



THE CHINESE UNIVERSITY OF HONG KONG
Department of Information Engineering
Seminar

**Massive Unsourced Random Access in
Cell-Free User-Centric Wireless Networks**

By

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Time : 2:00pm – 3:00pm

Venue : Rm 833, Ho Sin Hang Engineering Building, CUHK



Abstract

We consider unsourced random access (uRA) in user-centric cell-free (CF) wireless networks, where random access users send codewords from a common codebook during specifically dedicated random access channel (RACH) slots. The system is conceptually similar to the so-called 2-step RACH currently discussed in 3GPP standardization.

To cope with the distributed and CF nature of the network, we propose to partition the network coverage area into zones (referred to as "locations") and assign an uRA codebook to each location, such that users in each given location use the associated codebook. The centralized uRA decoder uses the multisource AMP algorithm recently proposed and theoretically analyzed by the authors. This yields, at once, the list of active uRA codewords, an estimate of the corresponding channel vectors, and an estimate of the active users' position. We show excellent performance of this approach and perfect agreement with the rigorous theoretical "state evolution" analysis.

Biography

Giuseppe Caire is a professor and head of the communications and information theory group at the Technical University of Berlin. He was previously a professor of electrical engineering with the Viterbi School of Engineering at the University of Southern California, Los Angeles. His main research interests are in communications theory, information theory, and channel and source coding, with a focus on those problems that are connected with wireless communications.

He served as an associate editor for the Institute of Electrical and Electronics Engineers (IEEE) Transactions on Communications from 1998-2001 and as an associate editor for the IEEE Transactions on Information Theory from 2001-2003. He received the Jack Neubauer Best System Paper Award from the IEEE Vehicular Technology Society in 2003, and the IEEE Communications Society & Information Theory Society Joint Paper Award in 2004 and 2011. Giuseppe Caire has been a Fellow of IEEE since 2005. He served on the Board of Governors of the IEEE Information Theory Society from 2004 to 2007, was an officer of the society from 2008 to 2013, and was president of the IEEE Information Theory Society in 2011.

**** ALL ARE WELCOME ****