

EE Department Seminars
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Yorgo I Stefanopulos Meeting Lounge (KB 217)

Synthetic Aperture Imaging using Ultra-narrow-Band Waveforms

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Classical synthetic aperture imaging methods rely on high range resolution or wideband transmitted waveforms. A long standing problem in synthetic aperture imaging is the question of “how to form high resolution images with narrowband transmitted waveforms?” This talk answers this question and presents the theory of synthetic aperture imaging using ultra-narrowband waveforms. The theory results in a new and novel imaging modality which we refer to as Doppler synthetic aperture imaging modality. I will present the new measurement model and the corresponding filtered-backprojection type image formation method for Doppler synthetic aperture imaging. Our theory shows that unlike the traditional wideband imaging methods which uses range and velocity of sensors, Doppler synthetic aperture imaging method uses velocity and acceleration of sensors for high resolution imaging. I will wrap up my talk with a brief discussion on the implications of this new theory in imaging applications.

Short Bio:

Birsen Yazıcı received BS degrees in Electrical Engineering and Mathematics in 1988 from Bogazici University, Istanbul Turkey and MS and Ph.D. degrees in Mathematics and Electrical Engineering both from Purdue University, W. Lafayette IN, in 1990 and 1994, respectively. From September 1994 until 2000, she was a research engineer at the General Electric Company Global Research Center, Schenectady NY. During her tenure in industry, she worked on radar, transportation, industrial and medical imaging systems. From 2001 to June 2003, she was an assistant professor at Drexel University, Electrical and Computer Engineering Department. In Fall 2003, she joined Rensselaer Polytechnic Institute as an assistant professor. She was an associate professor from 2008-May 2011. She is currently a full professor in the Department of Electrical, Computer and Systems Engineering and in the Department of Biomedical Engineering.

Prof. Yazıcı’s research interests span the areas of statistical signal processing, inverse problems in imaging, image reconstruction, biomedical optics, radar and X-ray imaging. She currently serves as an associate editor for the IEEE Transactions on Image Processing and SIAM Journal on Imaging Science. She is the recipient of the Rensselaer Polytechnic Institute 2007 School of Engineering Research Excellence Award. She holds 11 US patents.