



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering
Seminar

Network Localization using Large-Scale Antenna Array Systems

By

Prof SHEN Yuan
Associate Professor, Department of Electronic Engineering
Tsinghua University

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The Chinese University of Hong Kong

Abstract

Large-scale antenna arrays have not only been considered as the key technology in next generation communication systems, but also promised revolutionary impacts on network localization owing to its high spatial resolution. To reduce communication and computational overheads, we establish a general framework for beamspace direct localization, which consists of beamspace design and position determination. In particular, we first cast the beamspace design as an optimization problem under dimension constraints, and show that high-dimensional array signals can be projected into a low-dimensional beamspace without loss of information. Then a robust beamspace scheme is proposed to guarantee the performance in the presence of parameter uncertainty. Moreover, we develop an near-optimal direct localization algorithm with the computational complexity and communication overhead orders of magnitude smaller than conventional methods.

Biography

Yuan Shen received the Ph.D. degree and the S.M. degree in EECS from MIT in 2014 and 2008, respectively, and the B.E. degree in EE from Tsinghua University in 2005. He is now an Associate Professor with the Department of Electronic Engineering at Tsinghua University. Prior to that, he was a Research Assistant and then Postdoctoral Associate with the Wireless Information and Network Sciences Laboratory at MIT in 2005–2014. His current research focuses on network localization and navigation, inference techniques, resource allocation, and cooperative networks.

Professor Shen was a recipient of the IEEE ComSoc Asia-Pacific Board Outstanding Young Scholar Award, Qiu Shi Outstanding Young Scholar Award, the China's Youth 1000-Talent Program, and the Marconi Society Paul Baran Young Scholar Award. His papers received the IEEE ComSoc Fred W. Ellersick Prize and three Best Paper Awards from IEEE international conferences. He is elected Chair (2019–2020) for the IEEE ComSoc Radio Communications Technical Committee. He has served as TPC symposium Co-Chair for the IEEE ICC, Globecom, and the IEEE ICC Advanced Network Localization and Navigation Workshop. He also serves as Editor for the IEEE Trans. on Wireless Communications, IEEE Wireless Communications Letter, CHINA Communications, and IEEE Communications Letter (2015–2018).

**** ALL ARE WELCOME ****

Host: Prof Angela Zhang (Tel: 3943-8465, Email: angela@ie.cuhk.edu.hk)
Enquiries: Information Engineering Dept., CUHK (Tel.: 3943-8385)