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| **Electrical Engineering and Computer Science Technical Seminar Series**  **Friday, October 10, 2019**  **12:00 PM in COB 263**  Physics-guided information acquisition & learning for Urban infrastructure systems with constrained sensing capabilities Susu Xu Faculty Host: Shijia Pan Abstract Urban infrastructure systems play a vital role in the operation of the city. Recently, many advanced sensing systems have been developed to automate information acquisition and learning for urban infrastructures, such as structural health, traffic conditions, surrounding air quality, etc. However, urban infrastructure monitoring systems often have constrained sensing capabilities due to improper deployment conditions, budget limits, or the complexity of physical infrastructure systems. The constrained sensing capabilities include noisy data induced by complex physical systems, lack of label limiting the accuracy of data-driven models, inefficient sensor deployment resulting in low sensing coverage, and a lack of proper sensors for target tasks. These constrained sensing capabilities significantly degrade the performance of information acquisition and learning using conventional data-driven methods. To address these challenges, my research works combine physical knowledge with information theory/machine learning techniques to acquire and learn high-fidelity urban infrastructure information. In detail, I will talk about my work on combining the limited prior physical properties of infrastructures with data-driven approaches for the infrastructure damage states inference and adversarial knowledge transferring across different infrastructures without any label on the target structure. Further, I will present how these physical learning models work for earthquake-induced building damage diagnosis and vehicle-based indirect structural health monitoring of in-service bridge. Finally, I will mention my work which integrates physical state-space model and data-driven model to improve spatio-temporal state estimations in large-scale urban infrastructure systems.  **For additional information contact Prof. Wan Du <wdu3@ucmerced.edu>** | |  | | --- | | **Susu Xu****Qualcomm AI Research****Biography**Susu Xu is currently a research scientist at AI research team in Qualcomm Technologies. She received her Bachelor's degree in Engineering from Tsinghua University, Master's degree in Machine Learning and Ph.D. in Civil Engineering from Carnegie Mellon University. Her research focuses on physical sensing and learning for smart urban infrastructure systems. She has published in both Computer Science ACM/IEEE Journals/Conferences (IEEE Transactions on Mobile Computing, IPSN, SenSys) and Civil Engineering Journals/Conferences(Frontiers Built Environment, SPIE, IWSHM, World Conference on Earthquake Engineering). She received Liang Ji-Dian Graduate Fellowship, Dowd Fellowship, CMU CIT Dean Fellowship, Best Paper Award (IEEE ICMLA), and the champion of NeurIPS 2018 Adversarial Vision Challenge. | | **C:\Users\soefrontdesk\AppData\Local\Microsoft\Windows\INetCache\Content.Word\susu_photo.jpg**image | |

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