PHOTONICS SEMINAR

Dr. David G. Stork, Rambus Labs

Ultra-miniature Lenseless Computational Imagers and Sensors Using Optics for Computing and Computing for Optics Photometers

Faculty Host: Professor Lei Tian

October 6, 2016

2-3 p.m.

Room 339

Photonics Center

8 Saint Mary's Street

Refreshments will be served!

Dr. David G. Stork will describe a new class of computational optical sensors and imagers that do not rely on traditional refractive or reflective focusing, but instead on special diffractive optical elements integrated with CMOS photodiode arrays. The diffractive elements have optimal optical properties essential for imaging, and act as a visual chirp and preserve full Fourier image information on the photodiode arrays. Images are not captured, as in traditional imaging systems, but rather computed from raw photodiode signals. Because such imagers forgo the use of lenses, they can be made unprecedentedly small—as small as the cross-section of a human hair. Such imagers have extended depth of field, from roughly 1mm to infinity, and should find use in numerous applications, from endoscopy to infra-red and surveillance imaging and more. Furthermore, the gratings and signal processing can be tailored to specific applications from visual motion estimation to barcode reading and others.

David G. Stork is a Rambus Fellow and leads research in the Computational Sensing and Imaging Group at Rambus Labs in Sunnyvale, CA. A graduate in Physics from MIT and the University of Maryland, Dr. Stork has published eight books/proceedings volumes, including *Pattern Classification* (2nd ed.) and *Seeing the Light: Optics in Nature, Photography, Color, Vision and Holography* and has held faculty appointments in eight disciplines at Wellesley College, Swarthmore College, Clark University, Boston University, and Stanford University. He holds 48 issued patents and is a Fellow of the Optical Society of America (OSA), the Society for Photographic Instrumentation and Engineering (SPIE), the International Association for Pattern Recognition (IAPR), and the International Academy, Research and Industry Association (IARIA). He is also a Senior Member of the Association for Computing Machinery (ACM) and IEEE.

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