Day 1: Thursday December 14, 2017

8:30 **Welcome and Introduction to the Needs of the Railroad Industry**
Allan M. Zarembski, Professor, Director, Railroad Research and Safety Program, University of Delaware
Charles Riordan, Professor, Vice Provost for Research, University of Delaware
David Staplin, Deputy Chief Engineer Amtrak (retired) and Chairman of the Railroad Advisory Board at University of Delaware
Keynote Speaker: Charles "Wick" Moorman IV, President, National Railroad Passenger Corporation (Amtrak)

9:45 **Session I: Railroad Needs from Big Data: A CIO's Perspective**
Session Chair:
Lyndon C. Tennison Chief Information Officer and Senior Vice President, Union Pacific
Ghada Ijam, Chief Information Officer, Amtrak
Bill Zebrowski, Chief Information Officer, SEPTA

10:45 to 11:00 - Break

11:00 **Session II: Railroad and FRA Big Data Applications**
Session Chair: **Allan M Zarembski, University of Delaware**
Kevin Day, Assistant Chief Engineer, Technology, Testing and Standards, CN Rail
Thomas Lamb, Chief Innovation and Technology, Office of Strategic Innovation and Technology
New York City Transit Authority
William Lahnen, Assistant Chief Engineer CSX Transportation (tentative)
John Cech, Assistant Vice President - Engineering Services, BNSF (tentative)
Milad Hosseinipour, Amtrak, "New Approaches to Track Geometry Analysis"
Jay Baillargeon, Program Manager, FRA, "Safe Rail Transportation, Powered by Big Data."

12:45 to 1:40 - Lunch

1:40 **Session III: Big Data: Applications and Case Studies: Railway Asset Management**
Session Chair: **Jackie van der Westhuizen**, ENSCO
Daniel Glennon, Roy Hill, Iron Ore Railway, Australia and Rafael Maldonado, ENSCO, "A Practical Approach to Railroad Asset Management Plans Using Big Data: A Roy Hill Case Study
Florian Auer, Director of Technology, and **Krzysztof Wilczek**, Head of Track Analytics, Plasser & Theurer Vienna "Digitalisation of Railway Infrastructure"
Morgan Reed, FUGRO Geospatial, "The Benefits of Using an Absolute Coordinate Reference System when using Big Data for Railway Asset Management Plans"
Willem Ebersohn, ENCADA**,** "Management Information Required to Develop TAM Plans for Engineering Assets using RILA Survey System"

Sean Woods and Jackie van der Westhuizen, ENSCO, "Track Risk Assessment Using VTI Monitoring Data: A Big Data Application.

3:30 to 3:45 - Break

3:45 **Session III: Big Data: Applications and Case Studies II**
Session Chair**: Todd Euston**, Vice President Engineering, Georgetown Rail (GREX)
Michael J. Craft, Principal Engineer – Track Geometry Amtrak Engineering
David Pagliuco, Quality Assurance Manager – Engineering, GREX, "150 Million Crosstie Study: Analysis of the Failure Modes of Crossties Imaged using Backscatter X-ray Technology"
Robert Grant, Managing Director, NxGen Rail Services "The Big Data Challenge: Managing Massive Amounts of data and Converting it into Information"
Jesse Sipple and Jeff Cohen BDI, "Growing Big Data Approaches and Applications in Nondestructive Evaluation of Infrastructure"

5:30 Day 1 sessions end

6:30 – 8:00 Cocktail Reception:
Atrium, STAR Campus, University of Delaware

Day 2: Friday December 15, 2017

8:00 **Session IV: Big Data Analysis Applications and Case Studies III**
Session Chair**:**

H. James Rome, Rome Navigation Innovations, Inc. "Estimation of Visual Survey Detection Performance Based on Geometry Exception Data and Markov Analysis"
Bernhard Maier, Plasser-American Corporation, "Condition Monitoring and Fault Prediction on Track Maintenance Machines"
Ellen Linnenkamp, Managing Director, Strukton Rail North America, "Data Collection and Predictive Maintenance in Health Monitoring of Switches
Joseph Palese, Senior Scientist, University of Delaware, "Using Big Data to Develop Rail Wear Forecasting Model"

9:30 **Session**
Session IVA: Big Data Analysis Theory and Techniques
Session Chair**: Joseph Palese** University of Delaware
Nii Attoh-Okine, Professor, Civil & Environmental Engineering, and Director, Big Data Center, University of Delaware, *Leading Edge Analysis Techniques for Big Data*
Mehdi Ahmadian, Professor and Director, Railway Technologies Laboratory, Virginia Tech, "Determining Track Geometry Through Non-contacting LIDAR Sensors"
RailTec, University of Illinois,

Qing He, Assistant Professor, Civil & Environmental Engineering**,** University at Buffalo, SUNY, "Data-Driven Railway Track Defect Prediction"

11 – 11:10 Break

11:10 **Session IVB: Big Data Analysis Theory and Techniques (cont.)**
Session Chair**: Qing He, University at Buffalo, SUNY**
Xiang Liu, Assistant Professor, Rutgers University, "Risk Analysis of Broken Rail Derailments"
RailTec, University of Illinois,
Silvia Galvan Nunez and Nii Attoh-Okine, University of Delaware
Dennis Yurlov, University of Delaware

12:40 Concluding Remarks
David Staplin, Deputy Chief Engineer Amtrak (retired) and Chairman of the Railroad Advisory Board, University of Delaware
Allan M. Zarembski, Director, Railroad Engineering and Safety Program, University of Delaware

1:00 Program Ends

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"Big Data" in Railroad Maintenance Planning 2017

University of Delaware
Newark, DE
December 14-15, 2017

Converting the "Mountain" of Data Collected by Railway Systems into Effective Maintenance Planning Information with a Focus on Railway Needs and Practical Applications

Sponsored by:
University of Delaware's Railroad Engineering and Safety Program
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Modern Railways are making increasing use of new generation track inspection and operating technology to obtain more and more data on the condition of the track and equipment. This extensive amount of data, which includes data of increasing complexity as well as volume, has led to a condition known as "Big Data", where the volume of data is such that traditional analysis techniques are no longer viable to efficiently make use of all of this large volume of data. Thus, important information is often buried in this "mountain" of data. Since railways need to convert this data into useable information to help them plan their capital maintenance programs, there is a need for the application of new and improved analysis techniques to make this conversion from data into information. One such area of improved data analysis is the use of "Big Data" statistical analysis techniques. Others include improved engineering modeling and more traditional statistical analysis techniques.

The 2017 conference is intended to expand on previous years' conferences and introduce these new and emerging analysis techniques and to show how they can be applied to the large volume of inspection data collected by railways to improve their planning of the critical capital and maintenance programs. This year's conference focuses on the railway's specific needs and practical applications to date of "Big Data" analytics.