ASME® 2019 JRC
Joint Rail Conference

Program

CONFERENCE
April 10 – 12, 2019

Snowbird Summer & Ski Resort
Snowbird, UT

150 Years of Innovation Continues

The American Society of Mechanical Engineers®
ASME®

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SETTING THE STANDARD

Welcome

Debakanta (Deb) Mishra
JRC 2019 Conference Chair

Welcome to the 2019 Joint Rail Conference in beautiful Snowbird, Utah. This year is truly special for the JRC as it marks the sesquicentennial (150th) anniversary of the historic golden spike driven by Leland Stanford at Promontory Summit, Utah, to connect the Central Pacific and Union Pacific railroads. It is particularly fascinating this year that the JRC conference is being held less than two hours' drive from Promontory Summit.

As is the case every year, this year's conference has been organized with significant efforts from several individuals. Members of the organizing committee have put in countless volunteer hours to bring all the pieces together to make this conference a success. ASCE is the lead organization for this year's conference, and has collaborated with APTA, AREMA, ASME, IEEE, INFORMS, TRB, and the National University Rail Center (NURail) bringing together a diverse group of practitioners and researchers working in the field of railroad engineering. We have close to 100 technical papers and presentations covering all aspects of railroad engineering.

We have organized a fascinating tour for interested conference attendees to visit the Stadler US Inc. train manufacturing facility in Salt Lake City. I would like to thank the relevant personnel at Stadler for their hospitality. Located at a former Union Pacific Plant in Salt Lake City, Stadler plans to convert this into a 230,000 sq. ft., fifty million dollar state-of-the-art facility.

Our Keynote speaker this year is Mr. Michael J. Wheeler, Executive Vice President and Chief Operating Officer for Norfolk Southern (NS). A graduate from the University of Tennessee and Virginia Tech, Mr. Wheeler joined NS in 1985 as a research engineer and has since held various positions of increasing responsibility throughout the corporation.

Throughout the conference we have several exciting technical sessions along with break times for the attendees to network and interact. On the final day of the conference, we have an excellent workshop on Rail System Dynamics.

Conducted by Dr. Mehdi Ahmadian of Virginia Tech University, this workshop will provide a great opportunity for the attendees to participate in discussions related to topics such as Wheel-Rail Contact Mechanics, Wheelset Kinematics, as well as to go over different case studies.

With the high quality of the technical papers, a captivating plenary speaker session, and a grand challenge event focusing on unmanned aerial vehicles (UAVs), this conference will definitely be a memorable experience. Enjoy your stay at the beautiful Snowbird resort and we will see you again next year in St. Louis, Missouri.

D. Mishra

Debakanta (Deb) Mishra, Ph.D. P.E.
JRC 2019 Conference Chair
Assistant Professor, Department of Civil Engineering
Boise State University, Boise, Idaho

Contents

General Information

REGISTRATION HOURS AND LOCATION

On-Site Registration at Snowbird:

Tuesday	
April 9	2:00PM–6:00PM
Wednesday	
April 10	10:00AM–4:00PM
Thursday	
April 11	7:00AM–5:00PM
Friday	
April 12	7:00AM–4:00PM

ONSITE/LATE REGISTRATION FEES

FULL CONFERENCE RATES:

ASME Members/Cooperating Societies*	
Author/Presenter	$850
Non-ASME Member	$970
Student Member/Cooperating Societies*	$250
Student Non-Member	$500
Life Member	$320

ONE DAY RATES:

ASME Members/Cooperating Societies*	$500
Non-ASME/Cooperating Society Member	$650

Stadler Tour	$25
Additional Reception/Banquet Tickets**	$75

*Cooperating Societies include: APTA, IEEE, ASCE, AREMA, INFORM-RAS, NURAIL, and TRB

**Additional Reception/Banquet Tickets are available at the Registration Desk

The following may register at the discounted Member rate(s) – Please see Mary Jakubowski at the registration desk if you are NOT a current ASME Member.

- ASME Members
- Session Chairs, Session Co-Chairs, Speakers*
- ASME JRC Committee Members*
- Members of Reciprocating or Participating Organizations (Includes APTA, IEEE, ASCE, AREMA, INFORM-RAS, NURAIL, and TRB)

TECHNICAL CONFERENCE

- Access to all Technical Sessions
- Electronic Access to the Final Papers
- Digital Program
- Admission to the following networking events:
    - Daily Breakfast
    - Session-Break Refreshments
    - Welcome Reception and Banquet Dinner/Keynote (Thursday)
    - Daily Lunches
    - Exhibits
    - Opportunity to Attend Technical Facility Tour

ONE-DAY INCLUDES:

- Electronic Access to the Final Papers
- Digital Program
- Lunch and Conference Breakfast on Selected Day
- Session-Break Refreshments on Selected Day
- Exhibits

You may purchase a Banquet ticket separately if your one day is on Wednesday or Friday.

REGISTRATION REQUIREMENT:
Every published paper, presentation, and panel presentation must identify a designated presenter. Every presenter must register and pay the applicable conference fees. If not, the paper will not be included for publication in the proceedings and accompanying presentation information will be removed from the conference program.

CANCELLATIONS:
All cancellation requests must be made in writing and faxed. Cancellations made through March 9, 2019 will receive a full refund, less a $100 administration fee. Refunds will be made within four weeks of the end of the conference. Refunds are not available beginning March 10, 2019. "No shows" are not refundable and are liable for the full registration fee.

ASME TRAVEL POLICY:
ASME is not responsible for the purchase of non-refundable airline tickets or the cancellation/change fees associated with canceling a flight. ASME retains the right to cancel a course/conference up until three weeks of the scheduled presentation date.

ASME PRESENTER ATTENDANCE POLICY:
Paper information should not be used for citation purposes. According to ASME's presenter attendance policy, if a paper is not presented at the conference, the paper will not be published in the official Archival Proceedings, which are registered with the Library of Congress, and are abstracted and indexed. The paper also will not be published in the ASME Digital Library and may not be cited as a published paper.

MEMBERSHIP:
It is easy to apply, and the benefits include the fellowship and recognition from being associated with one of the largest engineering societies in the world. ASME members and student members, and members from select countries can receive a discount on their conference registration.

You can apply for ASME membership by registering online. Alternatively, you can call 1-800-THE-ASME (800-843-2763) or outside North America 973-882-1167 and ASME will mail you an application, or you can e-mail to request an application.

For questions about the conference, hotel, and registration, please contact:

Mary Jakubowski, CMP
Manager, Conferences & Events
Tel: 212-591-7637
Fax: 212-591-7856
Email: jakubowskim@asme.org
"No shows" are not refundable and are liable for the full registration fee.

Please note: First-time non-members who pay the full conference rate will be eligible for one free year of membership in ASME. You can apply online by going to https://www.asme.org/about-asme/professional-membership.

TECHNICAL TOUR

STADLER TOUR
Date: Friday, April 12, 2019
Time: 8:15AM–12:00PM
Cost: $25.00

Attendees of the 2019 Joint Rail Conference have the opportunity to tour Stadler's Salt Lake City rail vehicle production facility. The tour will include their production area, where attendees will be able to view the trains currently in production. The tour will also cover some information about the company and the brand new Stadler facility. Tour participants are required to wear close-toed, flat shoes, Stadler will provide safety gear. We will board a bus and travel from the conference hotel to Stadler, about a 30 minute ride. After the tour, the bus will bring us back to the conference hotel or attendees may make arrangements (Uber, taxi, etc.) to go straight from Stadler to the airport, which is about a 15 minute drive.

THE ASME RAIL TRANSPORTATION DIVISION

The ASME Rail Transportation Division is entirely composed of volunteers from the railroad industry. If you are interested in participating, please contact a conference organizer or email Sam Williams at williams5759@gmail.com

PROFESSIONAL DEVELOPMENT HOURS RECORD FORMS

Participation record forms will be provided upon request to conference attendees who need to track their number of professional development hours (PDHs). Forms are available at the conference registration desk. Conferees should check the rules of their appropriate State licensing body to see if participation in this conference will qualify for credit to maintain a P.E. license or other professional certification.

General Information

TAX DEDUCTIBILITY

Expenses of attending professional meetings have been held to be tax deductible as ordinary business expenses for U.S. citizens. Because of changes in the tax code, the current level of deduction is subject to change.

CONFERENCE BREAKFASTS, LUNCHEONS, AND RECEPTION/BANQUET

All attendees are encouraged to meet and discuss ideas with industry peers at the Thursday Conference Reception and Banquet as well as at the Conference Breakfasts and Luncheons.

The Reception and Banquet is being held at the Summit Restaurant, which is 11,000 feet above sea level. We will be transported to the Summit from the hotel via the Tram. If you are attending, tickets will be distributed at Registration.

Banquet tickets for Registrants will accompany your name badge. Additional Banquet tickets are available for $75 at the registration desk. The Conference Breakfasts are on Thursday and Friday and Luncheons on Wednesday, Thursday, and Friday are included with your registration.

PUBLICATION SALES

All JRC Technical Papers are available electronically to registered attendees only. Attendees will receive electronic access via their e-mail on record. Additional copies of the JRC Proceedings can be ordered from:

ASME Order Department
150 Clove Road, 6th Fl
Little Falls, NJ 07424-2139

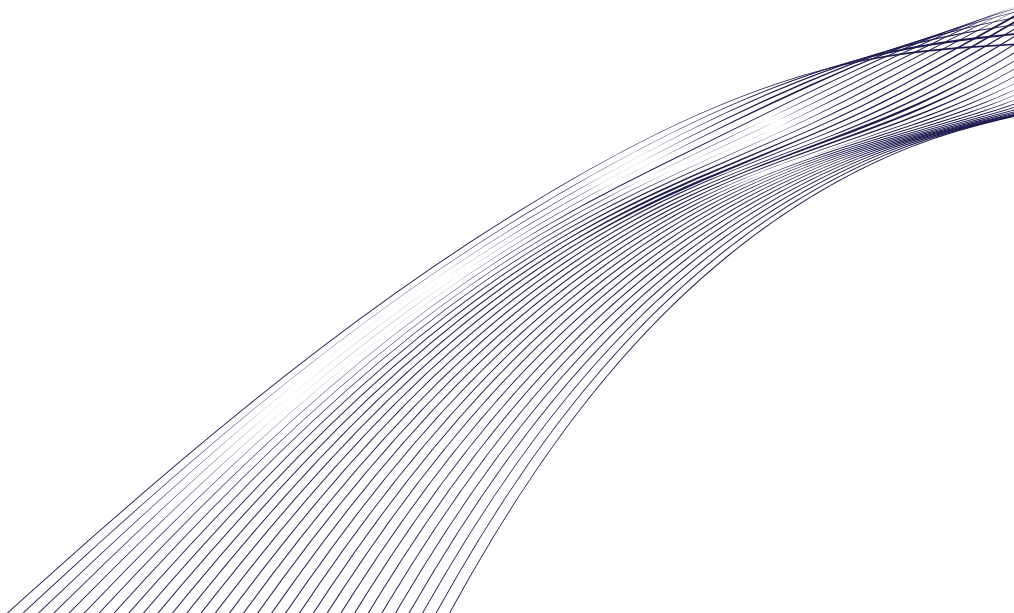
MESSAGE CENTER

A message board will be maintained at the Conference Registration Desk.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS INTERNATIONAL

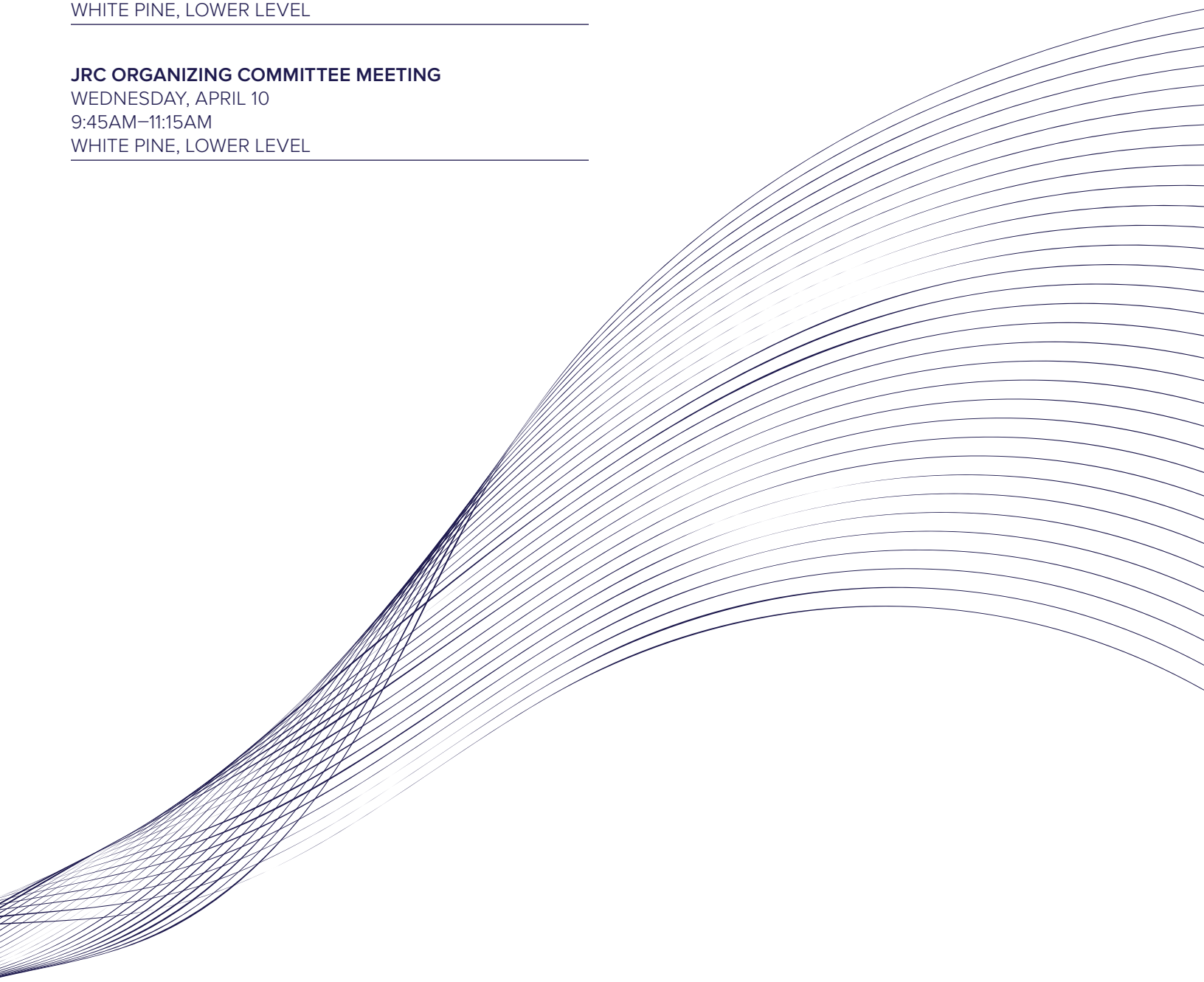
Mission: ASME's mission is to serve diverse global communities by advancing, disseminating and applying engineering knowledge for improving the quality of life; and communicating the excitement of engineering.

Vision: ASME aims to be the essential resource for mechanical engineers and other technical professionals throughout the world for solutions that benefit humankind.



ASME RTD COMMITTEE MEETING
WEDNESDAY, APRIL 10
8:00AM–9:30AM
WHITE PINE, LOWER LEVEL

JRC ORGANIZING COMMITTEE MEETING
WEDNESDAY, APRIL 10
9:45AM–11:15AM
WHITE PINE, LOWER LEVEL



INTRODUCTION TO RAIL SYSTEMS DYNAMICS
FRIDAY, APRIL 12, 2019
1:45PM–4:45PM
MAYBIRD, LOWER LEVEL

Introduction to Rail System Dynamics

Mehdi Ahmadian
Dan Pletta Professor of Mechanial Engineering
Director, Railway Technologies Laboratory
Center for Vehicle Systems and Safety
Virginia Tech

April 12, 2019

Introduction to Rail System Dynamics

Module 1: Introduction and Basics
- Introduction
- Axis and Coordinate Systems
- Dynamic Terminology
- Wheel, Rail, and Track Basics

Module 2: Wheel-Rail Contact Mechanics & Dynamic
- Introduction to Wheel-Rail Dynamics
- Hertzian Contact Theory
- Rolling Friction
- Contact Patch
- Track Model

Module 3: Wheelset Kinematics and Dynamics
- Dynamics of an Unconstrained Wheelset
- Dynamics on Tangent Track
- Hunting Dynamics
- Curving Dynamics
- Curving Forces
- Curving Energy

Module 4: Case Study
- Effect of Wheel/Rail Forces on Wheel Climb Derailment

Conference Schedule

TUESDAY, APRIL 9

EVENT	TIME	LOCATION
Registration Opens	2:00 PM–6:00PM	Primrose Lobby

WEDNESDAY, APRIL 10

EVENT	TIME	LOCATION
ASME RTD Committee Meeting	8:00AM–9:30AM	White Pine
JRC Organizing Committee Meeting	9:45AM–11:15AM	White Pine
Conference Registration	10:00AM–4:00PM	Atrium Overlook
Welcome Lunch	11:30AM–12:15PM	Ballroom 1
Plenary Session	12:30PM–01:15PM	Primrose
Exhibits Open	1:30PM–4:00PM	Atrium Overlook
Concurrent Technical Sessions #1	1:30PM–3:30PM	See Detailed Program
Afternoon Break	3:30PM–3:45PM	Atrium Overlook
Concurrent Technical Sessions #2	3:45PM–5:45PM	See Detailed Program
JRC Organizing Committee Dinner*	6:15PM–8:30PM	Cafe Trio*

*By Invitation only

THURSDAY, APRIL 11

EVENT	TIME	LOCATION
Breakfast	6:30AM–7:15AM	Ballroom 1
Conference Registration	7:00AM–5:00PM	Atrium Overlook
Exhibits	7:00AM–5:00PM	Atrium Overlook
Concurrent Technical Sessions #3	7:30AM–9:30PM	See Detailed Program
Morning Break	9:30AM–9:45AM	Atrium Overlook
Concurrent Technical Sessions #4	9:45PM–11:45PM	See Detailed Program
Lunch & Grand Challenge	12:00PM–1:00PM	Ballroom 1
Concurrent Technical Sessions #5	1:15PM–3:15PM	See Detailed Program
Afternoon Break	3:15PM–3:45PM	Atrium Overlook
Concurrent Technical Sessions #6	3:30PM–5:30PM	See Detailed Program
Conference Reception and Banquet	6:00PM–8:00PM	The Summit Restaurant**

**Please note, the Summit restaurant is only accessible by tram. If you are attending the banquet, you will receive a ticket when you pick up your name badge at registration.

FRIDAY, APRIL 12

EVENT	TIME	LOCATION
Breakfast	7:00AM–8:00AM	Ballroom 1
Conference Registration	7:00AM–4:00PM	Atrium Overlook
Stadler Tour***	8:15AM–12:00PM	Hotel's Lower Level 1***
Lunch	12:30PM–1:30PM	Atrium Overlook
Rail Systems Seminar	1:45PM–4:45PM	Maybird

***Meet in the Hotel's Lower Level 1 near Valet desk at 8:15 am for an 8:30 am departure. A bus will be provided for the tour.

Plenary Session

PLENARY SPEAKER
WEDNESDAY, APRIL 10
12:30PM–1:15PM
PRIMROSE, LOBBY LEVEL

Michael Messner,
Assistant Director System Program
BNSF Railway
Saddle River, NJ

Abstract: BNSF is using big data and sensors to enhance the quality of its track inspection and capital planning processes. Better track inspections and capital replacements reduce risk for our train crews, the passengers and freight that travel across our tracks, and the communities we go through. It also ensures that we are efficiently maintaining and replacing our track based on condition rather than by elapsed time or gross tonnage. From a track inspection and data gathering sense, we employ track geometry, laser rail profiling, optical track inspection technologies, ground penetrating radar, vehicle track interaction, and ultrasonic rail testing. Using this full suite of inspection technologies, we have a goal of reducing repetitive manual hy-rail inspections and increasing more focused inspections on our known trouble spots.

In turn, we use these same technologies to capture condition of our rail, tie, ballast, and turnouts to direct the best capital plan possible. BNSF is creating phone apps to gather more detailed information to create the most comprehensive replacement or repair plan possible.

Biography: Michael Messner is a 2000 Graduate from the United States Military Academy at West Point where he studied Spanish, German, and a field of study in mechanical engineering. He is also a 2020 PMBA Candidate at Texas Christian University. Michael served as a Field Artillery Officer in the United States Army from 2000 to 2005 in the United States, Germany, and Iraq.

He started in engineering at BNSF Railway in 2007 as an Assistant Roadmaster and Roadmaster in the Texas Division and progressed into roles in reliability engineering, capital planning, and capital plan execution before starting his current role. Michael works with teams of data scientists, GIS developers, and railroad engineering professionals to leverage data analytics to make safer and more efficient railroad decisions across the spectrum of operating maintenance, capital repair, and capital replacement projects. He leads change management efforts across the engineering organization when the team develops new tools and methods.

BANQUET KEYNOTE SPEAKER
THURSDAY, APRIL 11
6:00PM–8:00PM
THE SUMMIT RESTAURANT AT SNOWBIRD

Michael "Mike" Wheeler,
Executive Vice President and Chief Operating Officer
Norfolk Southern Corporation
Norfolk, VA

Biography: Mike Wheeler is Executive Vice President and Chief Operating Officer of Norfolk Southern Corporation. He joined NS as a research engineer in 1985 and has served in positions of increasing responsibility in all key areas of the company's operations, engineering, mechanical, and transportation - culminating in his current appointment in February 2016.

Mike is a native of Tennessee. He holds a Bachelor of Science degree in Metallurgical Engineering from the University of Tennessee and an MBA from Virginia Tech.

Mike is currently a member of the Transportation Technology Center, Inc. (TTCI) Board of Directors and the past Chairman of the AAR Safety & Operations Management Committee (SOMC) and past Board Member of The American Railway Engineering and Maintenance of Way Association; The Belt Railway Company of Chicago; and Consolidated Rail Corporation. He is also a former Board Member and President of the Indiana Harbor Belt Railroad Company.

Mike and his wife, Dana, live in Atlanta and have two daughters.

Scholarships

JRC SCHOLARSHIPS

The American Society of Mechanical Engineers (ASME) Rail Transportation Division (RTD) continues to be a strong supporter of collegiate researchers, both professors and students, who play a vital role in the advancement of the rail industry. To this end, the ASME RTD will continue to offer the ASME RTD Graduate and Undergraduate Student Scholarships to students enrolled in Mechanical Engineering programs in the USA. The scholarships provide students the opportunity to network with rail professionals, present rail research publications, and exchange ideas on rail technological innovations and solutions at the ASME Joint Rail Conference (JRC). Most importantly, the scholarships increase awareness of the rail engineering discipline from both an academic and professional perspective.

Since 2011, the ASME Rail Transportation Division has awarded over $148,200 in student conference scholarships to 141 deserving graduate and undergraduate students enrolled at U.S. colleges and universities with an interest in rail.

ASME RTD GRADUATE STUDENT CONFERENCE SCHOLARSHIP

V. TERREY HAWTHORNE MEMORIAL SCHOLARSHIP FUND

Purpose: Provide funding toward travel, lodging, and conference registration expenses for scholarship awardees that are selected to attend and present their research publication at the ASME Joint Rail Conference.

Award Amount: $800.00 USD

Application Deadline: February 8, 2019

Link to Scholarship Application Form (Graduate)

Requirements:

- The student must be enrolled full-time in a Mechanical Engineering program and attending a U.S. college or university.
- The graduate student must have at least one technical paper that has been accepted for publication and presentation at the 2019 ASME Joint Rail Conference.
- The student must be the lead author of the accepted paper(s).
- The student must agree to deliver an oral presentation of the paper(s) in person at the conference. Failure to present the paper will result in rescinding an awarded scholarship.
- Scholarship recipients must be present at the Conference Banquet to accept their awards. Failure to comply with this requirement will result in forfeiture of the scholarship.

The student must complete and return the ASME RTD Graduate Student Scholarship application to ASME.RTD.Scholar@gmail.com by the deadline specified.

Upon review of the applications by the RTD Scholarship Committee, the applicants will be notified by email by March 1, 2019. The decision of the Committee is final and is not subject to appeal.

In order to receive the scholarship, the student must be registered for the full conference as a student and must provide a completed Request for Taxpayer Identification Number and Certification Form (W-9) in PDF format for his/her college/university. The completion of the form is required for tax purposes and will need to be returned to the Scholarship Program Chair by the deadline specified. Note: W-9 Forms are not requested until after the scholarships have been awarded and should indicate college/university tax information not the applicant's tax information. In addition, only one W-9 Form should be submitted per college/-university for all scholarship awardees from that institution.

Please note that additional scholarship details and requirements may apply.

ASME RTD UNDERGRADUATE STUDENT CONFERENCE SCHOLARSHIP

SWAMIDAS K. CHARAN (JOHN) PUNWANI MEMORIAL UNDERGRADUATE STUDENT SCHOLARSHIP FUND

Purpose: To provide funding toward travel, lodging, and conference registration expenses for scholarship awardees selected to attend the ASME Joint Rail Conference.

Award Amount: $800.00 USD

Application Deadline: February 8, 2019

Link to Scholarship Application Form (Undergraduate)

Requirements:

- The student must be enrolled full-time in an undergraduate Mechanical Engineering program and attending a U.S. college, technical college, or university.
- The student must be of Junior or Senior status.
- The student must submit an essay that suggests a solution to a real-world rail industry problem (minimum 250 words, maximum 400 words). The 2019 JRC Undergraduate Student Essay topic is below:

Over the last few years, numerous articles have been published that purport to identify the top challenges facing railroad owners, operators, and maintainers.

Given the advancements in:

(1) computational modeling capabilities to increase understanding of complex mechanical systems and enable better designs for machines/systems to improve efficiency and extend their useful life, and

(2) analysis techniques that permit effective and efficient ways to manage "Big Data."

Explain how you would leverage these tools and apply mechanical engineering principles to address one of the reported challenges to the railroad industry.

Please cite your references and limit your usage of graphics to a maximum of two (2). The graphics do not count toward the word limit.

Note: If you are an undergraduate student who has submitted an ASME technical paper for the conference, you are not required to submit an essay, but you are required to submit the undergraduate application to be considered for the undergraduate scholarship.

Scholarship recipients must be present at the Conference Banquet to accept their awards. Failure to comply with this requirement will result in forfeiture of the scholarship.

The student must complete and return the ASME RTD Undergraduate Student Scholarship application and essay (if applicable) to ASME.RTD.Scholar@gmail.com by the deadline specified.

Upon review of the applications by the RTD Scholarship Committee, the applicants will be notified by email by March 1, 2019. The student must receive written notification from the ASME RTD Scholarship Committee indicating award of the scholarship. The decision of the Committee is final and is not subject to appeal.

In order to receive the scholarship, the student must be registered for the full conference as a student and must provide a completed Request for Taxpayer Identification Number and Certification Form (W-9) in PDF format for his/her college/university. The completion of the form is required for tax purposes and will need to be returned to the Scholarship Program Chair by the deadline specified. Note: W-9 Forms are not requested until after the scholarships have been awarded and should indicate college/university tax information not the applicant's tax information. In addition, only one W-9 Form should be submitted per college/university for all scholarship awardees from that institution.

In addition to the undergraduate scholarship award for reimbursement of travel-related expenses to attend the conference, one undergraduate student will be selected to receive an additional award for "Best Essay" based on the quality of his or her essay. Details of the award will be provided during the conference banquet where the award will be presented.

Please note that additional scholarship details and requirements may apply.

Questions regarding the ASME RTD Graduate and/or Undergraduate Student Scholarship programs should be directed to Mr. Jeffrey Gordon, ASME RTD Scholarship Committee Chair, at ASME.RTD.Scholar@gmail.com.

For inquiries regarding scholarship disbursements, please contact ASME Staff Support, Mary D. Jakubowski at jakubowskim@asme.org.

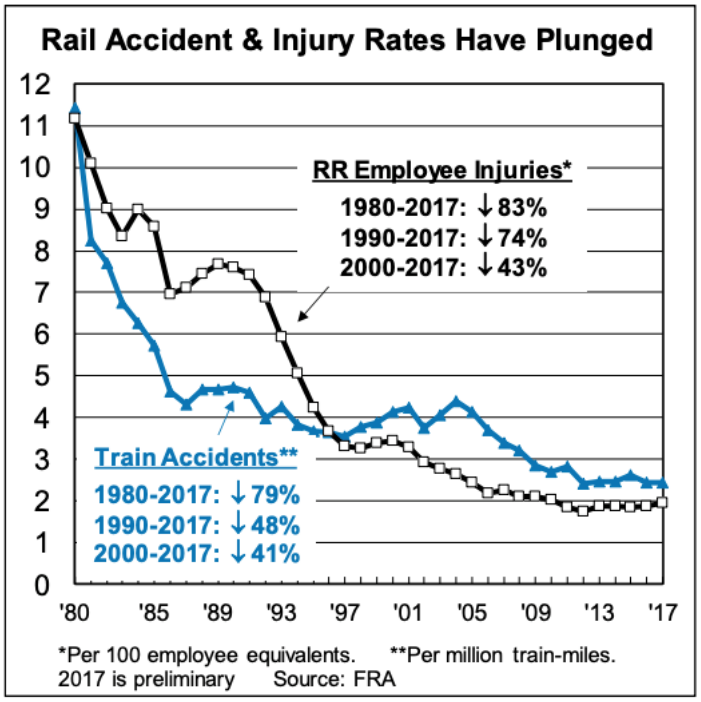
Grand Challenge Competition

JOINT RAIL CONFERENCE 2019 - GRAND CHALLENGE COMPETITION
THURSDAY, APRIL 11
12:00PM–1:00PM
BALLROOM 1, LOWER LEVEL

This year the JRC will host the 3rd Annual JRC Grand Challenge Competition open to all conference attendees. We invite registered participants to propose an idea to the below Grand Challenge Question and present that idea to a panel of industry experts using a 3-minute "shark tank pitch." The goal of this competition is to spark new ideas, innovations, and approaches to solving a relevant issue affecting the railroad industry.

The 2019 JRC Grand Challenge Question:

The railroad industry's commitment to safety is reflected in annual statistics published by the Federal Railroad Administration. The train accident rate in 2017 was down 41 percent from 2000; the employee injury rate in 2017 was down 43 percent from 2000, and the grade crossing collision rate in 2017 was down 38 percent from 2000. America's railroads today have lower employee injury rates than most other major industries. Nevertheless, railroads are always looking for ways to break the plateaus and make tomorrow safer than today.



Unmanned aerial vehicles (UAVs) present significant potential in the process of inspecting and monitoring the railroad safer, cheaper, and faster. Railroad inspection work is both remote and demanding. UAV-based inspections may provide a substantial improvement in labor efficiency and worker safety.

UAVs could provide benefits and save lives beyond inspecting the track. Hundreds of people are killed every year while trespassing on railroad property—many times more than are killed while traveling on passenger rail. Aerial drones could be significantly useful in detecting, and perhaps even warning, trespassers.

A few challenges still face the technology though. For example, multi-rotor copters are able to hover for close inspection of areas of concern. Such an ability would make them highly desirable in a railroad's UAV fleet, yet the range of rotor UAVs is generally quite limited. The flight range for commonly used drones is often less than five miles on a charge.

The equipment payloads for drones are evolving and expanding. While typical visible-spectrum cameras could detect some obvious obstructions, vital railway defects are often invisible to the naked eye. For example, inspection teams today use ultrasound equipment weighing up to hundreds of pounds—vastly more than what even a large drone could carry. However, emerging sensor technology shows promise to detect anything from soil moisture content to track alignment issues and cracks in the rails themselves.

We are tasked as professionals and stakeholders to consider several questions in order to best evaluate drone use in the railroad industry. What actuators and sensory systems can we mount on drones within their existing capabilities to:

1) Improve passenger and roadway worker protection,

2) Facilitate the railroad inspection,

3) Reduce the cost of inspection and limiting exposure of our workforce to items requiring attention. Further, how can we sort, understand, and leverage that data in an automated fashion?

Rules of the Competition:

This competition is open to all registered participants of the 2019 Joint Rail Conference. Participants must register for the conference in order to be admitted to the competition.

Participants may enter the competition between January 1, 2019 and April 5, 2019. Contestants will present their idea to a panel of industry experts on April 11, 12:00pm, using a 3-minute “shark tank pitch.” During the competition, contestants will be allowed no more than three (3) minutes to present their idea using a single PowerPoint slide. Contestants may present as individuals or as a team of three (3) people at most.

The winner of the competition will receive a prize of $500 (check to be mailed by ASME after the conclusion of the Joint Rail Conference). Competition winner will also be recognized at the conference banquet dinner on Thursday, April 11.

After submitting an online entry form, contestants will need to submit their presentation slide to the JRC Organizing Committee by the deadline. Entries are open to individual contestants or teams of two (2) or three (3) people, but only one entry is allowed per team.

Acknowledgments

The organizers thank each of the speakers, and track and session chairs for their willingness to freely share their knowledge and experiences with our attendees. Also, we thank the following individuals and the organizations that they represent, who generously volunteered many hours, their expertise, and dedication in planning this year's event:

2019 JRC TECHNICAL PROGRAM COMMITTEE

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Assistant: Martin Ehrenzeller (ASME)
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Manager of Divisional Affairs

David Thurston
IEEE Co-chair
Canadian Pacific Railway

Chris Barkan
NURail Co-chair
University of Illinois, Urbana–Champaign

Narayana Sundaram
APTA Co-chair
American Public Transportation Association

Conrad Ruppert, Jr.
AREMA Co-chair
University of Illinois, Urbana–Champaign

Tyler Dick
INFORMS RAS Co-chair
University of Illinois, Urbana–Champaign

Dave Schlesinger
TRB Co-chair
Parsons Corporation

Acknowledgments

2019 JRC PUBLICITY COMMITTEE

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Tyler Dick
INFORMS RAS Co-chair
University of Illinois, Urbana–Champaign

Chris Barkan
NURail Co-chair
University of Illinois, Urbana–Champaign

THANK YOU!

Technical Sessions

WEDNESDAY, APRIL, 10

TRACK 13 PLENARY SESSION

13-1
PLENARY SESSION
LOBBY LEVEL, PRIMROSE **12:30PM–1:15PM**

TRACK 1 RAILROAD INFRASTRUCTURE ENGINEERING

Track Organizer: Conrad Ruppert, *University of Illinois, Urbana, IL, United States*

Track Co-Organizer: Debakanta Mishra, *Boise State University, Boise, ID, United States*

1-1
CONCRETE CROSSTIE RESEARCH
LOBBY LEVEL, PRIMROSE B **1:30PM–3:30PM**

Session Organizer: Robert Peterman, *Kansas State University, Manhattan, KS, United States*

Evaluation of the Remaining Prestress Force and Center Negative Bending Moment in Crossties Removed From Track after 25 Years of Service

Technical Publication. JRC2019-1275

James Scott, Robert Peterman, Aaron Robertson, B. Terry Beck, *Kansas State University, Manhattan, KS, United States,* Kyle Riding, *University of Florida, Gainesville, FL, United States*

Experimental Investigation of Splitting Cracks of Pre-Stressed Concrete Railroad Ties Containing Polymer Fiber

Technical Presentation. JRC2019-1278

Aref Shafiei Dastgerdi, Adrijana Savic, Robert Peterman, B. Terry Beck, *Kansas State University, Manhattan, KS, United States,* Kyle Riding, *University of Florida, Gainesville, FL, United States*

Evaluation of Splitting Crack Propagation in Pre-Stressed Concrete Ties Made with Different Types of Coarse Aggregate

Technical Publication. JRC2019-1280

Aref Shafiei Dastgerdi, Adrijana Savic, Robert Peterman, B. Terry Beck, *Kansas State University, Manhattan, KS, United States,* Kyle Riding, *University of Florida, Gainesville, FL, United States*

TRACK 2 RAIL EQUIPMENT ENGINEERING

Track Organizer: Jeffrey Gordon, *US DOT/Federal Railroad Administration, Cambridge, MA, United States*

Track Co-Organizer: Bryan Schlake, *Penn State Altoona, Altoona, PA, United States*

2-1
EQUIPMENT COMPONENTS AND WEAR
LOWER LEVEL, MAGPIE B **1:30PM–3:30PM**

Session Organizer: Bryan Schlake, *Penn State Altoona, Altoona, PA, United States*

Prototyping a Conductive Polymer Steering Pad for Rail Freight Service

Technical Publication. JRC2019-1286

Anthony Villarreal, Miguel Ontiveros, *University Transportation Center for Railway Safety/University of Texas Rio Grande Valley, Edinburg, TX, United States,* Constantine Tarawneh, Robert Jones, *University of Texas Rio Grande Valley, Edinburg, TX, United States,* James Aranda, *University Transportation Center for Railway Safety/University of Texas Rio Grande Valley, Palmhurst, TX, United States*

Enhancements in the Performance of Journal Bearing Grease

Technical Publication. JRC2019-1302

Daniel Blasko, *The Timken Company, North Canton, OH, United States,* David Aindow, *The Timken Company, Northampton, United Kingdom,* Kuldeep K. Mistry, *The Timken Company, Canton, OH, United States*

Stochastic Analysis of Transit Wheel Wear and Optimized Forecasting of Wheel Maintenance Requirements

Technical Publication. JRC2019-1305

Joseph Palese, Allan Zarembski, Kyle Ebersole, *University of Delaware, Newark, DE, United States*

Going Beyond Conventional Problem Solving for Two Railroad Wheel Defects

Technical Publication. JRC2019-1312

Steven Dedmon, *Standard Steel, LLC, McClure, PA, United States*

TRACK 3 SIGNAL AND TRAIN CONTROL ENGINEERING

Track Organizer: David Thurston, *Canadian Pacific Railway, Calgary, AB, Canada*

3-1
TOPICS FOR TECHNOLOGY TO IMPROVE TRAIN CONTROL
LOBBY LEVEL, MAYBIRD 1:30PM–3:30PM

Session Organizer: David Thurston, *Canadian Pacific Railway, Calgary, AB, Canada*

Smart Rail: Rail Integrity and Occupancy Monitoring Using Fiber Optic Technology

Technical Publication. JRC2019-1216

Frank Smith, *Macro / Ross & Baruzzini, Chalfont, PA, United States*

Clustering Algorithms for Direct Current Track Coded Signals

Technical Publication. JRC2019-1300

Song Qin, Nenad Mijatovic, James Kiss, *Alstom Signaling Operations LLC, Melbourne, FL, United States,* Jeffrey Fries*, ALSTOM Transportation Holding, Grain Valley, MO, United States*

Improve Safety at Highway Crossings through Predictive Behavior and Innovative Technologies

Technical Publication. JRC2019-1317

John Hofbauer, *Parsons, Philadelphia, PA, United States*

TRACK 4 SERVICE QUALITY AND OPERATIONS RESEARCH

Track Organizer: Clark Cheng, *Norfolk Southern Railway, Atlanta, GA, United States*

Track Co-Organizer: Rapik Saat, *AAR, Washington, DC, United States*

4-1
RAILROAD MAINTENANCE SCHEDULING AND OPTIMIZATION
LOWER LEVEL, MAGPIE A 1:30PM–3:30PM

Session Organizer: Plinio Vilela, *Unicamp, Limeira, SP, Brazil*

Optimizing Railway Track Maintenance Scheduling to Minimize Circulation Impacts

Technical Publication. JRC2019-1298

Paulo Bueno, *CFlex, Campinas, SP, Brazil,* Plinio Vilela, *Unicamp, Limeira, SP, Brazil,* Luciano Christofoletti, Anderson Vieira, *CFlex, Campinas, Brazil*

Impact of Adjusting Train Timetable on Ticket Revenue: Using an Existing Seat Inventory Control Simulation Tool

Technical Presentation. JRC2019-1240

Huiling Fu, Wuyang Yuan, *Beijing Jiaotong University, Beijing, China*

Optimization of Shunting Operation Plan in Electric Multiple Units Depot

Technical Presentation. JRC2019-1241

Jintang Shi, Haodong Li, *Beijing Jiaotong University, Beijing, Beijing, China*

Cyclic Timetable Generation of High-speed Rail Based on Transfer Connections Optimization

Technical Presentation. JRC2019-1245

Tianqi Li, Lei Nie, *Beijing Jiaotong University, Beijing, China*

A Passenger-centric Approach to Railway Disruption Management from a Microscopic Point of View

Technical Presentation. JRC2019-1254

Luis Cadarso, Manuel Fuentes González, *Rey Juan Carlos University, Fuenlabrada, Spain,* Ricardo García-Ródenas, *Universidad de Castilla La-Mancha, Ciudad Real, Spain*

TRACK 5 PLANNING AND DEVELOPMENT

Track Organizer: Jeffrey Gordon, *US DOT/Federal Railroad Administration, Cambridge, MA, United States*

5-1
PLANNING AND DEVELOPMENT I
LOBBY LEVEL, CIRQUE 1:30PM–3:30PM

Session Organizer: Brian Donohue, *SNCL-Atkins Rail & Transit Engineering, Broomfield, CO, United States*

The Application of Big Data Analytic in Railway Marshalling Station Management

Technical Presentation. JRC2019-1242

Peibo Weng, Haodong Li, *Beijing Jiaotong University, Beijing, China*

Prescriptive Maintenance Scheduling Using Genetic Algorithm

Technical Presentation. JRC2019-1246

Julian Franzen, Bernd Kuhlenkötter, *Ruhr-University Bochum, Bochum, Germany,* Raphael Pfaff, *University of Applied Science Aachen, Aachen, Germany,* Udo Pinders, *Westfälische Lokomotiv-Fabrik Reuschling, Hattingen, Germany*

Network Simulation Approach for Assessing Advanced Train Control Technologies

Technical Presentation. JRC2019-1309

Hamed Pouryousef, Som Singh, Anand Prabhakaran, *Sharma & Associates, Inc., Countryside, IL, United States,* Monique Stewart, *Federal Railroad Administration (FRA), Laurel, MD, United States*

Technical Sessions

TRACK 1 RAILROAD INFRASTRUCTURE ENGINEERING

Track Organizer: Conrad Ruppert, *University of Illinois, Urbana, IL, United States*

Track Co-Organizer: Debakanta Mishra, *Boise State University, Boise, ID, United States*

1-2
EFFECT OF PRESTRESS WIRE PROPERTIES ON CONCRETE TIE PERFORMANCE
LOBBY LEVEL, PRIMROSE B 3:45PM–5:45PM

Session Organizer: Hailing Yu, *Volpe Center, Cambridge, MA, United States*

Effect of Strand Indentation Types on the Development Length and Flexural Capacity of Concrete Railroad Ties Made With Different Prestressing Strands

Technical Publication. JRC2019-1233

Amir Momeni, *Professional Engineering Consultants, P.A., Lawrence, KS, United States,* Robert Peterman, B. Terry Beck, Chih-Hang John Wu, *Kansas State University, Manhattan, KS, United States*

The Effect of Wire Type on Cracking Propensity in Prestressed Concrete Prisms

Technical Publication. JRC2019-1234

Adrijana Savic, B. Terry Beck, Aref Shafiei Dastgerdi, Robert Peterman, Aaron Robertson, *Kansas State University, Manhattan, KS, United States,* Kyle Riding, *University of Florida, Gainesville, FL, United States*

A High Resolution Automated Prestressing Wire Indent Profiling System for Verification of Wire-Concrete Mix Compatibility

Technical Publication. JRC2019-1269

B. Terry Beck, Aaron Robertson, Robert Peterman, Adrijana Savic, Chih-Hang John Wu, John Bloomfield, *Kansas State University, Manhattan, KS, United States,* Kyle Riding, *University of Florida, Gainesville, FL, United States*

Numerical Evaluation of Splitting Performance of Prestressed Concrete Prisms with Larger Diameter Prestressing Wires

Technical Publication. JRC2019-1315

Moochul Shin, *Western New England University, Springfield, MA, United States,* Hailing Yu, *Volpe Center, Cambridge, MA, United States*

TRACK 2 RAIL EQUIPMENT ENGINEERING

Track Organizer: Jeffrey Gordon, *US DOT/Federal Railroad Administration, Cambridge, MA, United States*

Track Co-Organizer: Bryan Schlake, *Penn State Altoona, Altoona, PA, United States*

2-2
CRASHWORTHINESS AND EQUIPMENT DESIGN
LOWER LEVEL, MAGPIE B 3:45PM–5:45PM

Session Organizer: Michael L. Burshtin, *Amtrak, Richland, NJ, United States*

Locomotive Crash Energy Management Coupling Tests Evaluation and Vehicle-to-Vehicle Test Preparation

Technical Publication. JRC2019-1259

Patricia Llana, Karina Jacobsen, *USDOT Volpe Center, Cambridge, MA, United States,* Richard Stringfellow, *TIAX, LLC, Lexington, MA, United States*

Use of Alternative Crash Pulses for Interior Fixture Design within CEM-Equipped Passenger Rail Cars

Technical Publication. JRC2019-1307

Benjamin Spears, Eloy Martinez, *LTK Engineering Services, Ambler, PA, United States*

Virtual Prototyping for the Railroad Industry

Technical Presentation. JRC2019-1318

Celine Cabana, *FD-GROUPS America Inc., Marietta, GA, United States*

Characterizing the Performance of Tank Car Pressure Relief Devices under Derailment Fire Conditions

Technical Presentation. JRC2019-1322

Francisco Gonzalez, III, *USDOT, Federal Railroad Administration, Washington, DC, United States,* Anand Prabhakaran, Graydon Booth, Andrew Robitaille, Harish Nambiar, Tanner Buel, *Sharma & Associates, Inc., Countryside, IL, United States*

TRACK 3 SIGNAL AND TRAIN CONTROL ENGINEERING

Track Organizer: David Thurston, *Canadian Pacific Railway, Calgary, AB, Canada*

3-2
COMMUNICATIONS APPLICATIONS FOR TRAIN CONTROL
LOBBY LEVEL, MAYBIRD 3:45PM–5:45PM

Session Organizer: David Thurston, *Canadian Pacific Railway, Calgary, AB, Canada*

MIMO Channel Capacity for Rail Transportation Applications: The Impact of Tunnel Curvatures

Technical Publication. JRC2019-1217

Arash Aziminejad, *WSP, Richmond Hill, ON, Canada,* Yan He, *WSP Canada Inc., Thornhill, ON, Canada*

High Speed Train Wireless Communication: Handover Performance Analysis for Different Radio Access Technologies

Technical Publication. JRC2019-1247

Subharthi Banerjee, Michael Hempel, Pejman Ghasemzadeh, Naji Albakay, Hamid Sharif, *University of Nebraska at Lincoln, Omaha, NE*

TRACK 5 PLANNING AND DEVELOPMENT

Track Organizer: Jeffrey Gordon, *US DOT/Federal Railroad Administration, Cambridge, MA, United States*

5-2
PLANNING AND DEVELOPMENT II
LOBBY LEVEL, CIRQUE 3:45PM–5:45PM

Session Organizer: Brian Donohue, *SNCL-Atkins Rail & Transit Engineering, Broomfield, CO, United States*

LRT for Juneau, Alaska — Elegant Accommodation for 1.5 Million Cruise Ship Visitors per Summer

Technical Presentation. JRC2019-1337

William Leighty, *The Leighty Foundation, Juneau, AK, United States*

Brazilian Freight Rail Concessions Overview: Current Outcomes and Perspectives

Technical Publication. JRC2019-1237

Fabio Barbosa, *FCB Research and Consulting, Brasilia, DF, Brazil*

Use of Rail in Oil and Gas Regions of Texas to Reduce Truck Impacts

Technical Publication. JRC2019-1257

Jeffery Warner, Curtis Morgan, Allan Rutter, Dahye Lee, *Texas A&M Transportation Institute (TTI), College Station, TX, United States*

TRACK 6 SAFETY AND SECURITY

Track Organizer: Dave Schlesinger, *Parsons, Ontario, CA, United States*

Track Co-Organizer: Larry Day, *US DOT, FRA, Clovis, CA, United States*

6-1
ACCIDENT ANALYSIS
LOWER LEVEL, MAGPIE A 3:45PM–5:45PM

Session Organizer: Greg Placencia, *California State Polytechnic University, Pomona, CA, United States*

Discovering Crash Severity Factors of Grade Crossing with a Machine Learning Approach

Technical Publication. JRC2019-1231

Dahye Lee, Jeffery Warner, Curtis Morgan, *Texas A&M Transportation Institute (TTI), College Station, TX, United States*

Train Presence Probability Modeling in the Risk Assessment of Adjacent Track Accidents on Multiple Track Territory

Technical Presentation. JRC2019-1323

Chen-Yu Lin, Chris Barkan, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

Freight Train Derailment Severity and Consequence Modeling in North America

Technical Presentation. JRC2019-1324

Brandon Wang, Chris Barkan, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

THURSDAY, APRIL 11

TRACK 1 RAILROAD INFRASTRUCTURE ENGINEERING

Track Organizer: Conrad Ruppert, *University of Illinois, Urbana, IL, United States*

Track Co-Organizer: Debakanta Mishra, *Boise State University, Boise, ID, United States*

1-3
TIMBER AND COMPOSITE CROSSTIE RESEARCH
LOBBY LEVEL, PRIMROSE B 7:30AM–9:30AM

Session Organizer: Shushu Liu, *iBiz, Cambridge, MA, United States*

Challenges with Broken Spikes in Premium Elastic Fasteners for Timber Crossties

Technical Presentation. JRC2019-1229

Tom Roadcap, *University of Illinois at Urbana–Champaign, Champaign, IL, United States,* Marcus S. Dersch, J. Riley Edwards, *University of Illinois at Urbana–Champaign, Urbana, IL, United States*

Finite Element Analysis of Spike Failure in Elastic Fastening Systems for Wood Ties

Technical Publication. JRC2019-1235

Hailing Yu, *Volpe Center, Cambridge, MA, United States,* Shushu Liu, *iBiz, Cambridge, MA, United States*

Simulation of the Thermal Effects on Engineered Polymer Composite Ties

Technical Publication. JRC2019-1299

Yin Gao, Michael McHenry, *Transportation Technology Center, Inc., Pueblo, CO, United States*

TRACK 3 SIGNAL AND TRAIN CONTROL ENGINEERING

Track Organizer: David Thurston, *Canadian Pacific Railway, Calgary, AB, Canada*

3-3
STUDIES IN RAIL SYSTEMS
LOBBY LEVEL, MAYBIRD 7:30AM–9:30AM

Session Organizer: John Hofbauer, *Parsons, Philadelphia, PA, United States*

The Future of Train Control in Canada and an Analysis of the CaRRL Report on Enhanced Train Control

Technical Publication. JRC2019-1225

David Thurston, *Canadian Pacific Railway, Calgary, AB, Canada*

Application of Software Tools to Implement a Systems Engineering Process for Specification Development in a Brownfield Train Control Project

Technical Publication. JRC2019-1226

John Carlo Chy, Kenneth Diemunsch, Brad Banks, *Parsons, Oakland, CA, United States*

Study on Running Safety of Railway Tank Car Based on the Experimental Identification Model

Technical Publication. JRC2019-1239

Jimin Zhang, Qiao Ren, *Tongji University, Shanghai, China*

TRACK 6 SAFETY AND SECURITY

Track Organizer: Dave Schlesinger, *Parsons, Ontario, CA, United States*

Track Co-Organizer: Larry Day, *US DOT, FRA, Clovis, CA, United States*

6-2
RAIL SAFETY
LOWER LEVEL, MAGPIE A 7:30AM–9:30AM

Session Organizer: David Neumeister, *Battelle, Columbus, OH, United States*

Development of a Reduced Scale Fire Resistance Test for a Rail Car Floor Assembly

Technical Publication. JRC2019-1228

Anil Kapahi, *Jensen Hughes, Baltimore, MD, United States,* Christian Rippe, Brian Lattimer, *Jensen Hughes, Blacksburg, VA, United States*

Big Data Analytics for Proactively Optimizing Rolling Stock Maintenance

Technical Publication. JRC2019-1253

Naji Albakay, Michael Hempel, Hamid Sharif, *University of Nebraska at Lincoln, Omaha, NE, United States*

Test Plans and Analysis for Oblique Impacts of Diesel Multiple Unit Fuel Tanks

Technical Presentation. JRC2019-1281

Karina Jacobsen, Michael Carolan, *US DOT/Volpe Center, Cambridge, MA, United States*

Prototype Rail Crossing Violation Warning (RCVW) - Advancing the Use of Connected Vehicle Technologies to Prevent Crashes at Rail Grade Crossings by Warning Vehicle Drivers of Predicated Violations

Technical Presentation. JRC2019-1325

Jeff Utterback, *Battelle, Lake Arrowhead, CA, United States,* David Neumeister, *Battelle, Columbus, OH, United States*

TRACK 7 ENERGY EFFICIENCY AND SUSTAINABILITY

Track Organizer: Brian Donohue, *SNCL-Atkins Rail & Transit Engineering, Broomfield, CO, United States*

7-1
ENERGY EFFICIENCY AND SUSTAINABILITY
LOWER LEVEL, MAGPIE B 7:30AM–9:30AM

Session Organizer: Brian Donohue, *SNCL-Atkins Rail & Transit Engineering, Broomfield, CO, United States*

U.S. Freight Rail Fuel Efficiency: 1920-2015 Review and Discussion of Future Trends

Technical Publication. JRC2019-1296

Michael E. Iden, *Independent Author, Melrose Park, IL, United States*

Fuel Cell Rail Technology Review: A Tool for an Autonomous Rail Electrifying Strategy

Technical Publication. JRC2019-1223

Fabio Barbosa, *FCB Research and Consulting, Brasilia, DF, Brazil*

Theoretical and Experimental Study on the Energy Consumption of Railroad Bearings in Normal and Abnormal Operation Conditions

Technical Presentation. JRC2019-1293

Lee Cantu, *University Transportation Center for Railway Safety/University of Texas Rio Grande Valley, La Joya, TX, United States,* Constantine Tarawneh, *University of Texas Rio Grande Valley, Edinburg, TX, United States,* Arturo A. Fuentes, Carlos Lopez, *University Transportation Center for Railway Safety/ University of Texas Rio Grande Valley, Edinburg, TX, United States*

TRACK 1 RAILROAD INFRASTRUCTURE ENGINEERING

Track Organizer: Conrad Ruppert, *University of Illinois, Urbana, IL, United States*

Track Co-Organizer: Debakanta Mishra, *Boise State University, Boise, ID, United States*

1-4
BALLAST CHARACTERIZATION AND TESTING
LOBBY LEVEL, PRIMROSE B 9:45AM–1:45AM

Session Organizer: D. Kody Johnson, *Boise State University, Boise, ID, United States*

Laboratory Study on Frost Heave of Ballast

Technical Presentation. JRC2019-1244

Feng Guo, Yu Qian, Yi Wang, Dimitris C Rizos, *University of South Carolina, Columbia, SC, United States,* Shaofeng Wang, *East China Jiaotong University, Nanchang, Jiangxi Province, China*

Effect of Tamping on Railroad Ballast Breakage - A DEM Study

Technical Presentation. JRC2019-1250

Beema Dahal, Debakanta Mishra, *Boise State University, Boise, ID, United States*

Monitoring and Detecting Fouled Ballast Using Forward-Looking Infrared Radiometer (FLIR) Aerial Technology: Possibilities and Limitations

Technical Publication. JRC2019-1327

Yongwen Tan, Yang Chen, Andrew Peterson, *Virginia Tech, Blacksburg, VA, United States,* Mehdi Ahmadian, *VA Poly Inst & State University, Blacksburg, VA, United States*

TRACK 6 SAFETY AND SECURITY

Track Organizer: Dave Schlesinger, *Parsons, Ontario, CA, United States*

Track Co-Organizer: Larry Day, *US DOT, FRA, Clovis, CA, United States*

6-3
RAIL OPERATIONAL SAFETY
LOWER LEVEL, MAGPIE A 9:45AM–11:45AM

Session Organizer: Greg Placencia, *California State Polytechnic University, Pomona, CA, United States*

Balancing Ontime Performance and Safety Using STAMP

Technical Presentation. JRC2019-1221

Greg Placencia, *California State Polytechnic University, Pomona, CA, United States*

Identifying Railroad Requirements for the Future Automated and Connected Vehicle Environment

Technical Presentation. JRC2019-1261

Curtis Morgan, Jeffery E. Warner, Dahye Lee, David Florence, *Texas A&M Transportation Institute, College Station, TX, United States*

Estimating the Outer Ring Defect Size and Remaining Service Life of Freight Railcar Bearings Using Vibration Signatures

Technical Publication. JRC2019-1284

Jennifer Lima, *University Transportation Center for Railway Safety/University of Texas Rio Grande Valley, Alamo, TX, United States,* Constantine Tarawneh, Jonas Regan Cuanang, *University of Texas Rio Grande Valley, Edinburg, TX, United States,* Joseph Montalvo, Nancy De Los Santos, *University Transportation Center for Railway Safety/University of Texas Rio Grande Valley, Pharr, TX, United States*

FRA Training Requirements for Safety-Related Employees

Technical Presentation. JRC2019-1320

Dave Schlesinger, *Parsons, Ontario, CA, United States*

TRACK 9 ELECTRIFICATION

Track Organizer: John Grantham, *SNC-Lavalin / Atkins North America, Calverton, MD, United States*

Track Co-Organizer: Bih-Yuan Ku, *National Taipei University of Technology, Taipei, Taiwan*

9-1
TRACTION ELECTRIFICATION SESSION: OCS, TPS AND GROUNDING
LOBBY LEVEL, MAYBIRD 9:45AM–11:45AM

Session Organizer: John Grantham, *SNC-Lavalin / Atkins North America, Calverton, MD, United States*

An Analysis of the Grounding Strategy for Mixed AC/DC Areas

Technical Publication. JRC2019-1232

Roberto Loiero, Federico Jorreto, Jorge Garzon, Pablo Minayo, *AECOM, Madrid, Spain*

Impact of Reduced Share of Rotary Frequency Converters in a Low Frequency Synchronous Railway Grid: A Transient Stability Study

Technical Publication. JRC2019-1238

John Laury, Lars Abrahamsson, Math Bollen, *Luleå University of Technology, Skelleftea, Sweden*

Evaluating a Constant-Current Load Model through Comparative Transient Stability Case-Studies of a Synchronous-Synchronous Rotary Frequency Converter-Fed Railway

Technical Publication. JRC2019-1249

Lars Abrahamsson, John Laury, Math Bollen, *Luleå University of Technology, Skelleftea, Sweden*

Milwaukee Streetcar Overhead Contact System: A Challenging Design Effort

Technical Publication. JRC2019-1294

Paul White, Gerti Kola, *HNTB Corporation, Chelmsford, MA, United States*

TRACK 10 VEHICLE-TRACK INTERACTION

Track Organizer: Anand Prabhakaran, *Sharma & Associates, Inc., Countryside, IL, United States*

Track Co-Organizer: Jeffrey Gordon, *US DOT/Federal Railroad Administration, Cambridge, MA, United States*

10-1
VTI - SESSION 1
LOWER LEVEL, MAGPIE B 9:45AM–11:45AM

Session Organizer: Anand Prabhakaran, *Sharma & Associates, Inc., Countryside, IL, United States*

Experimental Modeling of Railway Car Wheel-Forces during Turning

Technical Publication. JRC2019-1219

Frank Otremba, Jose Antonio Romero Navarrete, *Federal Institute for Materials Research and Testing (BAM), Berlin, Germany*

Assessing Derailment Potential of Partially Filled Railroad Tank Cars

Technical Presentation. JRC2019-1262

Brian Marquis, Mark Hunter, Robert Greif, *US DOT Volpe Center, Cambridge, MA, United States,* Ali Tajaddini, *Federal Railroad Administration, Gaithersburg, MD, United States*

Studying the Effect of Tangential Forces on Rolling Contact Fatigue in Rails Considering Microstructure

Technical Publication. JRC2019-1279

Mohamad Ghodrati, Reza Mirzaeifar, *Virginia Tech, Blacksburg, VA, United States,* Mehdi Ahmadian, *VA Poly Inst & State University, Blacksburg, VA, United States*

Out-of-Round Wheel Modeling and Comparison to Field-Measured Truck Dynamic Performance Data

Technical Presentation. JRC2019-1311

Edward (Ned) Parker, *LTK Engineering, Denver, CO, United States*

Influence of Rail Cant on High Rail Side Wear on Sharp Curve of Urban Transit

Technical Publication. JRC2019-1260

Shaofeng Wang, Qingsong Feng, *East China Jiaotong University, Nanchang, Jiangxi, China,* Yu Qian, Feng Guo, *University of South Carolina, Columbia, SC, United States,* Xinwei Luo, *Guangzhou Metro Design & Research Institute Co., Ltd, Guangzhou, Guangdong, China*

TRACK 12 GRAND CHALLENGE

12-1
GRAND CHALLENGE
LOWER LEVEL, BALLROOM 1 12:00PM–1:00PM

TRACK 1 RAILROAD INFRASTRUCTURE ENGINEERING

Track Organizer: Conrad Ruppert, *University of Illinois, Urbana, IL, United States*

Track Co-Organizer: *Debakanta Mishra, Boise State University, Boise, ID, United States*

1-5
TRACK CONDITION MONITORING AND FAILURE PREDICTION
LOBBY LEVEL, PRIMROSE B 1:15PM–3:15PM

Session Organizer: Radim Bruzek, *ENSCO Inc., Springfield, VA, United States*

Quantification of Vertical and Lateral Loads Using Strain Gauges: Eliminating the Wheatstone Bridge

Technical Publication. JRC2019-1271

D. Kody Johnson, Md. Fazle Rabbi, Debakanta Mishra, *Boise State University, Boise, ID, United States,* Radim Bruzek, *ENSCO Inc., Springfield, VA, United States*

Monitoring of Railway Structure: High Speed Line: Bretagne - "Pays de la Loire"

Technical Presentation. JRC2019-1288

Diana Khairallah, *Railenium, Nantes, Loire atlantique, France,* Juliette Blanc, *IFSTTAR, Bouguenais, Loire atlantique, France*

A Machine Learning Approach for Track Condition Assessment through Repeated Historical Data Analytics

Technical Publication. JRC2019-1272

Milad Afzalan, Farrokh Jazizadeh, *Virginia Tech, Blacksburg, VA, United States,* Mehdi Ahmadian, *VA Poly Inst & State University, Blacksburg, VA, United States*

Forecasting the Risk of Rail Service Failures between Successive Rail Inspections Using Hazard Based Models

Technical Presentation. JRC2019-1333

Naresh Chava, Qing He, Faeze Ghofrani, *University at Buffalo, The State University at New York, Buffalo, NY, United States*

Comparing Track Geometry and GRMS as Indicators of Weak Track Strength

Technical Publication. JRC2019-1345

Radim Bruzek, *ENSCO Inc., Springfield, VA, United States*

1-7
THERMAL AND FRICTIONAL ASPECTS OF RAILS
LOBBY LEVEL, MAYBIRD 1:15PM–3:15PM

Session Organizer: Tim Mast, *Virginia Tech, Blacksburg, VA, United States*

Train-Induced Load Effects on the Thermal Track Buckling

Technical Publication. JRC2019-1276

Giovanni Pio Pucillo, *University of Naples Federico II, Naples, Naples, Italy*

A Non-Contacting System for Rail Neutral Temperature Measurements

Technical Presentation. JRC2019-1289

Katelyn Knopf, Dimitris Rizos, Yu Qian, Michael Sutton, *University of South Carolina, Columbia, SC, United States*

Measuring Neutral Temperature in CWR, the Big Challenge of Railroad Maintenance: Lessons Learnt and Future Possibilities

Technical Presentation. JRC2019-1339

Francesco Lanza di Scalea, *University of California San Diego, La Jolla, CA, United States*

Development of Laser/LED-Based Instrument for Optical Detection of Railroad Top-of-Rail (ToR) Friction Modifiers and Lubricity Conditions

Technical Publication. JRC2019-1285

Campbell Neighborgall, Tim Mast, *Virginia Tech, Blacksburg, VA, United States,* Andrew Peterson, *Center for Vehicle Systems and Safety - Virginia Tech, Blacksburg, VA, United States,* Mehdi Ahmadian, *VA Poly Inst & State University, Blacksburg, VA, United States,* Carvel Holton, *Center for Vehicle Systems and Safety - Virginia Tech, Blacksburg, VA, United States*

TRACK 6 SAFETY AND SECURITY

Track Organizer: Dave Schlesinger, *Parsons, Ontario, CA, United States*

Track Co-Organizer: Larry Day, *US DOT, FRA, Clovis, CA, United States*

6-4
SAFETY AND SECURITY ANALYSIS
LOWER LEVEL, MAGPIE A 1:15PM–3:15PM

Session Organizer: Bryan Schlake, *Penn State Altoona, Altoona, PA, United States*

Cyber Security Analysis for Advanced Train Control System (ATCS) in CTC Systems: Concepts and Methods

Technical Publication. JRC2019-1236

Zezhou Wang, *Rutgers University, Edison, NJ, United States,* Yongxin Wang, Chaitanya Yavvari, Matthew Jablonski, Duminda Wijesekera, *George Mason University, Fairfax, VA, United States,* Brian Sykes, *GA, United States,* Keith Holt, *HNTB, Philadelphia, PA, United States,* Xiang Liu, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States*

Safety and Security Analysis for Movable Railroad Bridges

Technical Publication. JRC2019-1251

Yongxin Wang, Matthew Jablonski, Chaitanya Yavvari, Duminda Wijesekera, *George Mason University, Fairfax, VA, United States,* Zezhou Wang, *Rutgers University, Edison, NJ, United States,* Xiang Liu, *Rutgers, The State University of New Jersey, Piscataway, NJ, United States,* Keith Holt, *HNTB, Philadelphia, PA, United States*

Creating an Embedded Security Framework

Technical Presentation. JRC2019-1328

Jeffrey Struik, *Cyber Strike Solutions, LLC, Williamsburg, IA, United States*

Assessment of Railway Cyber Security Vulnerabilities and Potential Steps Forward

Technical Presentation. JRC2019-1344

Bryan Schlake, Suman Saha, *Penn State Altoona, Altoona, PA, United States*

TRACK 11 RAILROAD HISTORY

Track Organizer: Michael L. Burshtin, *Amtrak, Richland, NJ, United States*

11-1
RAILROAD HISTORY
LOBBY LEVEL, CIRQUE 1:15PM–3:15PM

Session Organizer: Michael L. Burshtin, *Amtrak, Richland, NJ, United States*

The Creation of Cab Signaling

Technical Publication. JRC2019-1314

John Hofbauer, *Parsons, Philadelphia, PA, United States*

How Staged Head-On Collisions Changed Public Perception of Railroads

Technical Publication. JRC2019-1329

Leanne Thurston, *Boise Independent School District, Boise, ID, United States*

TRACK 1 RAILROAD INFRASTRUCTURE ENGINEERING

Track Organizer: Conrad Ruppert, *University of Illinois, Urbana, IL, United States*

Track Co-Organizer: Debakanta Mishra, *Boise State University, Boise, ID, United States*

1-6
RAIL INSPECTION AND CRACK GROWTH RESEARCH
LOBBY LEVEL, PRIMROSE B 3:30PM–5:30PM

Session Organizer: Benjamin Perlman, *US DOT/Volpe Center, Cambridge, MA, United States*

On Numerical Analyses of Rail Steel Fatigue Crack Growth Data

Technical Publication. JRC2019-1264

David Jeong, *Independent Author, North Reading, MA, United States*

Defect Growth Characterization in Modern Rail Steels

Technical Publication. JRC2019-1265

David Jeong, *Independent Author, North Reading, MA, United States,* Pawel Woelke, *Thornton Tomasetti, New York, NY, United States,* Herman Nied, John DuPont, Sena Kizildemir, *Lehigh University, Bethlehem, PA, United States,* Fred Fletcher, *ArcelorMittal, Coatesville, PA, United States,* John W. Hutchinson, *Harvard University, Boston, MA, United States*

Developing Finite Element Models to Examine Rail Defects under Combined Loading

Technical Publication. JRC2019-1268

Michael Carolan, Benjamin Perlman, *US DOT/Volpe Center, Cambridge, MA, United States*

Boundary Conditions Effects on the Crack Growth Mechanism under Cycling Bending

Technical Publication. JRC2019-1274

Giovanni Pio Pucillo, Luca Esposito, *University of Naples Federico II, Naples, Italy,* Davide Leonetti, *Eindhoven University of Technology, Eindhoven, Netherlands*

Estimation of Rail Vertical Profile Using an H-Infinity Based Optimization with Learning

Technical Publication. JRC2019-1266

Xiao Liang, Minghui Zheng, *University at Buffalo, Buffalo, NY, United States*

High-speed Rail Inspection by Passive-Only Ultrasonic Monitoring

Technical Presentation. JRC2019-1338

Francesco Lanza di Scalea, Albert Liang, *University of California San Diego, La Jolla, CA, United States,* Margherita Capriotti, *UC San Diego, San Diego, CA, United States,* Robert Wilson, *Federal Railroad Administration, Washington, DC, United States*

1-8
TRACK TRANSITIONS AND TRACK SUBSTRUCTURE
LOBBY LEVEL, MAYBIRD 3:30PM–5:30PM

Session Organizer: Debakanta Mishra, *Boise State University, Boise, ID, United States*

Effects of Under Tie Pads (UTPs) on Railway Infrastructure

Technical Presentation. JRC2019-1230

Jacob Branson, Marcus S. Dersch, Arthur de Oliveira Lima, J. Riley Edwards, *University of Illinois at Urbana-Champaign, Urbana, IL, United States*

Probabilistic Structural Analysis of Railroad Subgrade Using Finite Element Analysis

Technical Publication. JRC2019-1255

Asif Arshid, Ying Huang, Denver Tolliver, *North Dakota State University, Fargo, ND, United States*

A Study on Load Distribution Patterns in Track Substructures: Field Instrumentation and Numerical Modeling

Technical Presentation. JRC2019-1316

Md. Fazle Rabbi, Debakanta Mishra, *Boise State University, Boise, ID, United States*

Track Performance with Age in Tunnels and Transition Areas

Technical Presentation. JRC2019-1341

Kyle Riding, Stephen Gonzalez, Jennifer Bridge, Justin R. Davis, *University of Florida, Gainesville, FL, United States,* Shanyue Guan, *Eastern Carolina University, Greenville, NC, United States*

TRACK 8 URBAN PASSENGER RAIL TRANSPORT

Track Organizer: Brian Donohue, *SNCL-Atkins Rail & Transit Engineering, Broomfield, CO, United States*

Track Co-Organizer: V. Dimitra Pyrialakou, *West Virginia University, Morgantown, WV, United States*

8-1
URBAN PASSENGER RAIL TRANSPORT
LOBBY LEVEL, CIRQUE 3:30PM–5:30PM

Session Organizer: Brian Donohue, *SNCL-Atkins Rail & Transit Engineering, Broomfield, CO, United States*

Design and Strength Evaluation of Laser-Welded Carbody for Railway Vehicles

Technical Publication. JRC2019-1222

Qi Luo, Chunyu Zhang, Kefei Wang, Hongxiao Wang, *CRRC Changchun Railway Vehicles Co., Ltd, Changchun, Jilin, China,* Ziwen Fang, Jianran Wang, Haifeng Hong, *CRRC MA Corporation, Quincy, MA, United States,* Steven Kirkpatrick, *Applied Research Associates, Inc., Los Altos, CA, United States*

High Speed Intercity and Urban Passenger Transport Maglev Train Technology Review: A Technical and Operational Assessment

Technical Publication. JRC2019-1227

Fabio Barbosa, *FCB Research and Consulting, Brasilia, DF, Brazil*

A Framework for High-Speed Passenger Train Wireless Network Radio Evaluations

Technical Publication. JRC2019-1248

Subharthi Banerjee, Michael Hempel, Naji Albakay, Pejman Ghasemzadeh, Hamid Sharif, *University of Nebraska at Lincoln, Omaha, NE, United States*

TRACK 10 VEHICLE-TRACK INTERACTION

Track Organizer: Anand Prabhakaran, *Sharma & Associates, Inc., Countryside, IL, United States*

Track Co-Organizer: Jeffrey Gordon, *US DOT/Federal Railroad Administration, Cambridge, MA, United States*

10-2
VTI - SESSION 2
LOWER LEVEL, MAGPIE B 3:30PM–5:30PM

Session Organizer: Anand Prabhakaran, *Sharma & Associates, Inc., Countryside, IL, United States*

Evaluating the Effect of Natural Third Body Layers on Friction Using the Virginia Tech Roller Rig

Technical Publication. JRC2019-1292

Ahmad Radmehr, *Virginia Tech, Blacksburg, VA, United States,* Karan Kothari, *Amtrak, Washington, DC, United States,* Mehdi Ahmadian, *VA Poly Inst & State University, Blacksburg, VA, United States*

Virginia Tech-Federal Railroad Administration Roller Rig Measurement Capabilities and Baseline Measurements

Technical Publication. JRC2019-1295

Ahmad Radmehr, *Virginia Tech, Blacksburg, VA, United States,* Ali Tajaddini, *Federal Railroad Administration, Gaithersburg, MD, United States,* Brian Marquis, *US DOT Volpe Center, Cambridge, MA, United States,* Mehdi Ahmadian, *VA Poly Inst & State University, Blacksburg, VA, United States*

Development of Vertical Force Control System for the Virginia Tech - Federal Railroad Administration Roller Rig

Technical Presentation. JRC2019-1326

Jay Dixit, *Center for Vehicle Systems and Safety, Blacksburg, VA, United States,* Mehdi Ahmadian, *VA Poly Inst & State University, Blacksburg, VA, United States*

A Computationally Efficient Novel Algorithm Using Subsystems and Calculating Interface Contact Forces Explicitly to Determine Dynamic Train-Track (Vertical) Interactions

Technical Presentation. JRC2019-1252

Arya Datta, Dimitris Rizos, Yu Qian, Jeffrey S. Mulliken, Robert Mullen, Iman Asareh, *University of South Carolina, Columbia, SC, United States*

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		JRC2019-1249	Evaluating a Constant-Current Load Model Through Comparative Transient Stability Case-Studies of a Synchronous-Synchronous Rotary Frequency Converter-Fed Railway	9-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Maybird
Afzalan	Milad	JRC2019-1272	A Machine Learning Approach for Track Condition Assessment Through Repeated Historical Data Analytics	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
Ahmadian	Mehdi	JRC2019-1327	Monitoring and Detecting Fouled Ballast Using Forward-Looking Infrared Radiometer (FLIR) Aerial Technology: Possibilities and Limitations	1-4	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Primrose
		JRC2019-1272	A Machine Learning Approach for Track Condition Assessment Through Repeated Historical Data Analytics	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
		JRC2019-1285	Development of Laser/LED-Based Instrument for Optical Detection of Railroad Top-of-Rail (ToR) Friction Modifiers and Lubricity Conditions	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
		JRC2019-1279	Studying the Effect of Tangential Forces on Rolling Contact Fatigue in Rails Considering Microstructure	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
		JRC2019-1292	Evaluating the Effect of Natural Third Body Layers on Friction Using the Virginia Tech Roller Rig	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
		JRC2019-1295	Virginia Tech-Federal Railroad Administration Roller Rig Measurement Capabilities and Baseline Measurements	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
		JRC2019-1326	Development of Vertical Force Control System for the Virginia Tech ? Federal Railroad Administration Roller Rig	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Aindow	David	JRC2019-1302	Enhancements in the Performance of Journal Bearing Grease	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B
Albakay	Naji	JRC2019-1247	High Speed Train Wireless Communication: Handover Performance Analysis for Different Radio Access Technologies	3-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Maybird
		JRC2019-1253	Big Data Analytics for Proactively Optimizing Rolling Stock Maintenance	6-2	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie A
		JRC2019-1248	A Framework for High-Speed Passenger Train Wireless Network Radio Evaluations	8-1	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Cirque
Aranda	James	JRC2019-1286	Prototyping a Conductive Polymer Steering Pad for Rail Freight Service	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B
Arshid	Asif	JRC2019-1255	Probabilistic Structural Analysis of Railroad Subgrade Using Finite Element Analysis	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Asareh	Iman	JRC2019-1252	A Computationally Efficient Novel Algorithm Using Subsystems And Calculating Interface Contact Forces Explicitly To Determine Dynamic Train-Track (Vertical) Interactions	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Aziminejad	Arash	JRC2019-1217	MIMO Channel Capacity for Rail Transportation Applications: The Impact of Tunnel Curvatures	3-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Maybird
Banerjee	Subharthi	JRC2019-1247	High Speed Train Wireless Communication: Handover Performance Analysis for Different Radio Access Technologies	3-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Maybird
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Barbosa	Fabio	JRC2019-1237	Brazilian Freight Rail Concessions Overview: Current Outcomes and Perspectives	5-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Cirque
		JRC2019-1223	Fuel Cell Rail Technology Review: A Tool for an Autonomous Rail Electrifying Strategy	7-1	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie B
		JRC2019-1227	High Speed Intercity and Urban Passenger Transport Maglev Train Technology Review: A Technical and Operational Assessment	8-1	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Cirque
Barkan	Chris	JRC2019-1323	Train Presence Probability Modeling In The Risk Assessment Of Adjacent Track Accidents On Multiple Track Territory	6-1	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie A
		JRC2019-1324	Freight Train Derailment Severity and Consequence Modeling in North America	6-1	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie A
Beck	B. Terry	JRC2019-1275	Evaluation of the Remaining Prestress Force and Center Negative Bending Moment in Crossties Removed From Track After 25 Years of Service	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1278	Experimental investigation of splitting cracks of pre-stressed concrete railroad ties containing polymer fiber	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1280	Evaluation of Splitting Crack Propagation in Pre-Stressed Concrete Ties Made With Different Types of Coarse Aggregate	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1233	Effect of Strand Indentation Types on the Development Length and Flexural Capacity of Concrete Railroad Ties Made With Different Prestressing Strands	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1234	The Effect of Wire Type on Cracking Propensity in Prestressed Concrete Prisms	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1269	A High Resolution Automated Prestressing Wire Indent Profiling System for Verification of Wire-Concrete Mix Compatibility	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
Blanc	Juliette	JRC2019-1288	Monitoring of railway structure: High Speed line ?Bretagne ? Pays de la Loire?	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
Blasko	Daniel	JRC2019-1302	Enhancements in the Performance of Journal Bearing Grease	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B

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Branson	Jacob	JRC2019-1230	Effects of Under Tie Pads (UTPs) on Railway Infrastructure	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Bridge	Jennifer	JRC2019-1341	Track Performance with Age In Tunnels and Transition Areas	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Bruzek	Radim	JRC2019-1271	Quantification of Vertical and Lateral Loads Using Strain Gauges: Eliminating the Wheatstone Bridge	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
		JRC2019-1345	Comparing Track Geometry and GRMS as Indicators of Weak Track Strength	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
Buel	Tanner	JRC2019-1322	Characterizing the Performance Of Tank Car Pressure Relief Devices Under Derailment Fire Conditions	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
Bueno	Paulo	JRC2019-1298	Optimizing Railway Track Maintenance Scheduling to Minimize Circulation Impacts	4-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie A
Cabana	Celine	JRC2019-1318	Virtual prototyping for the railroad industry	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
Cadarso	Luis	JRC2019-1254	A Passenger-centric Approach to Railway Disruption Management from a Microscopic Point of View	4-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie A
Cantu	Lee	JRC2019-1293	Theoretical And Experimental Study On The Energy Consumption of Railroad Bearings In Normal and Abnormal Operation Conditions	7-1	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie B
Capriotti	Margherita	JRC2019-1338	High-speed Rail Inspection by Passive-Only Ultrasonic Monitoring	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Carolan	Michael	JRC2019-1268	Developing Finite Element Models to Examine Rail Defects Under Combined Loading	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
		JRC2019-1281	Test Plans and Analysis for Oblique Impacts of Diesel Multiple Unit Fuel Tanks	6-2	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie A
Chava	Naresh	JRC2019-1333	Forecasting the Risk of Rail Service Failures Between Successive Rail Inspections Using Hazard Based Models	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
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Chy	John Carlo	JRC2019-1226	Application of Software Tools to Implement a Systems Engineering Process for Specification Development in a Brownfield Train Control Project	3-3	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lobby Level, Maybird
Cuanang	Jonas Regan	JRC2019-1284	Estimating the Outer Ring Defect Size and Remaining Service Life of Freight Railcar Bearings Using Vibration Signatures	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
Dahal	Beema	JRC2019-1250	Effect of Tamping on Railroad Ballast Breakage ? A DEM Study	1-4	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Primrose
Datta	Arya	JRC2019-1252	A Computationally Efficient Novel Algorithm Using Subsystems And Calculating Interface Contact Forces Explicitly To Determine Dynamic Train-Track (Vertical) Interactions	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Davis	Justin R.	JRC2019-1341	Track Performance with Age In Tunnels and Transition Areas	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
De Los Santos	Nancy	JRC2019-1284	Estimating the Outer Ring Defect Size and Remaining Service Life of Freight Railcar Bearings Using Vibration Signatures	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
de Oliveira Lima	Arthur	JRC2019-1230	Effects of Under Tie Pads (UTPs) on Railway Infrastructure	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Dedmon	Steven	JRC2019-1312	Going Beyond Conventional Problem Solving for Two Railroad Wheel Defects	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B
Dersch	Marcus S.	JRC2019-1229	Challenges with Broken Spikes in Premium Elastic Fasteners for Timber Crossties	1-3	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lobby Level, Primrose
		JRC2019-1230	Effects of Under Tie Pads (UTPs) on Railway Infrastructure	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
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Dixit	Jay	JRC2019-1326	Development of Vertical Force Control System for the Virginia Tech ? Federal Railroad Administration Roller Rig	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
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Fletcher	Fred	JRC2019-1265	Defect Growth Characterization in Modern Rail Steels	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Florence	David	JRC2019-1261	Identifying Railroad Requirements for the Future Automated and Connected Vehicle Environment	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
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		JRC2019-1248	A Framework for High-Speed Passenger Train Wireless Network Radio Evaluations	8-1	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Cirque
Ghodrati	Mohamad	JRC2019-1279	Studying the Effect of Tangential Forces on Rolling Contact Fatigue in Rails Considering Microstructure	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
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Gonzalez	Stephen	JRC2019-1341	Track Performance with Age In Tunnels and Transition Areas	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Gonzalez, III	Francisco	JRC2019-1322	Characterizing the Performance Of Tank Car Pressure Relief Devices Under Derailment Fire Conditions	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
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Guan	Shanyue	JRC2019-1341	Track Performance with Age In Tunnels and Transition Areas	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
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		JRC2019-1253	Big Data Analytics for Proactively Optimizing Rolling Stock Maintenance	6-2	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie A
		JRC2019-1248	A Framework for High-Speed Passenger Train Wireless Network Radio Evaluations	8-1	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Cirque
Hofbauer	John	JRC2019-1317	Improve Safety at Highway Crossings Through Predictive Behavior and Innovative Technologies	3-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Maybird
Hofbauer	John	JRC2019-1314	The Creation of Cab Signaling	11-1	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Cirque
Holt	Keith	JRC2019-1236	Cyber Security Analysis for Advanced Train Control System (ATCS) in CTC Systems: Concepts and Methods	6-4	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lower Level, Magpie A
		JRC2019-1251	Safety and Security Analysis for Movable Railroad Bridges	6-4	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lower Level, Magpie A
Holton	Carvel	JRC2019-1285	Development of Laser/LED-Based Instrument for Optical Detection of Railroad Top-of-Rail (ToR) Friction Modifiers and Lubricity Conditions	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
Hong	Haifeng	JRC2019-1222	Design and Strength Evaluation of Laser-Welded Carbody for Railway Vehicles	8-1	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Cirque
Huang	Ying	JRC2019-1255	Probabilistic Structural Analysis of Railroad Subgrade Using Finite Element Analysis	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Hunter	Mark	JRC2019-1262	Assessing Derailment Potential of Partially Filled Railroad Tank Cars	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
Hutchinson	John W.	JRC2019-1265	Defect Growth Characterization in Modern Rail Steels	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Iden	Michael E.	JRC2019-1296	U.S. Freight Rail Fuel Efficiency: 1920-2015 Review and Discussion of Future Trends	7-1	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie B
Jablonski	Matthew	JRC2019-1236	Cyber Security Analysis for Advanced Train Control System (ATCS) in CTC Systems: Concepts and Methods	6-4	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lower Level, Magpie A

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Jacobsen	Karina	JRC2019-1259	Locomotive Crash Energy Management Coupling Tests Evaluation and Vehicle-to-Vehicle Test Preparation	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
		JRC2019-1281	Test Plans and Analysis for Oblique Impacts of Diesel Multiple Unit Fuel Tanks	6-2	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie A
Jazizadeh	Farrokh	JRC2019-1272	A Machine Learning Approach for Track Condition Assessment Through Repeated Historical Data Analytics	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
Jeong	David	JRC2019-1264	On Numerical Analyses of Rail Steel Fatigue Crack Growth Data	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
		JRC2019-1265	Defect Growth Characterization in Modern Rail Steels	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Johnson	D. Kody	JRC2019-1271	Quantification of Vertical and Lateral Loads Using Strain Gauges: Eliminating the Wheatstone Bridge	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
Jones	Robert	JRC2019-1286	Prototyping a Conductive Polymer Steering Pad for Rail Freight Service	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B
Jorreto	Federico	JRC2019-1232	An Analysis of the Grounding Strategy for Mixed AC/DC Areas	9-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Maybird
Kapahi	Anil	JRC2019-1228	Development of a Reduced Scale Fire Resistance Test for a Rail Car Floor Assembly	6-2	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie A
Khairallah	Diana	JRC2019-1288	Monitoring of railway structure: High Speed line ?Bretagne ? Pays de la Loire?	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
Kirkpatrick	Steven	JRC2019-1222	Design and Strength Evaluation of Laser-Welded Carbody for Railway Vehicles	8-1	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Cirque
Kiss	James	JRC2019-1300	Clustering Algorithms for Direct Current Track Coded Signals	3-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Maybird
Kizildemir	Sena	JRC2019-1265	Defect Growth Characterization in Modern Rail Steels	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Knopf	Katelyn	JRC2019-1289	A Non-Contacting System for Rail Neutral Temperature Measurements	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
Kola	Gerti	JRC2019-1294	Milwaukee Streetcar Overhead Contact System: A Challenging Design Effort	9-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Maybird
Kothari	Karan	JRC2019-1292	Evaluating the Effect of Natural Third Body Layers on Friction Using the Virginia Tech Roller Rig	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Kuhlenkötter	Bernd	JRC2019-1246	Prescriptive Maintenance Scheduling Using Genetic Algorithm	5-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Cirque
Lanza di Scalea	Francesco	JRC2019-1339	Measuring Neutral Temperature in CWR, the Big Challenge of Railroad Maintenance: Lessons Learnt and Future Possibilities	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
		JRC2019-1338	High-speed Rail Inspection by Passive-Only Ultrasonic Monitoring	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Lattimer	Brian	JRC2019-1228	Development of a Reduced Scale Fire Resistance Test for a Rail Car Floor Assembly	6-2	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie A
Laury	John	JRC2019-1238	Impact of Reduced Share of Rotary Frequency Converters in a Low Frequency Synchronous Railway Grid: A Transient Stability Study	9-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Maybird
		JRC2019-1249	Evaluating a Constant-Current Load Model Through Comparative Transient Stability Case-Studies of a Synchronous-Synchronous Rotary Frequency Converter-Fed Railway	9-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Maybird
Lee	Dahye	JRC2019-1257	Use of Rail in Oil and Gas Regions of Texas to Reduce Truck Impacts	5-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Cirque
		JRC2019-1231	Discovering Crash Severity Factors of Grade Crossing With a Machine Learning Approach	6-1	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie A
		JRC2019-1261	Identifying Railroad Requirements for the Future Automated and Connected Vehicle Environment	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
Leighty	William	JRC2019-1337	LRT for Juneau, Alaska? Elegant Accommodation for 1.5 Million Cruise Ship Visitors per Summer	5-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Cirque
Leonetti	Davide	JRC2019-1274	Boundary Conditions Effects on the Crack Growth Mechanism Under Cycling Bending	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Li	Haodong	JRC2019-1241	Optimization of Shunting Operation Plan in Electric Multiple Units Depot	4-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie A
		JRC2019-1242	The Application of Big Data Analytic in Railway Marshalling Station Management	5-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Cirque
Li	Tianqi	JRC2019-1245	Cyclic Timetable Generation of High-speed Rail Based on Transfer Connections Optimization	4-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie A
Liang	Xiao	JRC2019-1266	Estimation of Rail Vertical Profile Using an H-Infinity Based Optimization With Learning	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Liang	Albert	JRC2019-1338	High-speed Rail Inspection by Passive-Only Ultrasonic Monitoring	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Lima	Jennifer	JRC2019-1284	Estimating the Outer Ring Defect Size and Remaining Service Life of Freight Railcar Bearings Using Vibration Signatures	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
Lin	Chen-Yu	JRC2019-1323	Train Presence Probability Modeling In The Risk Assessment Of Adjacent Track Accidents On Multiple Track Territory	6-1	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie A
Liu	Shushu	JRC2019-1235	Finite Element Analysis of Spike Failure in Elastic Fastening Systems for Wood Ties	1-3	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lobby Level, Primrose
Liu	Xiang	JRC2019-1236	Cyber Security Analysis for Advanced Train Control System (ATCS) in CTC Systems: Concepts and Methods	6-4	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lower Level, Magpie A
		JRC2019-1251	Safety and Security Analysis for Movable Railroad Bridges	6-4	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lower Level, Magpie A

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Llana	Patricia	JRC2019-1259	Locomotive Crash Energy Management Coupling Tests Evaluation and Vehicle-to-Vehicle Test Preparation	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
Loiero	Roberto	JRC2019-1232	An Analysis of the Grounding Strategy for Mixed AC/DC Areas	9-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Maybird
Lopez	Carlos	JRC2019-1293	Theoretical And Experimental Study On The Energy Consumption of Railroad Bearings In Normal and Abnormal Operation Conditions	7-1	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie B
Luo	Qi	JRC2019-1222	Design and Strength Evaluation of Laser-Welded Carbody for Railway Vehicles	8-1	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Cirque
Luo	Xinwei	JRC2019-1260	Influence of Rail Cant on High Rail Side Wear on Sharp Curve of Urban Transit	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
Marquis	Brian	JRC2019-1262	Assessing Derailment Potential of Partially Filled Railroad Tank Cars	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
		JRC2019-1295	Virginia Tech-Federal Railroad Administration Roller Rig Measurement Capabilities and Baseline Measurements	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Martinez	Eloy	JRC2019-1307	Use of Alternative Crash Pulses for Interior Fixture Design Within CEM-Equipped Passenger Rail Cars	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
Mast	Tim	JRC2019-1285	Development of Laser/LED-Based Instrument for Optical Detection of Railroad Top-of-Rail (ToR) Friction Modifiers and Lubricity Conditions	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
McHenry	Michael	JRC2019-1299	Simulation of the Thermal Effects on Engineered Polymer Composite Ties	1-3	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lobby Level, Primrose
Mijatovic	Nenad	JRC2019-1300	Clustering Algorithms for Direct Current Track Coded Signals	3-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Maybird
Minayo	Pablo	JRC2019-1232	An Analysis of the Grounding Strategy for Mixed AC/DC Areas	9-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Maybird
Mirzaeifar	Reza	JRC2019-1279	Studying the Effect of Tangential Forces on Rolling Contact Fatigue in Rails Considering Microstructure	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
Mishra	Debakanta	JRC2019-1250	Effect of Tamping on Railroad Ballast Breakage ? A DEM Study	1-4	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Primrose
		JRC2019-1271	Quantification of Vertical and Lateral Loads Using Strain Gauges: Eliminating the Wheatstone Bridge	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
		JRC2019-1316	A Study on Load Distribution Patterns in Track Substructures: Field Instrumentation and Numerical Modeling	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Mistry	Kuldeep K.	JRC2019-1302	Enhancements in the Performance of Journal Bearing Grease	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B
Momeni	Amir	JRC2019-1233	Effect of Strand Indentation Types on the Development Length and Flexural Capacity of Concrete Railroad Ties Made With Different Prestressing Strands	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
Montalvo	Joseph	JRC2019-1284	Estimating the Outer Ring Defect Size and Remaining Service Life of Freight Railcar Bearings Using Vibration Signatures	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
Morgan	Curtis	JRC2019-1257	Use of Rail in Oil and Gas Regions of Texas to Reduce Truck Impacts	5-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Cirque
		JRC2019-1231	Discovering Crash Severity Factors of Grade Crossing With a Machine Learning Approach	6-1	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie A
		JRC2019-1261	Identifying Railroad Requirements for the Future Automated and Connected Vehicle Environment	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
Mullen	Robert	JRC2019-1252	A Computationally Efficient Novel Algorithm Using Subsystems And Calculating Interface Contact Forces Explicitly To Determine Dynamic Train-Track (Vertical) Interactions	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Mulliken	Jeffrey S.	JRC2019-1252	A Computationally Efficient Novel Algorithm Using Subsystems And Calculating Interface Contact Forces Explicitly To Determine Dynamic Train-Track (Vertical) Interactions	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Nambiar	Harish	JRC2019-1322	Characterizing The Performance Of Tank Car Pressure Relief Devices Under Derailment Fire Conditions	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
Neighborgall	Campbell	JRC2019-1285	Development of Laser/LED-Based Instrument for Optical Detection of Railroad Top-of-Rail (ToR) Friction Modifiers and Lubricity Conditions	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
Neumeister	David	JRC2019-1325	Prototype Rail Crossing Violation Warning (RCVW) ? Advancing the Use of Connected Vehicle Technologies To Prevent Crashes at Rail Grade Crossings by Warning Vehicle Drivers of Predicated Violations	6-2	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lower Level, Magpie A
Nie	Lei	JRC2019-1245	Cyclic Timetable Generation of High-speed Rail Based on Transfer Connections Optimization	4-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie A
Nied	Herman	JRC2019-1265	Defect Growth Characterization in Modern Rail Steels	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Ontiveros	Miguel	JRC2019-1286	Prototyping a Conductive Polymer Steering Pad for Rail Freight Service	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B
Otremba	Frank	JRC2019-1219	Experimental Modeling of Railway Car Wheel-Forces During Turning	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
Palese	Joseph	JRC2019-1305	Stochastic Analysis of Transit Wheel Wear and Optimized Forecasting of Wheel Maintenance Requirements	2-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lower Level, Magpie B
Parker	Edward (Ned)	JRC2019-1311	Out-of-Round Wheel Modeling and Comparison to Field-Measured Truck Dynamic Performance Data	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
Perlman	Benjamin	JRC2019-1268	Developing Finite Element Models to Examine Rail Defects Under Combined Loading	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose

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		JRC2019-1278	Experimental investigation of splitting cracks of pre-stressed concrete railroad ties containing polymer fiber	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1280	Evaluation of Splitting Crack Propagation in Pre-Stressed Concrete Ties Made With Different Types of Coarse Aggregate	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1233	Effect of Strand Indentation Types on the Development Length and Flexural Capacity of Concrete Railroad Ties Made With Different Prestressing Strands	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1234	The Effect of Wire Type on Cracking Propensity in Prestressed Concrete Prisms	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1269	A High Resolution Automated Prestressing Wire Indent Profiling System for Verification of Wire-Concrete Mix Compatibility	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
Peterson	Andrew	JRC2019-1327	Monitoring and Detecting Fouled Ballast Using Forward-Looking Infrared Radiometer (FLIR) Aerial Technology: Possibilities and Limitations	1-4	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Primrose
		JRC2019-1285	Development of Laser/LED-Based Instrument for Optical Detection of Railroad Top-of-Rail (ToR) Friction Modifiers and Lubricity Conditions	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
Pfaff	Raphael	JRC2019-1246	Prescriptive Maintenance Scheduling Using Genetic Algorithm	5-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Cirque
Pinders	Udo	JRC2019-1246	Prescriptive Maintenance Scheduling Using Genetic Algorithm	5-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Cirque
Placencia	Greg	JRC2019-1221	Balancing Ontime Performance and Safety Using STAMP	6-3	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie A
Pouryousef	Hamed	JRC2019-1309	Network Simulation Approach for Assessing Advanced Train Control Technologies	5-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Cirque
Prabhakaran	Anand	JRC2019-1322	Characterizing the Performance Of Tank Car Pressure Relief Devices Under Derailment Fire Conditions	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
		JRC2019-1309	Network Simulation Approach for Assessing Advanced Train Control Technologies	5-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Cirque
Pucillo	Giovanni Pio	JRC2019-1276	Train-Induced Load Effects on the Thermal Track Buckling	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
		JRC2019-1274	Boundary Conditions Effects on the Crack Growth Mechanism Under Cycling Bending	1-6	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Primrose
Qian	Yu	JRC2019-1244	Laboratory Study on Frost Heave of Ballast	1-4	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Primrose
		JRC2019-1289	A Non-Contacting System for Rail Neutral Temperature Measurements	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
		JRC2019-1260	Influence of Rail Cant on High Rail Side Wear on Sharp Curve of Urban Transit	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
		JRC2019-1252	A Computationally Efficient Novel Algorithm Using Subsystems And Calculating Interface Contact Forces Explicitly To Determine Dynamic Train-Track (Vertical) Interactions	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Qin	Song	JRC2019-1300	Clustering Algorithms for Direct Current Track Coded Signals	3-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Maybird
Rabbi	Md. Fazle	JRC2019-1271	Quantification of Vertical and Lateral Loads Using Strain Gauges: Eliminating the Wheatstone Bridge	1-5	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Primrose
		JRC2019-1316	A Study on Load Distribution Patterns in Track Substructures: Field Instrumentation and Numerical Modeling	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
Radmehr	Ahmad	JRC2019-1292	Evaluating the Effect of Natural Third Body Layers on Friction Using the Virginia Tech Roller Rig	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
		JRC2019-1295	Virginia Tech-Federal Railroad Administration Roller Rig Measurement Capabilities and Baseline Measurements	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B
Ren	Qiao	JRC2019-1239	Study on Running Safety of Railway Tank Car Based on the Experimental Identification Model	3-3	Thursday, April 11, 2019	07:30 AM – 09:30 AM	Lobby Level, Maybird
Riding	Kyle	JRC2019-1275	Evaluation of the Remaining Prestress Force and Center Negative Bending Moment in Crossties Removed From Track After 25 Years of Service	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1278	Experimental investigation of splitting cracks of pre-stressed concrete railroad ties containing polymer fiber	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1280	Evaluation of Splitting Crack Propagation in Pre-Stressed Concrete Ties Made With Different Types of Coarse Aggregate	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1234	The Effect of Wire Type on Cracking Propensity in Prestressed Concrete Prisms	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1269	A High Resolution Automated Prestressing Wire Indent Profiling System for Verification of Wire-Concrete Mix Compatibility	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1341	Track Performance with Age In Tunnels and Transition Areas	1-8	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lobby Level, Maybird
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Rizos	Dimitris C.	JRC2019-1244	Laboratory Study on Frost Heave of Ballast	1-4	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lobby Level, Primrose
		JRC2019-1289	A Non-Contacting System for Rail Neutral Temperature Measurements	1-7	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lobby Level, Maybird
		JRC2019-1252	A Computationally Efficient Novel Algorithm Using Subsystems And Calculating Interface Contact Forces Explicitly To Determine Dynamic Train-Track (Vertical) Interactions	10-2	Thursday, April 11, 2019	03:30 PM – 05:30 PM	Lower Level, Magpie B

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Robertson	Aaron	JRC2019-1275	Evaluation of the Remaining Prestress Force and Center Negative Bending Moment in Crossties Removed From Track After 25 Years of Service	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1234	The Effect of Wire Type on Cracking Propensity in Prestressed Concrete Prisms	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1269	A High Resolution Automated Prestressing Wire Indent Profiling System for Verification of Wire-Concrete Mix Compatibility	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
Robitaille	Andrew	JRC2019-1322	Characterizing the Performance Of Tank Car Pressure Relief Devices Under Derailment Fire Conditions	2-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lower Level, Magpie B
Romero Navarrete	Jose Antonio	JRC2019-1219	Experimental Modeling of Railway Car Wheel-Forces During Turning	10-1	Thursday, April 11, 2019	09:45 AM – 11:45 AM	Lower Level, Magpie B
Rutter	Allan	JRC2019-1257	Use of Rail in Oil and Gas Regions of Texas to Reduce Truck Impacts	5-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Cirque
Saha	Suman	JRC2019-1344	Assessment of Railway Cyber Security Vulnerabilities and Potential Steps Forward	6-4	Thursday, April 11, 2019	01:15 PM – 03:15 PM	Lower Level, Magpie A
Savic	Adrijana	JRC2019-1278	Experimental investigation of splitting cracks of pre-stressed concrete railroad ties containing polymer fiber	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1280	Evaluation of Splitting Crack Propagation in Pre-Stressed Concrete Ties Made With Different Types of Coarse Aggregate	1-1	Wednesday, April 10, 2019	01:30 PM – 03:30 PM	Lobby Level, Primrose
		JRC2019-1234	The Effect of Wire Type on Cracking Propensity in Prestressed Concrete Prisms	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
		JRC2019-1269	A High Resolution Automated Prestressing Wire Indent Profiling System for Verification of Wire-Concrete Mix Compatibility	1-2	Wednesday, April 10, 2019	03:45 PM – 05:45 PM	Lobby Level, Primrose
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Track Organizers

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Track Organizer: Conrad Ruppert, *University of Illinois at Urbana–Champaign*

Track Co-Organizer: Debakanta Mishra, *Boise State University*

TRACK 2 - RAIL EQUIPMENT ENGINEERING

Track Organizer: Jeffrey Gordon, *US DOT Federal Railroad Administration*

Track Co-Organizer: Bryan Schlake, *Penn State Altoona*

TRACK 3 - SIGNAL AND TRAIN CONTROL ENGINEERING

Track Organizer: David Thurston, *Canadian Pacific Railway*

TRACK 4 - SERVICE QUALITY AND OPERATIONS RESEARCH

Track Organizer: Clark Cheng, *Norfolk Southern Railway*

Track Co-Organizer: Rapik Saat, *The Association of American Railroads*

TRACK 5 - PLANNING AND DEVELOPMENT

Track Organizer: Jeffrey Gordon, *US DOT Federal Railroad Administration*

TRACK 6 - SAFETY AND SECURITY

Track Organizer: Dave Schlesinger, *Parsons*

Track Co-Organizer: Larry Day, *US DOT, Federal Railroad Administration*

TRACK 7 - ENERGY EFFICIENCY AND SUSTAINABILITY

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TRACK 8 - URBAN PASSENGER RAIL TRANSPORT

Track Organizer - Brian Donohue, *SNCL-Atkins Rail & Transit Engineering*

Track Co-Organizer: V. Dimitra Pyrialakou, *West Virginia University*

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Track Organizer: John Grantham, *Atkins North America*

Track Co-Organizer: Bih-Yuan Ku, *National Taipei University of Technology*

TRACK 10 - VEHICLE-TRACK INTERACTION

Track Organizer: Anand Prabhakaran, *Sharma and Associates, Inc.*

Track Co-Organizer- Jeffrey Gordon, *US DOT Federal Railroad Administration*

TRACK 11 - RAILROAD HISTORY

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Railroad Infrastructure Engineering	1-4	Ballast Characterization and Testing	D. Kody	Johnson	Academia	Boise State University
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Railroad Infrastructure Engineering	1-6	Rail Inspection and Crack Growth Research	Benjamin	Perlman	Government	US DOT/Volpe Center
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Railroad Infrastructure Engineering	1-8	Track Transitions and Track Substructure	Debakanta	Mishra	Academia	Boise State University
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Signal and Train Control Engineering	3-2	Communications applications for Train Control	David	Thurston	Industry	Canadian Pacific Railway
Signal and Train Control Engineering	3-3	Studies in Rail Systems	John	Hofbauer	Industry	Parsons
Service Quality and Operations Research	4-1	Railroad Maintenance Scheduling and Optimization	Plinio	Vilela	Academia	Unicamp

Session Organizers

TRACK	SESSION #	SESSION NAME	FIRST NAME	LAST NAME	AFFILIATION	COMPANY
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Planning and Development	5-2	Planning and Development II	Brian	Donohue	Industry	SNCL-Atkins Rail & Transit Engineering
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Safety and Security	6-2	Rail Safety	David	Neumeister	Industry	Battelle
Safety and Security	6-3	Rail Operational Safety	Greg	Placencia	Academia	California State Polytechnic University
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EXHIBITORS:

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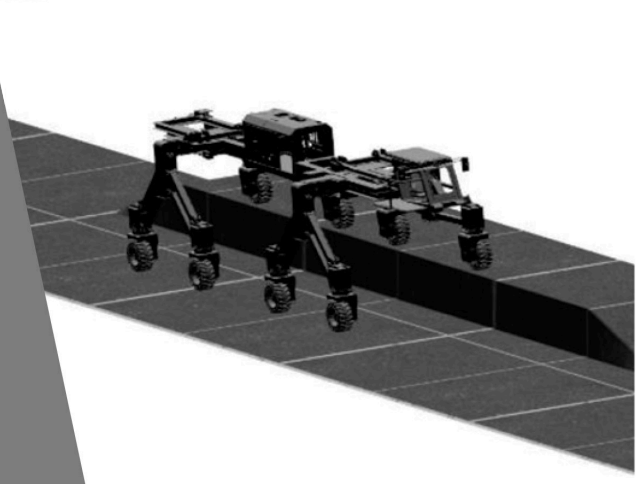

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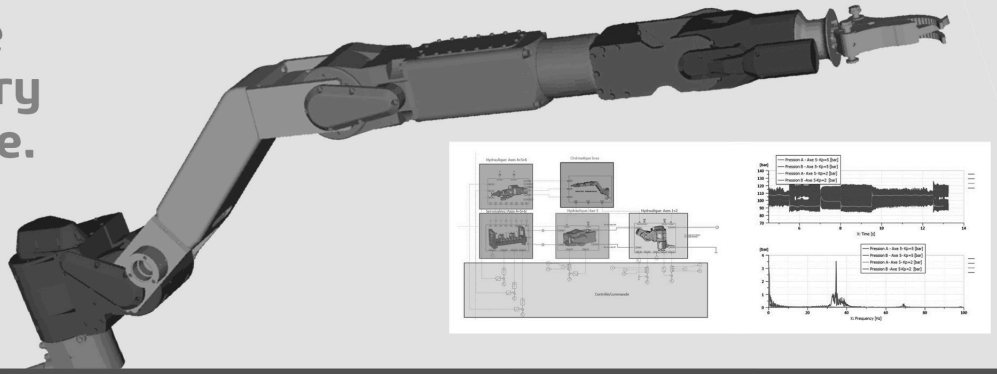

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I am excited and honored to inform you that the year 2020 marks the centennial anniversary of the American Society of Mechanical Engineers (ASME) Rail Transportation Division (RTD), and the Joint Rail Conference (JRC), the advocate for the application of the art, science and practice of mechanical and multidisciplinary engineering and allied sciences to railroading.

The first ASME-IEEE Joint Rail Conference was held in St. Louis in 1920. The Conference is returning to St. Louis on April 15-17, 2020 and it is being held at the historic St Louis Union Station Hotel Curio Collection by Hilton. The St. Louis Union Station will provide a historical glimpse of the past in railroading with a touch of elegance. Please join us to celebrate.

The RTD is one of the original eight Divisions founded in 1920 as the Railroad Division promoting application of the art, science and practice of mechanical and multidisciplinary engineering and allied sciences to railroading. It later became the Rail Transportation Division to reflect its broad focus on rail rapid transit as well as conventional intercity freight and passenger railroading around the globe.

Over ten decades, the Rail Transportation Division and its members have been at the forefront of technological developments that have shaped railroading--the development of super power steam locomotives and their eclipse by the diesel--electrics; experiments with turbine and other new locomotive types; the first streamlined passenger trains of the 30's; the MetroLiners and TurboTrains of the 60's; high speed trains; and more recent Positive Train control (PTC); the development of larger, heavier freight cars, unit bulk commodity trains, intermodal trains, and the solutions to technological problems they have brought.

As the world becomes more conscious of the value of railroads in the dawning era of energy scarcity and high cost, interest in the Rail Transportation Division is growing. The Division encourages technical research and development to improve safety and productivity of railroad operations and rolling equipment designs, publishing technical papers dealing with this work, and provides a forum where railroad mechanical engineers can exchange ideas and discuss common problems and their solutions.

To find out more about this event, feel free to contact me.

Giuseppe Sammartino, PE
Secretary
2019 JRC Organizing and Planning Committee
Principal Engineer and Lab Manager
CTLGroup

JRC 2020 is the major, multidisciplinary North American railroad conference encompassing all aspects of rail transportation and engineering research.

Go to: https://www.asme.org/events/joint-rail-conference

Abstracts should be in English and should be limited to a maximum of 400 words. Paper submittal is encouraged but not required. Interested authors will be notified of abstract acceptance. Conference papers will be peer-reviewed. ***Publication of papers in conference proceedings requires attendance and presentation at the conference.***

The ASME Rail Transportation Division is offering a limited number of conference scholarships for both undergraduates and graduate students. For specific details and questions regarding the scholarship program, please contact Mr. Jeffrey Gordon, ASME RTD Scholarship Committee Chair, at ASME.RTD.Scholar@gmail.com.

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Energy Efficiency and Sustainability
Energy conservation and efficiency, energy storage modeling, hybrid vehicles, emissions reduction and control and alternative energy sources

Service Quality and Operations Research
Service availability and reliability, capacity models, impacts of aging equipment on service quality, transport mode integration especially with high-speed rail, passenger information systems and passenger reservation systems, freight railroad network optimization, asset planning, and train scheduling

Electrification
Catenary design, third rail design, materials, safety, efficiency, electrification approaches, design for high speeds, electromagnetic compatibility (EMC), corrosion control, load flow simulation, energy savings, energy storage devices, regenerative braking, smart electrical supply

Safety and Security
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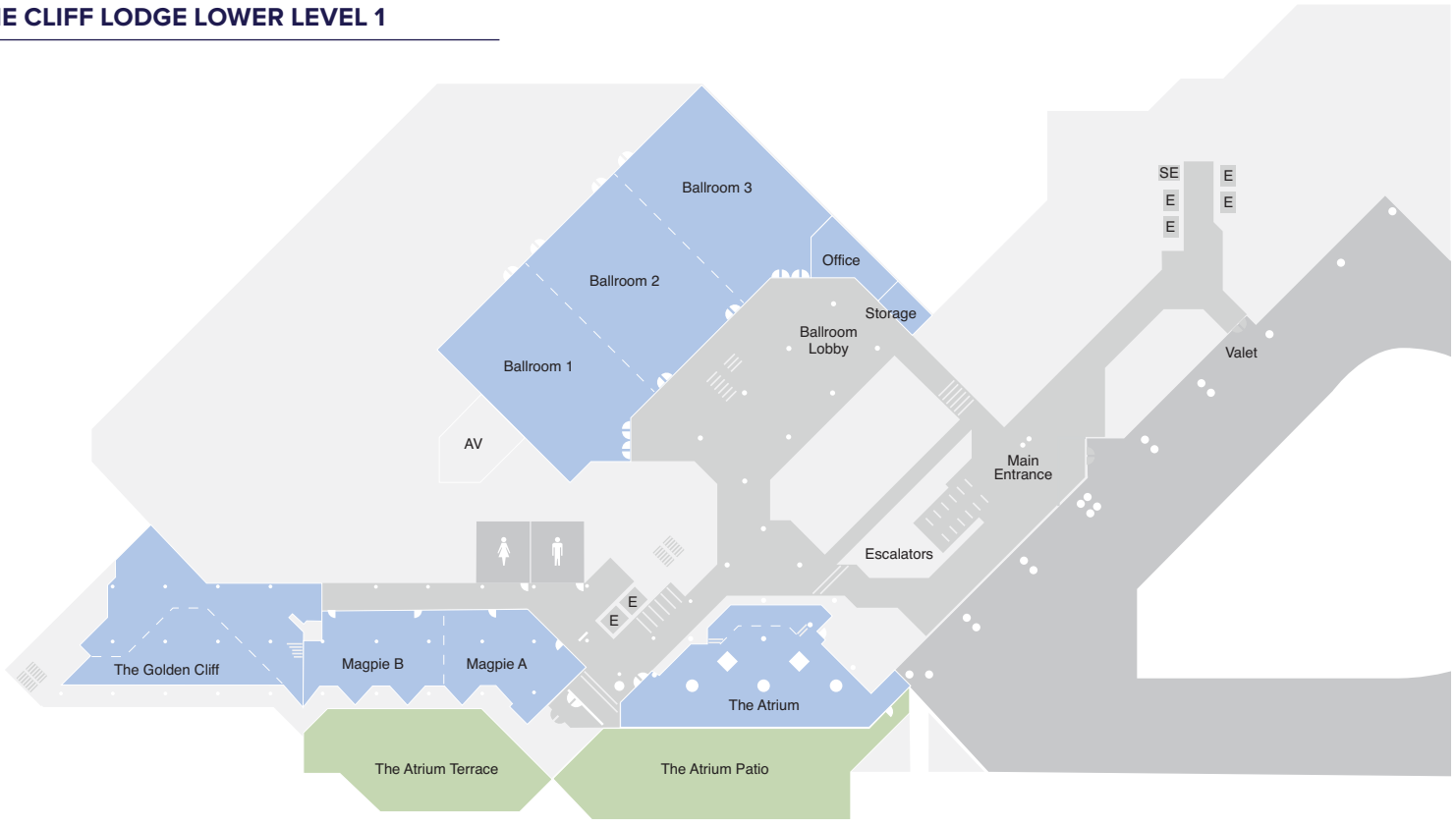
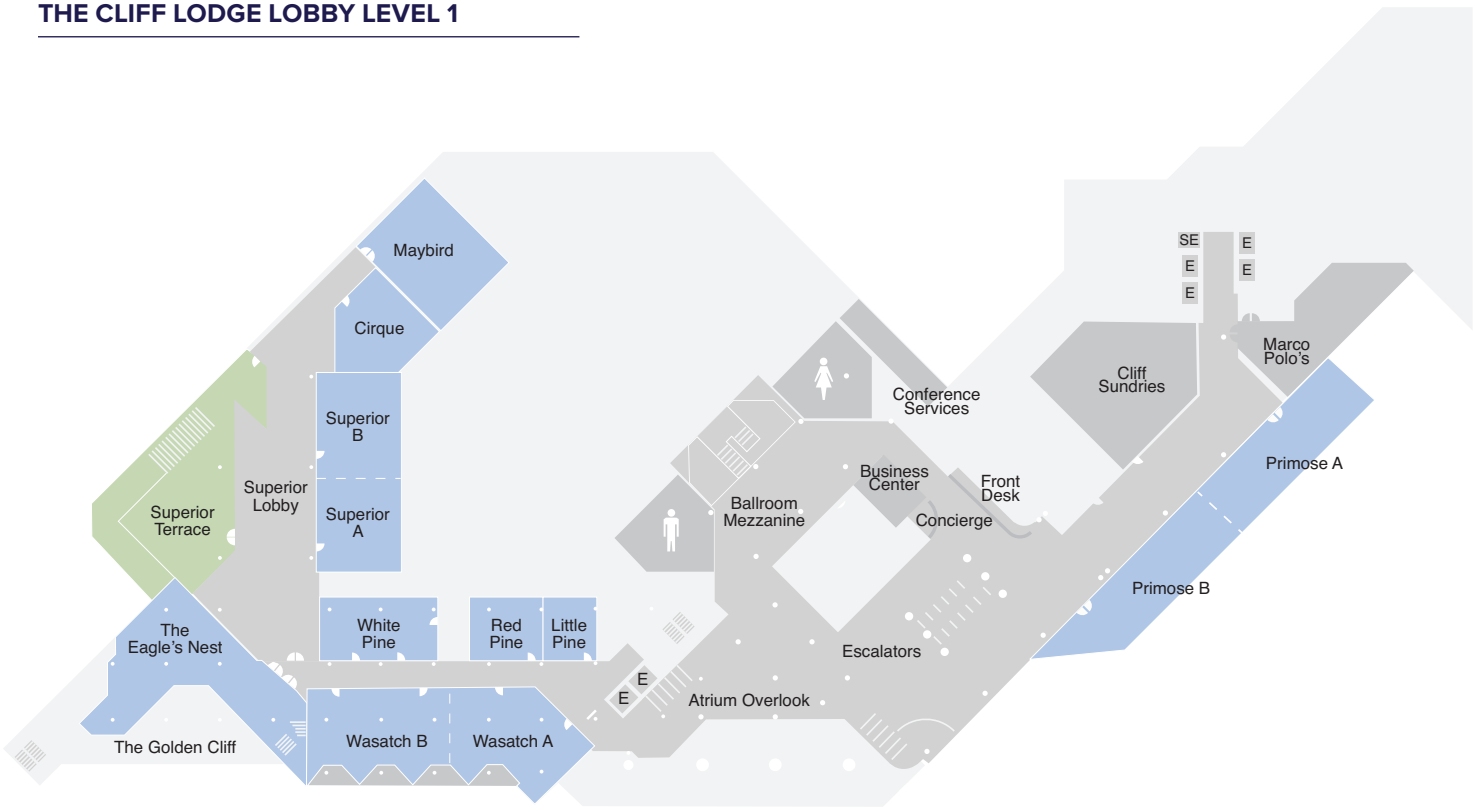
THE CLIFF LODGE LOWER LEVEL 1



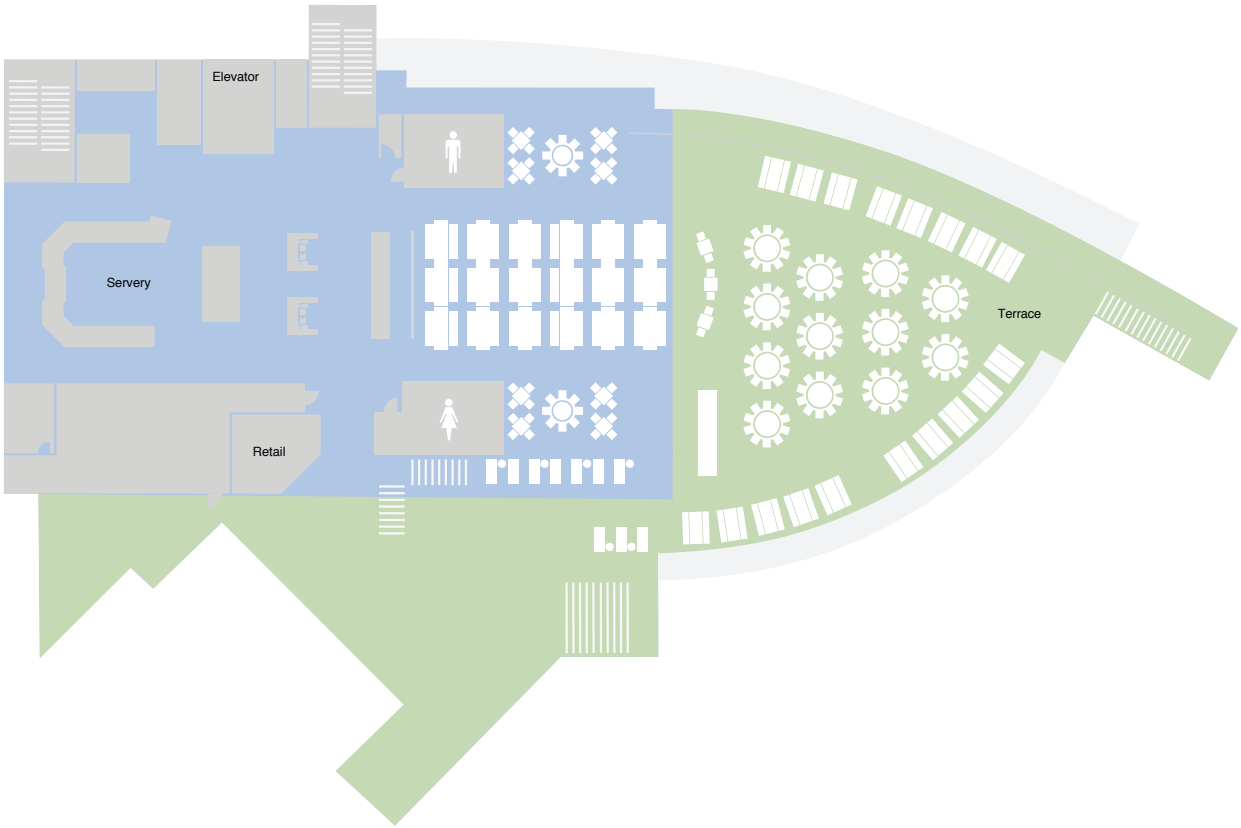
THE CLIFF LODGE LOBBY LEVEL 1



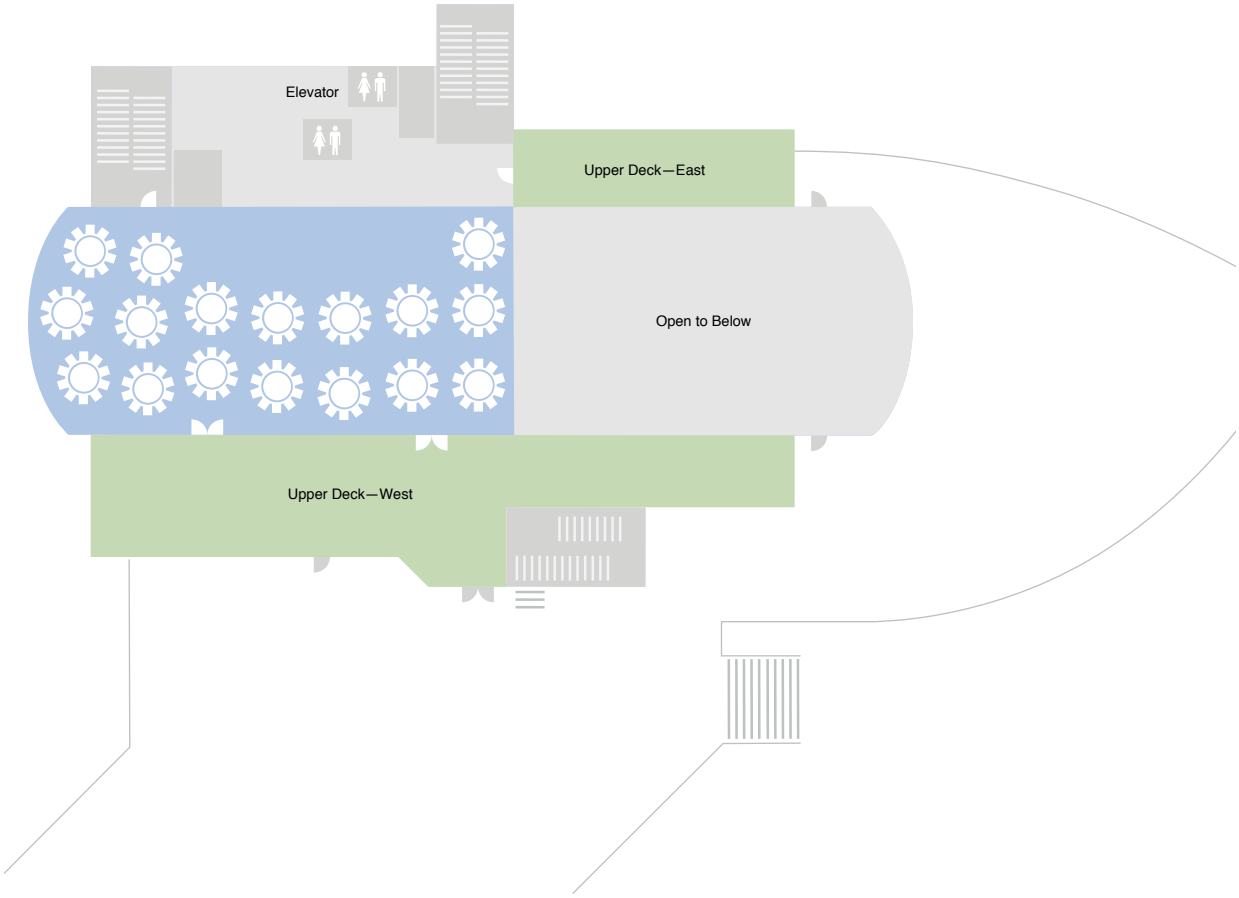
Floor Plans

THE CLIFF LODGE LOWER LEVEL 1 & 1 O

THE SUMMIT MAIN LEVEL



THE SUMMIT UPPER LEVEL



Notes

Notes

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Joint Rail Conference

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