

Seminar Announcement

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Friday, December 4, 2015
Green Hall, Room 0120
3:30 PM

Compressive Covariance Sensing

Abstract: Compressive signal sampling is one of the recent important advances in signal processing and statistical learning, with impact to various applications including data sciences, communications, sensor networks, and medical imaging. Traditionally it requires information-bearing signals to be sparse over known domains, either naturally or by design. In this talk, I will introduce the fresh notion of compressive covariance sensing, and advocate its exciting implications for (cyclo) stationary processes characterized by second-order statistical descriptors. Such descriptors include (periodic) covariances or frequency, cyclic, angular and Doppler spectra, which already effect signal compression even for non-sparse signals. Using this key observation, I will demonstrate how the attribute of sparsity can be bypassed, or leveraged more effectively, when recovering the second-order statistical information of interest. I will also delineate the minimal sampling rates for recovering certain useful statistics of non-sparse random signals, along with the compressive sampler designs for approaching such rates. I will illustrate the usefulness of compressive covariance sensing using several engineering applications that rely on frequency or angular spectrum sensing, such as wireless cognitive radio and statistical array processing.

Bio: Zhi (Gerry) Tian is a Professor in the Electrical and Computer Engineering Department of George Mason University, Fairfax, VA, as of January 2015. Prior to that, she was on the faculty of Michigan Technological University from 2000 to 2014. She served as a Program Director in the Division of Electrical, Communications and Cyber Systems at NSF from 2012 to 2014. Her research interests lie in statistical signal processing, wireless communications and wireless sensor networks. She is an IEEE Fellow. She is a Distinguished Lecturer of the IEEE Vehicular Technology Society and the IEEE Communications Society. She served as Associate Editor for IEEE Transactions on Wireless Communications and IEEE Transactions on Signal Processing. She received a CAREER award from the US National Science Foundation in 2003.