

Smart Cities

Session Co-chairs: Da An, China Academy of Electronics and Information Technology, and Dan Work, Vanderbilt University

The world's urban population is expected to grow by 2.5 billion people through 2050 (United Nations, 2018), with much of the growth concentrated in urban areas. This context creates heightened urgency to develop, restore, and enhance urban infrastructure systems such as buildings, energy, transportation, and water. Due to the high cost of infrastructure investments, new technology-focused smart cities approaches are being explored to improve the efficiency, sustainability, and resilience of urban infrastructure systems needed to support this expanding and urbanizing population.

The integration of sensing, communication, and computing capabilities at all scales in the infrastructure allows for improved understanding and eventually the possibility of real-time and continuous improvement of urban infrastructure systems. However, deploying new smart cities approaches are challenging for a number of reasons including:

- Urban systems are large, costly, complex, and interdependent;
- The potential for new cyber-vulnerabilities created by the internet of infrastructure;
- Human infrastructure interaction is only beginning to be understood;
- The comparatively long design life of physical infrastructure systems is currently incompatible with cyber timescales.

This session will explore these and other issues in the context of China and the US, highlighting commonalities and differences between each country's respective approaches. The US population today is already primarily urbanized, with 82% of the population living in urban areas, and is dependent on infrastructure often in serious need of restoration. In contrast, China represents one of the most acute urban growth regions on the planet, giving rise to larger and more megacities that will need to support 250 million new urban dwellers by 2050. The approaches taken by both countries towards the development of smart cities technologies are often distinct, with top down approaches needed in China to achieve scale quickly, while organic approaches are more common in the US.

The speakers on the US side will be Saurabh Amin, who will describe how to exploit smart cities technologies to make urban infrastructure systems more resilient to natural hazards and malicious attack. Lillian Ratliff will explicitly connect the people & infrastructure perspectives by describing how to incentivize efficiencies in next generation urban infrastructure systems. Examples from transportation, energy, and water networks will be used to motivate the discussion. The speakers on the Chinese side will be Chi Liu, who will talk about mobile crowd-sensing for smart cities, and Lan Wang, who will give a presentation on healthy city planning and design.