Infrastructure Management and Construction Engineering Lab

Baris Salman, Ph.D., Assistant Professor
Department of Civil and Environmental Engineering
Syracuse University

Mission

Our lab's overarching mission is to improve sustainability and resilience of civil infrastructure systems.

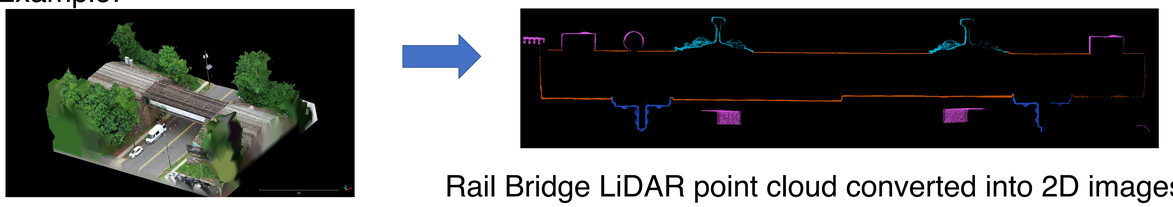
- Contribute to the state-of-art and state-of-practice by conducting research on improving decision making procedures throughout lifecycle stages of civil infrastructure systems.
- Develop and enhance skills and capabilities of next generation of civil and environmental engineers on the importance of infrastructure management and construction engineering practices.
- Provide technical assistance and training sessions to organizations responsible for managing civil infrastructure systems.

Scope

Our current research efforts focus on:

- Incorporating technological approaches to traditional infrastructure management and construction engineering practices.
- Generating decision support systems to achieve State of Good Repair (SGR) in consideration of economic, social, and environmental benefits and costs.

Example:



Rail Bridge LiDAR point cloud converted into 2D images to determine components and geometry

Team Members

Dr. Baris Salman, Assistant Professor
Ms. Parisa Sanaei, Ph.D. Student
Mr. Michael Ammoury, Ph.D. Student
Mr. Erick Lojano-Quispe, M.S. Student
Mr. Iqbal Ahmad Noor, M.S. Student

Capabilities

- Data Collection
- Data Analysis
  - Geographic Information Systems (GIS)
  - Building Information Modeling
  - Statistical Analysis and Machine Learning
- Data Visualization
  - Oculus Virtual Reality Headsets
- Construction Materials Testing
  - Concrete and Cement Mortar Testing Devices
  - Automax Multitest Testing Platform

Leica BLK 360 – Laser Scanner

Construction Engineering Lab

Services

- Decision support systems (DSS)
- Materials testing
- Asset Management Training

Active/Recently Completed Projects

- Digital Twin for Open-Deck Railway Bridges, Amirali Najafi (Rutgers Uni.), Baris Salman, and Jeff Knueppel (KCI). Sponsor: New Jersey Transit through Rutgers Uni.
- Business Case Development Program, Ali Maher (Rutgers Uni.), Richard Voith (ESI Consult), Ethan Conner-Ross (ESI Consult), Baris Salman. Sponsor: New Jersey Transit through Rutgers Uni.
- Incorporating Smart Building Technologies into an Airport Management Framework to Improve Sustainability and Resilience, Baris Salman. Sponsor: Federal Aviation Administration
- Incorporating Photogrammetry and Laser Scanning Technologies into Runway Inspection Procedures, Baris Salman. Sponsor: Federal Aviation Administration
- Investigating Cement Mortar Mix Design Alternatives to Reduce Shrinkage Cracking in Cement Mortar Lining (CML) Applications, Baris Salman and Riyad Aboutaha. Sponsor: Raymond International, WLL.

Publications

- Salman, B. and Gursoy, B. (2022) "Markov Chain Pavement Deterioration Prediction Models for Local Street Networks." Built Environment Project and Asset Management, Emerald.
- AlTami, S. A. and Salman, B. (2022) "Implementation of IoT-Based Sensor Systems for Smart Stormwater Management." Journal of Pipeline Systems Engineering and Practice, Vol: 13, Issue: 3, ASCE.
- Keskin, B., Salman, B., and Koseoglu, O. (2022) "Architecting a BIM-based Digital Twin Platform for Airport Asset Management: An Approach Based on Model Based System Engineering with SysML." Journal of Construction Engineering and Management, Vol. 148, Issue: 5, ASCE.
- For other publications: https://ecs.syracuse.edu/faculty-staff/baris-salman

Sponsors

- NJ Transit, USEPA, FAA, Center for Advanced Infrastructure and Transportation (Rutgers Uni.)