Stony Brook University

Department of Civil Engineering

College of Engineering and Applied Sciences

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Friday, November 11th, 1:00 – 1:55 PM
Frey Hall Room 201

Taking the Pulse of Cities via Non-dedicated Sensing of Civil Infrastructure Systems

Abstract

The world is undergoing the largest wave of urban growth in history. Over 50% of the population lives in urban areas today who are connected, protected, and supported by civil infrastructure systems. Therefore, monitoring various infrastructure assets is an important step toward making our city safer, more intelligent, and more resilient. For example, it is essential to prevent severe damage to infrastructure that may lead to significant human and economic losses. Monitoring the state of aging infrastructure helps detect structural damages in the early stages. People have deployed many dedicated sensors, such as cameras and vibration sensors, for infrastructure monitoring. However, using dedicated sensors is inefficient and costly for large-scale infrastructure monitoring as it requires on-site installation and maintenance of sensors and equipment. To this end, my research introduces the use of non-dedicated sensing platforms to collect ambient vibrations of civil infrastructure systems for monitoring these systems in a scalable and sustainable way. The non-dedicated sensing platforms that have been studied in my research include pre-existing vehicles, trains, and telecommunication fiber-optic cables that interact with civil infrastructure assets.

Speaker Biography

Jingxiao Liu is a Ph.D. candidate in the Department of Civil & Environmental Engineering at Stanford University. He received his M.S. in Civil Engineering from Carnegie Mellon

University in 2017. His research focuses on structural health monitoring, smart infrastructure systems, and smart city applications using signal processing, data mining, physics-guided machine learning, mobile sensing, and fiber-optic sensing techniques.