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From Lensless Cameras to Deep-Brain Microscopy: Exploring the Potential of Computational Imaging

Tuesday, June 11, 2019 1:00 PM - 2:00 PM EDT

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About This Webinar

This webinar will introduce you to the enormous potential of computational imaging for a range of industries, from manufacturing to machine vision to biophotonics. Professor Rajesh Menon and his group from the University of Utah have demonstrated several examples of computational imaging, which will be discussed during this webinar.

First is a "see-through" camera, comprised of a transparent window with an image sensor placed facing into the edge of the window. In this lensless camera, the image and field of view are optimized not through a lens, but through a careful selection of geometric parameters and training of a neural network, enabling highly compact and private imaging systems. Next is a snapshot hyperspectral imaging camera, whose spatial and spectral performance can be programmed without any change in the hardware. Finally, an approach to deep-brain imaging that uses only an ultrathin surgical needle to transport light in and out of a mouse brain will be discussed. In all cases, imaging is essentially a form of information transfer enabling highly nonintuitive forms of imaging.

Menon will cover the underlying technologies and their limitations. He will discuss additional potential applications for lensless cameras, including in augmented reality and security, and techniques such as application-specific imaging that can make lensless cameras more efficient than traditional imaging technologies. He will also address the broader field of computational optics.

About the presenter:
Rajesh Menon, Ph.D., is an associate professor of electrical and computer engineering and director of the Laboratory for Optical Nanotechnologies at the University of Utah. He has an M.S. in electrical engineering and a doctoral degree in electrical engineering from the Massachusetts Institute of Technology (MIT). Menon's work encompasses the areas of nanofabrication, computation, and optical engineering. His research in these areas has affected a wide array of fields, including superresolution lithography, broadband diffractive optics, integrated photonics, metamaterials, photovoltaics, and computational optics.

Menon's research has appeared in more than 100 publications. He holds more than 40 patents and his work has led to four spinoff companies. He is a fellow of The Optical Society and a senior member of IEEE and SPIE. In addition, he is the recipient of a NASA Early Stage Innovations Award, an NSF CAREER Award, and the International Commission for Optics Prize.

Who should attend:
Optical and electrical engineers, optical designers, scientists, researchers, students, educators, and others who are interested and/or involved in imaging technologies will enjoy this webinar and benefit from it. This webinar will provide an opportunity to learn about the state-of-the-technology of computational imaging and computational optics, and current and future applications from a foremost expert in the field.
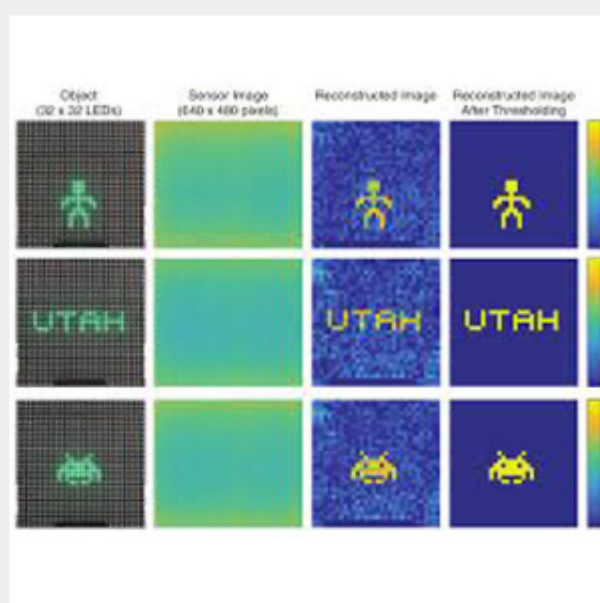
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