, Urbana Champaign  
Marcus Dersch, University of Illinois, Urbana Champaign  
Erol Tutumluer, University of Illinois, Urbana Champaign  
J. Riley Edwards, University of Illinois, Urbana Champaign  
Yu Qian, University of Illinois, Urbana Champaign

### **Full-Scale Model Testing on Ballasted High-Speed Railway: Dynamic Responses and Accumulated Settlements**

Wei Li, Zhejiang University  
Xuecheng Bian, Zhejiang University  
Xiang Duan  
Erol Tutumluer, University of Illinois, Urbana Champaign

### **Stone Blowing as a Remedial Measure to Mitigate Differential Movement Problems at Railroad Bridge Approaches**

Huseyin Boler, University of Illinois, Urbana Champaign  
Debakanta Mishra, Boise State University  
Erol Tutumluer, University of Illinois, Urbana Champaign  
Steven Chrismer, ENSCO, Inc.  
James Hyslip, LORAM-HyGround Division

### **Measurement of Track Deflection and Associated Track Performance Effects**

Theodore Sussmann, OST-R/Volpe Center  
Gary Carr, Federal Railroad Administration (FRA)  
Yu-Jiang Zhang, Federal Railroad Administration (FRA)  
Hugh Thompson, Federal Railroad Administration (FRA)

### **A Comparison of Railroad Ballast Elastic Modulus as Estimated from Lightweight Deflectometer (LWD) and Dynamic Cone Penetrometer (DCP)**

Aaron Rubin, University of Massachusetts, Amherst  
Carlton Ho, University of Massachusetts, Amherst  
Charles Oden, Earth Science Systems, LLC

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### **Evolution of Longitudinal Resistance Performance of Granular Ballast Track with Durable Dynamic Reciprocated Changes**

Jieling Xiao, Southwest Jiaotong University  
Hao Liu, Southwest Jiaotong University  
Ping Wang, Southwest Jiaotong University  
Ganzhong Liu, Southwest Jiaotong University  
Mingyuan Gao, Southwest Jiaotong University  
Yuan Wang, Southwest Jiaotong University

### **Investigation of Lateral Track Panel Stiffness Through Four-Point Bending Tests**

Manuel Zimmermann, ETHZ - Swiss Federal Institute of Technology  
Heinrich Patrick Braess, ETH Zürich, IVT - Institute for Transport Planning and Systems  
Sébastien Guillaume, ETH Zürich

### **Investigation of Relationship between Train Speed and Bolted Rail Joint Fatigue Life Using Finite Element Analysis**

Hao Yin, University of Illinois, Urbana Champaign  
Yu Qian, University of Illinois, Urbana Champaign  
J. Riley Edwards, University of Illinois, Urbana Champaign  
Kaijun Zhu, University of Illinois, Urbana Champaign

### **Laboratory Characterization of Structural Capacity of North American Heavy Haul Concrete Crossties**

Josué César Bastos, University of Illinois, Urbana Champaign  
J. Riley Edwards, University of Illinois, Urbana Champaign  
Marcus Dersch, University of Illinois, Urbana Champaign  
Alejandro Alvarez, University of Illinois, Urbana Champaign  
Christopher Barkan, University of Illinois, Urbana Champaign

## **Railroad Track Structure System Design Committee, AR050**

Tuesday 1:30 PM – 3:15 PM

**Marriott Marquis, Capitol (M4)**

J. Riley Edwards, University of Illinois, Urbana Champaign, presiding

## **Freight Rail Propulsion: Where Does the Energy Come From?**

Tuesday 1:30 PM – 3:15 PM

**Lectern Session 624 | Convention Center, 143A**

Pasi Lautala, Michigan Tech Transportation Institute, presiding

*The U.S. rail system (excluding transit systems) accounts for over 2% of the U.S. transportation energy consumption, with over 90% of this impact from freight rail. U.S. freight rail currently runs almost entirely on diesel fuel, with exceptions including very short, isolated lines. In 2015, the energy required by the Class I freight railroads translated into a consumption of over 3.5 billion gallons of diesel and accounted for 27.5% of Class I operating costs. There are both economic and environmental reasons to explore alternatives to diesel. This session provides historical background to the energy sources used by U.S. freight railroads and discusses the opportunities for alternative fuels in the future.*

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**The Life and Death of North American Rail Freight Electrification**

John Allen

Gregory Newmark, Kansas State University

**Operational Considerations in Transitioning to Alternative and Emerging Locomotive Technologies for Line-Haul Freight Rail Applications**

Tyler Dick, University of Illinois, Urbana Champaign

**Rail and Public Transportation Caucus (sponsored by BNSF)**

*Tuesday 6:00 PM – 7:30 PM*

**Convention Center, Ballroom south Pre-Function C**

Dennis Hinebaugh, USF Center for Urban Transportation Research, presiding

George Grimes, Patriot Rail Company, presiding

**Geological and Geoenvironmental Engineering Section Executive Board**

*Tuesday 6:00 PM – 9:30 PM*

**Marriott Marquis, Catholic University (M1)**

Erol Tutumluer, University of Illinois, Urbana Champaign, presiding

**Rail Capacity, AR040(1), Joint Subcommittee of AR040, AR030, AP070, AT010, AR010**

*Tuesday 7:30 PM – 9:30 PM*

**Marriott Marquis, Treasury (M4)**

Tyler Dick, University of Illinois, Urbana Champaign, presiding

RailTEC Faculty, Staff, Students and Alumni extend our sincerest thanks to the people, partners and organizations supporting rail transportation engineering research and education at Urbana-Champaign.

We are deeply grateful and appreciate the opportunity to work with you!



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