

## “Methods for Application-Specific Computational and Compressive Spectral Imaging: Sense Only what is Needed to Answer your Questions”



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**2:00 – 3:00 p.m. Olin 202**

**Reception in Olin 204 3:00 – 3:30 p.m.**

**Abstract:** While there have been dramatic advances in the past decade in spectral-imaging technologies, the amount of data produced can be prohibitively large for storage, transmission, and analysis. In many applications (e.g., persistent surveillance and thematic classification), the relevant spatio-spectral information present in a spectral image that can be used in answering questions about the scene constitutes a very small fraction of the total information present in the image. Rather than sensing enormous amounts of spatio-spectral data and analyzing it to answer application-specific questions, as traditionally done, in this colloquium we will review concepts that exploit the coarse, electrical tunability of certain spectral sensors, in conjunction with data-driven algorithms, to develop front-end, computational spectral imaging methods that sense only the spatio-spectral information that is relevant to an application of interest. The front-end computations are minimal, and they can be performed on the sensor.

**Bio:** Dr. Hayat received his Bachelor of Science (summa cum laude) in Electrical Engineering from the University of the Pacific (in Stockton, CA) in 1985. He received the M.S. and the Ph.D. degrees in Electrical and Computer Engineering from the University of Wisconsin-Madison in 1988 and 1992, respectively. He is currently a Professor and Department Chair of Electrical and Computer Engineering at Marquette University. His research activities cover a broad range of topics including resilience and reliability of interdependent cyberphysical systems, dynamical modeling of cascading phenomena with applications to power systems, avalanche photodiodes, statistical communication theory, signal and image processing, algorithms for spectral and radar sensing and imaging, optical communication, and networked computing. Dr. Hayat is a Fellow of IEEE, OSA, SPIE and OPTICA.