



2024 International Crosstie & Fastening System Symposium

Preliminary Program
4-5 June 2024



Hosted by:



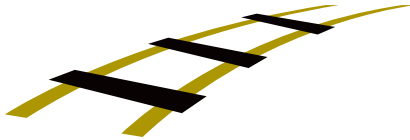
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2024 Symposium Welcome

Dear 2024 Symposium Attendee,

Welcome to Champaign-Urbana, Illinois and the Department of Civil and Environmental Engineering (CEE) at the University of Illinois Urbana-Champaign. CEE at Illinois is home to the Rail Transportation and Engineering Center (RailTEC), and we look forward to you meeting the students, staff, and faculty that work within RailTEC and CEE.

We are pleased that you have chosen to attend the 2024 International Crosstie and Fastening System Symposium and hope you will actively participate in discussions and engage your fellow attendees throughout the event. Our objective is to facilitate the transfer of technology and knowledge as well as to further domestic and international communication and collaboration on the design and performance challenges and solutions for crossties and fastening systems. We are hopeful that you will enjoy the technical presentations, research discussions, Rail Transit and Class I keynote addresses, and your time in and around Champaign-Urbana.

We would like to thank the Federal Railroad Administration (FRA), Federal Transit Administration (FTA), Engineer Research and Development Center ERDC), Applied Research Associates (ARA), and BNSF Railway for their ongoing sponsorship of rail infrastructure research at RailTEC at Illinois. Without these organizations and the many other individuals and organizations that frequently provide input and guidance for our research, we would not be able to conduct research and host an event such as this.

If there is anything that our team can do to make your stay in Champaign-Urbana more enjoyable, please do not hesitate to contact one of the faculty, staff, or students within RailTEC. Have a wonderful week!

Sincerely,

Marcus S. Dersch

J. Riley Edwards

Arthur de O. Lima

RailTEC Infrastructure Research Sponsors



U.S. Department
of Transportation

**Federal Railroad
Administration**



U.S. Department
of Transportation

**Federal Transit
Administration**



2024 Symposium Overview

Monday 3 June

Informal Welcome Reception (Location TBA)

Tuesday 4 June

Registration (Yeh Center Atrium, 1st Floor)	7:00am - 5:00pm
Light Breakfast	7:00am - 8:00am
Opening Remarks	8:00am - 8:20am
Session 1 - Concrete I	8:20am - 9:40am
Break	9:40am - 10:05am
Session 2 - Timber	10:05am - 11:45am
Lunch (ECE Building, Room 3002)	11:45am - 1:30pm

Rail Transit Keynote Address: Carrie Wagener - Chicago Transit Authority

Session 3 - Fasteners	1:40pm - 3:20pm
Break	3:20pm - 3:55pm
Session 4 - Track Inspection & Component Monitoring I	3:55pm - 5:15pm
Dinner (Memorial Stadium)	6:00pm - 8:00pm

Wednesday 5 June

Registration (Yeh Center Atrium, 1st Floor)	7:00am - 5:00pm
Light Breakfast	7:00am - 8:00am
Session 5 - Concrete II	8:00am - 9:40am
Break	9:40am - 10:10am
Session 6 - Crosstie Performance	10:10am - 11:50am
Lunch (ECE Building, Room 3002)	11:50am - 1:30pm

Class I Railroad Keynote Address: Brent Laing - CN Railway

Session 7 - Crosstie Support Investigations	1:40pm - 3:20pm
Break	3:20pm - 3:50pm
Session 8 - Track Inspection & Component Monitoring II	3:50pm - 5:10pm
Dinner (Engineering Hall Patio)	5:15pm - 6:30pm

Thursday 6 June

AREMA Committee 30	8:00am - 4:00pm
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Symposium Locations

Newmark Civil Engineering Laboratory

Yeh Center - All Technical Sessions will be held in 1310 Yeh Center.

Electrical and Computer Engineering (ECE) Building | Lunches

306 N. Wright St., Urbana, IL 61801

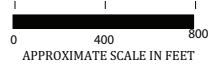
Memorial Stadium | Tuesday Dinner

1401 S. 1st St., Champaign, IL 61820

Engineering Hall Patio | Wednesday Dinner

1308 W. Green St., Urbana, IL 61801 (North side of building)

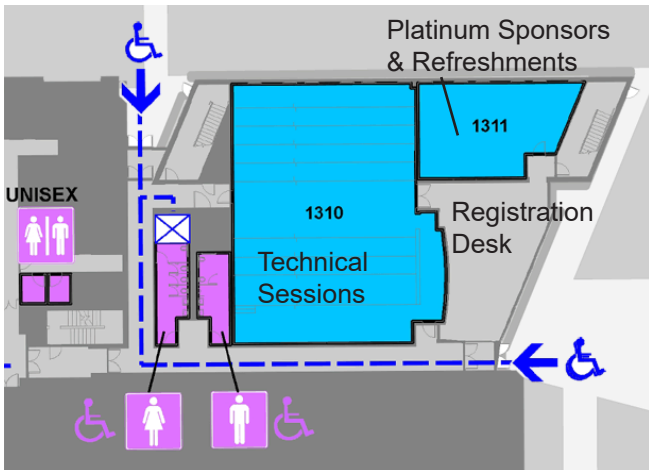
Symposium Map



- A** Newmark Lab & Yeh Center
- B** ECE Building
- C** Engineering Hall
- D** Permit Parking



**Yeh Student Center
(Newmark Civil Engineering Lab)**



Tuesday Spoken Presentations

8:00 Welcome & Safety Briefing

Riley Edwards - University of Illinois Urbana-Champaign

8:20 Session 1 - Concrete I

Transfer and Development Length of Different-size Indented Prestressing Wires Used in Pretensioned Concrete Railroad Ties

Bob Peterman - Kansas State University

Analyzing Aggregate Morphology in Cement-based Materials Using 3D Structured Light Scanning

Moochul Shin - Western New England University

Tie Inspection, Performance, and Life Estimation

Adam Bankston - BNSF Railway

Yin Gao - MxV Rail

Study of Concrete Crossties Design Optimization

Patrick Macedo - Vale

9:40 Break

10:05 Session 2 - Timber

Market Talk

Nate Irby - Railway Tie Association

Tree to Track

Brad Crawford - Stella-Jones Corporation

Next Generation Wood Preservative for Ties and Timbers

Bob Baeppler - Viance

Extending Tie Life with a Weatherproof Asphalt Coating

Marvin Exline - Asphalt Materials, Inc

Timber Tie Disposal

Curtis Schoop - National Salvage & Service Corporation

11:45 Lunch - ECE Building - Room 3002

Rail Transit Keynote: CTA's Red and Purple Modernization Phase One Project: Overcoming Challenging Constraints

Carrie Wagener - Chicago Transit Authority (CTA)

1:40 Session 3 - Fasteners

Analytic Study of Variation Coefficient Applied to Calculating Design Forces for Rail Fastening Systems

Tadashi Deshimaru - Railway Technical Research Institute

Class I Perspective - BNSF's Fastening System Design and Performance Experience and Future Trends

Zach Dombrow - BNSF Railway

Spike Failure Mitigation: Design & Laboratory Evaluation of Spring Washer for Tieplate Hold-down

Rahat Khan - University of Illinois Urbana-Champaign

Lowering Fastener Stresses: Buffer Cars, Rail Stress Management, and Ugly Solutions

Marcus Dersch - University of Illinois Urbana-Champaign

Track Superstructure Design Considerations to Increase Buckling Resistance

Brandon Van Dyk - Vossloh

3:20 Break

3:55 Session 4 - Track Inspection & Component Monitoring I

Overview of CSX Track Inspection Program

Brad Spencer - CSX Transportation

Use of 3D Laser Triangulation and AI for Automated Switch and Crossing Inspection

Richard Fox-Ivey - Railmetrics

Track Component Health vs Geometry Degradation: An Investigation Leveraging Machine Vision Inspection Data

Augusto Ramos - University of Illinois Urbana-Champaign

Crosstie Modeling for Capital Planning Optimization

Bryan Palsat - Tetra Tech

5:15 Adjourn Technical Sessions

6:00 Dinner at Memorial Stadium - see map on page 11

Wednesday Spoken Presentations

8:00 Session 5 - Concrete II

Non-Destructive Testing to Assess the Degradation of Prestressed Concrete Sleepers

Laisy Meurer Perin - Federal University of Uberlandia

Selection and Verification of Indented Prestressing Wire and Concrete Properties for Use in Pretensioned Concrete Railroad Ties

Bob Peterman - Kansas State University

Diagnostic Assessment of Concrete Crossties Damage on Brazil's Railways by Microstructural Analysis

Eliane Betânia Carvalho Costa - Federal University of Uberlandia

Management of the Supply of Concrete Sleepers for a Track Renewal Project

Paulo Gonzaga Ferreira - MRS Logística

Effect of Track Infrastructure on Rail Gaps: A Numerical Study

Kamyar Kosarimeshan - University of Illinois Urbana-Champaign

9:40 Break

10:10 Session 6 - Crosstie Performance

Union Pacific Tie Strategy Update

Mike Gilliam - Union Pacific Railroad

DoD Crosstie Maintenance and Research Updates

Jeremy Beasley - U.S. Army Engineering Research & Development Center

Laboratory Comparison Tests of Tie Plugging Materials

Yin Gao - MxV Rail

Mechanics of Composite Crossties

Vit Lojda - Lankhorst Engineered Products

Exploring the Fatigue Performance of Recycled Plastics Railroad Ties Using Penn State Ballast Box Facility

Jubair Ahmad Musazay - Pennsylvania State University

11:50 Lunch - ECE Building - Room 3002

Class I Railroad Keynote: Railroad Basics – Back to the Future

Brent Laing - CN Railway

1:40 Session 7 - Crosstie Support Investigations

Rail Mounted Optical Fiber Sensors for Tie Support and Track Substructure Condition Assessments

Mahsa Gharizadehvarnosefaderani & Md. Fazle Rabbi - Oklahoma State University

Turnout Performance Improvement through Geometry and Stiffness Optimization

Jaek Lee - University of Illinois Urbana-Champaign

Under Tie Pad Performance in U.S. High-Speed Rail

Todd Finley, Tamara Nazhmutdinova & Keith Keene - Amtrak

Transition Direction Effects on Dynamic Load Factor in Diverse Subgrade Track Conditions

Danial Behnia & Michael Hendry - University of Alberta

Pads and Mats: Opportunities to Tune Track Stiffness for Optimum Performance

Shushu Liu & Ted Sussmann - VOLPE

3:20 Break

3:50 Session 8 - Track Inspection & Component Monitoring II

Toward Large-Scale Simulation of Railroad Dynamics: 30-Tie Coupled Train-Track-DEM Model

Zhongyi Liu - University of Illinois Urbana-Champaign

Rail Track Monitoring with Distributed Acoustic Sensing (DAS) Systems

Mahsa Gharizadehvarnosefaderani & Md. Fazle Rabbi - Oklahoma State University

Rakan Alturk & Radim Bruzek - ENSCO

Remote Sensing for Railway Geo-Hazards

Tim Stark - University of Illinois Urbana-Champaign

Handheld Railroad Spike Inspector for Track Safety

Banibrata Poddar - Blue Halo

5:10 Adjourn Technical Sessions

5:15 Dinner at Engineering Hall Patio - see map on page 5

Rail Transit Keynote



Carrie Wagener

Chicago Transit Authority (CTA)
First Deputy Chief Engineer

Carrie Wagener, PE, is First Deputy Chief Engineer at the nation's second largest public transit agency, the Chicago Transit Authority (CTA), where she oversees civil/track, structures, signal, and traction power design and construction within the Infrastructure Engineering department. She additionally directs the owner's multi-disciplinary engineering team for the \$2.1B Red and Purple

Modernization (RPM) Phase One project, CTA's largest-ever capital improvement project to renew heavy rail infrastructure along its busiest rail lines.

A 16-year CTA veteran, Carrie has worked in various departments including track maintenance, power & way maintenance, safety, and quality assurance. Carrie is an alumnus of the University of Illinois Urbana-Champaign where she earned both bachelor's and master's degrees in Civil Engineering.

Class I Railroad Keynote



Brent Laing

CN Railway
Vice President, Engineering

Brent is a professional engineer with extensive Class 1 heavy haul freight railway technical and management experience.

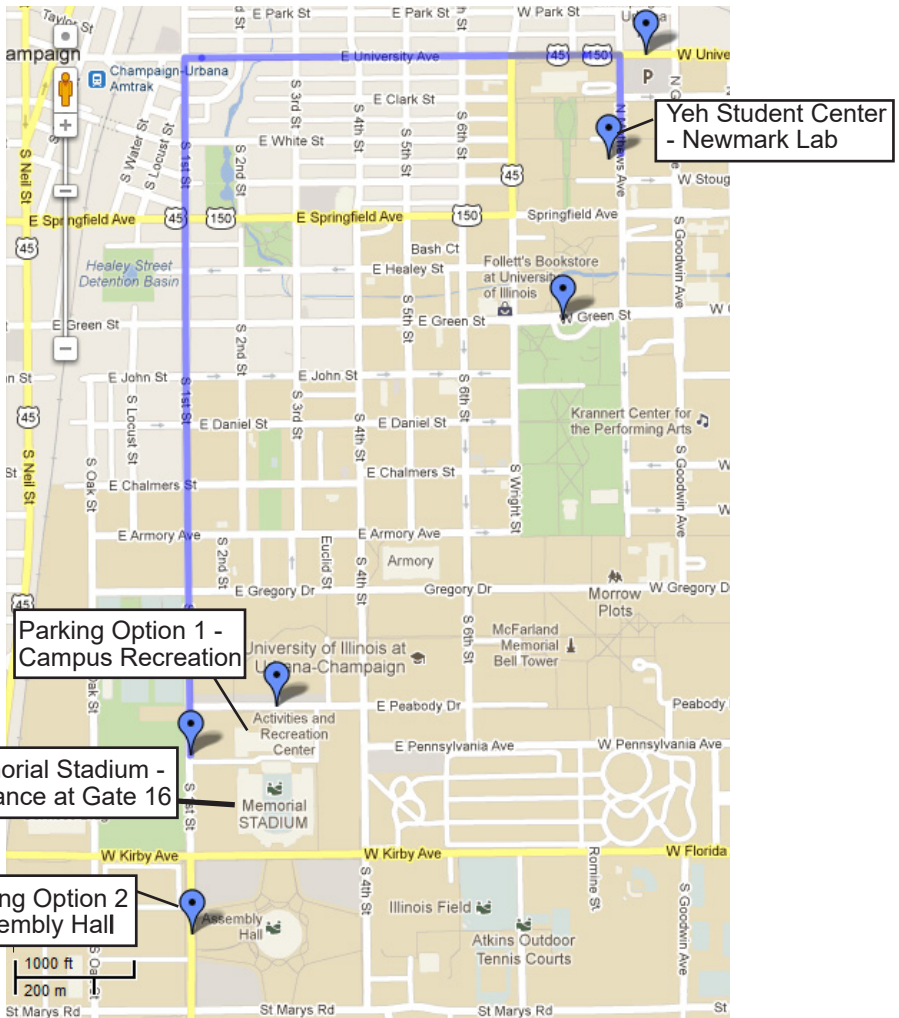
Brent is the Vice President Engineering at CN, being appointed to that position in June 2022. He has the overall accountability of all engineering functions at CN including track maintenance, production, work equipment, signals & communications, bridges and structures, infrastructure design, and construction.

Prior to coming to CN, Brent was President of a small engineering consulting firm, focused on working with select clients in the mining, light and heavy rail areas on railway-related projects.

A career railroader, Brent also held various positions at Canadian Pacific Railway. As well as Vice President Engineering, he also led corporate environmental teams as Director Environmental Affairs, and locomotive and freight car repair teams as General Manager Mechanical Operations.

He has been a longtime member of American Railway Engineering and Maintenance of Way Association and has been recently nominated to the AREMA Board of Governors. Brent has been professional engineer for over 39 years.

Memorial Stadium Dinner Map



Yeh Student Center - Newmark Civil Engineering Laboratory, 205 N. Mathews Ave, Urbana, IL 61801

Memorial Stadium - (Dinner in the 77 Club on 6th Floor - Enter Stadium at Gate 16 on the West side) - 1402 South 1st Street, Champaign, IL 61820

Transportation will be provided from the Yeh Student Center. If you wish to drive, there are 2 parking options:

**Parking Option 1 - Campus Recreation (metered spots, requires payment)
201 East Peabody Drive, Champaign, IL 61820**

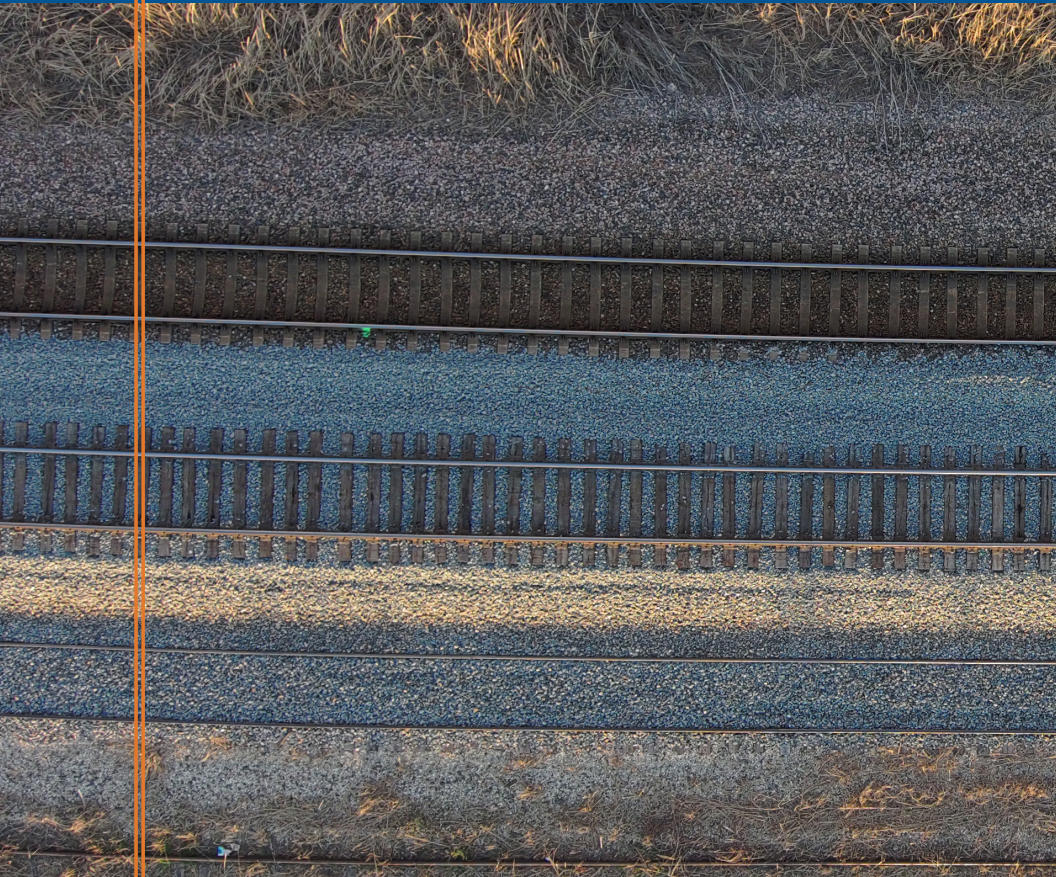
**Parking Option 2 - Assembly Hall
1800 South 1st Street, Champaign, IL 61820**

Wireless Internet Connection:

Choose the "IllinoisNet_Guest" wireless network.
Open an internet browser and the UI Wireless page should load.
Select the "Register a temporary guest account" link below the Log In.
Fill out the form, accept the terms of use, and click Register.
The University is legally required to collect your information before providing you with network access.
Click the Log In button at the bottom of your confirmation page

For help with the Illinois wireless network, please contact the Help Desk at 217-244-7000.

Note: WiFi Registration forms are valid for a 24-hour period. A new registration form will need to be completed to gain access after 24 hours.



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