Human-AI Co-Evolution in Research Data Management: Building Trustworthy and Adaptive Data Ecosystems for Construction Engineering

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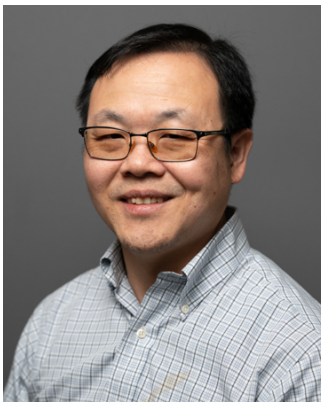
Bio



Dr. Pingbo Tang is an Associate Professor in the Department of Civil and Environmental Engineering at Carnegie Mellon University, where he founded and directs the Spatiotemporal Workflows and Resilient Management Laboratory (SWARM Lab). He earned his B.S. and M.S. from Tongji University and his Ph.D. from Carnegie Mellon's Advanced Infrastructure Systems group (2009). His research applies remote sensing, human systems engineering, data analytics, and information modeling to support predictive management of constructed facilities and infrastructure systems, with particular focus on Human-Cyber-Physical Systems in construction and infrastructure operations. He has published over 100 peer-reviewed articles, received the NSF CAREER Award (2015), and leads research funded by NSF, DOE, NASA, and other agencies. Tang serves as Chair of the ASCE Data Sensing and Analysis Committee, sits on multiple editorial boards, and has received numerous best paper awards at leading construction informatics conferences.

Abstract

This talk examines how human–artificial intelligence collaboration can enable robust research data management in construction by transforming heterogeneous datasets from Building Information Modeling, visual sensing, and digital twins into reusable, trustworthy assets aligned with Findable, Accessible, Interoperable, and Reusable open-science principles. Building on the OpenConstruction catalog of open visual datasets and related infrastructure projects, I will outline socio-technical research data management in construction frameworks that integrate AI-assisted, context-aware curation with human-in-the-loop quality control and governance. Case studies from construction monitoring, bridge inspection, and modular production will illustrate concrete patterns for metadata design, dataset documentation, and explainable automation that improve reproducibility and cross-project reuse. The talk will close with a research agenda for research data management in construction that connects construction informatics with the National Science Foundation's Cyberinfrastructure for Public Access and Open Science priorities, including shared benchmarks, community repositories, and interdisciplinary collaborations between construction, cyberinfrastructure, and information science researchers.