Day 1: Wednesday December 11, 2019

8:30 - 9:45  **Session I: Welcome and Introduction**

Allan M. Zarembski, Professor, Director, Railroad Research and Safety Program, University of Delaware
Dennis Assanis, President, University of Delaware (invited)
Charles Riordan, Vice Provost for Research, University of Delaware
Anne Canby, Director, OneRail and Chairman of the Railroad Advisory Board at University of Delaware

**Keynote Speaker**
Introduction: Allan M Zarembski, University of Delaware
**Keynote:** Jeffrey D. Knueppel, P.E. General Manager, Southeastern Pennsylvania Transportation Authority (SEPTA)

9:45 to 10:00 - Break

10:00-12:00 **Session II: Railroad and FRA Big Data Applications and Needs**

Session Chair: Allan M. Zarembski, University of Delaware

Milad Hosseinipour, Amtrak “Finding the needle in the haystack: Using machine learning as a pre-processing tool to focus on what matters”
Michael Messner, Assistant Director of Roadway Planning, BNSF, “Modeling the Degradation of Gage and Cant”
Antonio Merheb, MRS Logistica, Brazil, “Moving from repair of failure to pro-active maintenance using Emerging Data Techniques: A Practical Application in Heavy Haul Railroad”
Stephen C. Love, Manager of Inspection & Records CSX Transportation and Joshua Doran, Data Scientist, VisioStack, Leveraging Advanced Data Analytics to See a Clearer Future
Jay Baillargeon, Program Manager, FRA, “Update on FRA’s Predictive Analytics Research”

12:00 to 1:00 - Lunch

1:00-3:00  **Session IIIA: Big Data Applications and Case Studies: Railway Infrastructure Asset Management**

Session Chair: Joseph Palese, University of Delaware

Krzysztof Wilczek, Head of Track Analytics, Plasser & Theurer, “Use cases of big data technology in track Maintenance”
Michael Liesenfelt, GREX, “Classifying Railroad Crossties from X-Ray Images Using an Artificial Intelligence Approach”
Andrew Smith, Rail and Transit Solutions Executive, and Robert Henderson, Rail and Transit Consultant, Bentley, “Big Data Driven Decisions to Transform Track Maintenance”
Erland Tegelberg, Strukton Rail, “Effective Asset Management and Exciting New Big Data Sources”
Dan Einbiner, R. Bruzek, and Jacki VanDerWesthuizen, ENSCO: Transforming Autonomous Measurement Data into Autonomous Decision-Making

3:00 to 3:15 - Break

3:15 -5:15  **Session IIIB: Big Data: Applications and Case Studies: Rolling Stock Asset Management**
Session Chairman: **Anne Canby**, OneRail
**Krishna Prashant Jarugumilli**, CNRail, Improved Data Prediction from Hot Box Detectors
**Emilio Barcelos**, Senior Data Scientist, Alstom, “Challenges and Solutions for Log Analytics in Transportation”
**Eric Pelli**, Director of Rail Systems, Collins Aerospace, “Driving Railroad Optimization with Improved Data Management and Analytics”
**Timothy Thompson**, UPTAKE, Utilizing Machine Learning and Artificial Intelligence on wayside data to reduce maintenance costs and rolling stock dwell

5:15  Day 1 sessions end

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

**Day 2: Thursday, December 12, 2019**

8:00  Introduction to Day Two: **Nii Attoh-Okine**, University of Delaware

8:20- 10:20  **Session IIIC: Applications and Case Studies:**
Session Chairman: **Nii Attoh-Okine**, University of Delaware
**John Schmid**, Parsons Transportation Group and **Peer Vanderzee** Lifespan, “Don’t Replace Your Bridge Too Soon”
**Joseph Palese**, Senior Scientist, University of Delaware, “Application of Data Analytics to Rail Wear Forecasting”,
**Trefor Williams**, Professor, Rutgers University, and **John Betak**, Collaborative Solutions LLC, “Using LDA Topic Modelling to Identify Themes in British and American Railroad Accidents”
**Tim Stark**, University of Illinois at Urbana-Champaign, **Hugh Thompson**, FRA, “Track Geometry Defects Using Site-Specific Fouled Ballast Monitoring”

10:20 – 10:40 Break

10:40- 12:40  **Session IV: Big Data Analysis Theory and Techniques**
Session Chairman: **Hai Huang**, Penn State Altoona

Allan M Zarembski, University of Delaware, ‘Probabilistic Relationship for development of a severe track geometry defect based on Ballast Condition as Measured by GPR”

Xiang Liu, Assistant Professor, Rutgers University “Artificial Intelligence-Aided Broken Rail Derailment Risk Analysis”

Hai Huang, Penn State Altoona, “Fouling Identification Through Statistical Pattern Recognition On SmartRock Data”

Faeze Ghofrani, SUNY Buffalo, “Data-driven Railway Track Deterioration Modeling for Predictive Maintenance”

12:40 Concluding Remarks

Allan M. Zarembski, Professor, Director, Railroad Research and Safety Program, University of Delaware

Anne Canby, Chairman of the Railroad Advisory Board at University of Delaware

1:00 PM Program Ends
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.

The 2019 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 to include both infrastructure and rolling stock maintenance planning.