

Smart Infrastructure/Buildings as the Backbone of Smart Cities

BURCU AKINCI AND MARIO BERGES

Cities need high quality and well-functioning infrastructure systems, such as transportation systems, building network, and water and wastewater systems, to provide the needed services and increase the quality of life of their citizens. Yet, many cities in the world face the problem of aging and failing infrastructure systems. Rapid growth of urban population together with increased stresses caused by the environment, such as climate changes, further challenges the operation and maintenance of the existing infrastructure systems. Concurrently, recent advances in sensing and communication are allowing us to peer into urban phenomena and infrastructure in a dramatically different way, though there are significant technical challenges that remain unsolved to ensure that these solutions are cost-effective and scalable. Thus, the need for trillions of dollars of investment for infrastructure maintenance and renewal, while promoting sustainability and resilience, is real, but might be challenging to attain.

These all emphasize the need to transform/revolutionize the way we operate and maintain our infrastructure systems. As is the case for any critical investment in resource-constrained environments, we need to make proactive decisions about our investments to infrastructure systems in the most informed manner, which requires smart infrastructure systems and smart processes associated with it. This would involve utilization of diverse data, rapidly identifying “pain” in the existing infrastructure, maintaining a memory, and developing approaches for proactive decision-making. Such concepts associated with smart infrastructure would enable city and government officials, and industry partners to leverage information and data about these systems when prioritizing the decisions associated with where and how much to invest. In this talk, we will give an overview of research done on smart infrastructure and dive deeper into specific research projects on smart buildings for operational and energy efficiency.



BURCU AKINCI

**ASSOCIATE DEAN FOR RESEARCH,
COLLEGE OF ENGINEERING
CARNEGIE MELLON UNIVERSITY**

Dr. Burcu Akinci is a Professor of Civil & Environmental Engineering and co-director of Pennsylvania Smarter Infrastructure Incubator at Carnegie Mellon University. She earned her BS in Civil Engineering (1991) from Middle East Technical University and her MBA (1993) from Bilkent University at Ankara, Turkey. After that, she earned her MS (1995) and her Ph.D. (2000) in Civil and Environmental Engineering with a specialization in Construction Engineering and Management from Stanford University.

Her research interests include development of approaches to model and reason about information rich histories of facilities, to streamline construction and facility management processes. She specifically focuses on investigating utilization and integration of building information models with data capture and tracking technologies, such as 3D imaging, embedded sensors and radio-frequency identification systems to capture semantically-rich as-built histories of construction projects and facility operations.

Dr. Akinci has one patent, two patent applications, over 60 referred journal publications, and 80 refereed conference publications. She co-edited a book on CAD/GIS Integration and another book on Embedded Commissioning. She has graduated more than 16 PhD students and 15 MS thesis students, and is currently advising/co-advising 4 PhD students.



MARIO BERGES

**ASSOCIATE PROFESSOR, CIVIL AND
ENVIRONMENTAL ENGINEERING
CARNEGIE MELLON UNIVERSITY**

Mario Berges is an associate professor in the Department of Civil and Environmental Engineering at Carnegie Mellon University. He is interested in making our built environment more operationally efficient and robust through the use of information and communication technologies, so that it can better deal with future resource constraints and a changing environment.

Berges is the faculty co-director of the IBM Smart Infrastructure Analytics Laboratory at CMU, as well as the director of the Intelligent Infrastructure Research Lab (INFERLab). Among recent awards, he received the Outstanding Early Career Researcher award from FIATECH in 2010, and the Dean's Early Career Fellowship from CMU in 2015.

SEMINAR INFORMATION

Refreshments will be served

Date: June 8th, 2017

Location: CCSB G.0208

Time: 9:00a.m.-10:00a.m.