

Emerging Robotic Solutions for Infrastructure Management

May 30, 2019

9:00am–4:15p.m.

LOCATIONS

Morning sessions

Rutgers CAIT Auditorium

HOSTED BY

USDOT Region 2 University Transportation Center led by Rutgers
Center for Advanced Infrastructure and Transportation (CAIT)

100 Brett Rd • Piscataway, NJ 08854-8048

Afternoon sessions

Richard Weeks Hall of Engineering

500 Bartholomew Rd • Piscataway, NJ

08854-8048

AGENDA

9:00–9:10 am CAIT Auditorium	Welcome Ali Maher, Director of Rutgers Center for Advanced Infrastructure and Transportation
9:10–9:20 am CAIT Auditorium	Workshop Vision Jie Gong, Franklin Moon, Matthew Bandelt, Xiao Liang, Richard Dunne
9:20–10:05 am CAIT Auditorium	Keynote: Robotics, Risk, and Rework Carl Haas, Ph.D., Professor of Civil Engineering, University of Waterloo, and Fellow of the Canadian Academy of Engineering
10:05–11:00 am CAIT Auditorium	Panel on Current and Emerging Robotic Solutions Strategies for Overcoming Challenges Associated with Innovative Development • Carson Carney, Vice President, TyBOT Autonomous Bridge Deck Inspection and Repair: Rutgers Activities • Nenad Gucunski, Professor and Chair of Department of Civil and Environment Engineering, Rutgers University AI-assisted Infrastructure Digital Twins • Zheng Wu, Director of Research, Bentley Systems Inc.
11:00 am-12:30 pm Weeks Hall	Break, Tours, and Lunch <i>RABIT, ANDERS, LIDAR, DRONE, and CAVE Visualization Lab</i>
12:30–1:15 pm Weeks Hall, Rm 102	Owner Discussion I: The roles of maintenance and repair activities within the asset management of infrastructure systems <i>How does your agency distinguish maintenance actions from repair?</i> <i>Does your agency perform time-based maintenance, condition-based maintenance, or both? If time-based maintenance is performed, can you provide some examples of typical actions?</i> <i>Is the condition-based maintenance and repair actions typically driven by inspection reports?</i> <i>What is the average time from when a maintenance/repair need is recognized to when it is completed for both low- and high-priority items?</i> <i>Does your agency have a management system that tracks maintenance and/or repair actions from initiation through completion?</i> <i>Does your agency do maintenance/repair in-house, or does it generally contract out for maintenance/repair? If it does, some maintenance/repair in-house, how does it identify what/when to contract out?</i> <i>Compared to the overall annual budget to operate and maintain your bridge stock, what is the approximate percentage spent on maintenance and repair?</i>

1:15–2:15 pm Weeks Hall, Rm 102	<p>Eight-minute Research Overview Talks</p> <p>Seeing Two Sides of Surfaces: From Deep Active Learning for Civil Infrastructure Defect Detection to Through-Wall Object Detection and Mapping • Chen Feng, Assistant Professor, Department of Civil and Urban Engineering, New York University</p> <p>Emerging Frontiers in Inspection Robotics • David Lattanzi, Assistant Professor, Department of Civil, Environmental, and Infrastructure Engineering, George Mason University</p> <p>Intelligent Transportation Asset Management Using Mobile LiDAR and Beyond • Cheng Bo Ai, Assistant Professor, Department of Civil and Environmental Engineering, University of Massachusetts–Amherst</p> <p>Toward Autonomous Wall-Climbing Robots for Nondestructive Evaluation of Infrastructure • Jizhong Xiao, Professor, Robotics Lab, City College of New York</p> <p>Mobile and Remote Infrastructure Monitoring and Inspection Using Computational Vibrometry System • Wei Jie, Professor, Computer Science, City College of New York</p> <p>Structural Health Monitoring and Inspection Using Domain Knowledge and Physics Informed AI • Xiao Liang, Research Assistant Professor, Department Civil, Structural and Environmental Engineering, University at Buffalo</p>
2:15–2:30 pm	Coffee Break
2:30–3:15 pm Weeks Hall, Rm 102	<p>Owner Discussion II: Discussion of specific maintenance and repair actions to identify opportunities for robotic applications</p> <p><i>What are the most frequently deployed maintenance actions in general, e.g., cleaning, spot painting, patching, greasing, others?</i></p> <p><i>What bridge/pavement/tunnel/sign/pipeline elements are most commonly address through maintenance actions, e.g., barriers/railing, deck, joints, bearings, superstructure elements (girders, truss elements, suspenders), connections, approach slabs, others?</i></p> <p><i>What are the most frequently deployed repair actions in general, e.g., drilling, welding, member straightening, replacement of components (joints, bearings, barriers, etc.), or others?</i></p> <p><i>What bridge/pavement/tunnel/sign/pipeline elements are most commonly repaired, e.g., elements subject to vehicle collision, movement systems (bearings, joints), approach slabs, deck, superstructure elements, substructure elements, or others?</i></p>
3:15–3:30 pm Weeks Hall, Rm 102	<p>Bridge Evaluation and Accelerated Structural Testing Lab: The BEAST</p> <p>Franklin Moon, Professor, Rutgers University</p>
3:30–4:15 pm The BEAST Lab Livingston Campus	Tour: The BEAST

WORKSHOP ORGANIZERS

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