



SCHOOL OF COMPUTER SCIENCE

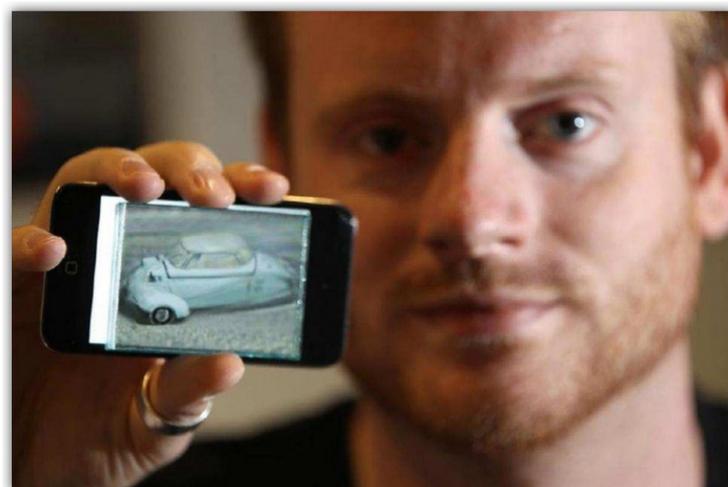
Faculty Candidate

Gordon Wetzstein

Massachusetts Institute of Technology

Compressive Imaging and Display Systems

Compressive image acquisition and display is an emerging architecture for consumer electronics that explores the co-design of optics, electronics, applied mathematics, and real-time computing. Together, these hardware/software systems exploit compressibility of the recorded or presented data to facilitate new device form factors and relax requirements on electronics and optics. For instance, light field or glasses-free 3D displays usually show different perspectives of the same 3D scene to a range of different viewpoints. All these images are very similar and therefore highly compressible. By combining multilayer hardware architectures and directional backlighting with real-time implementations of light field tensor factorization, limitations of existing displays, for instance in resolution, contrast, depth of field, and field of view, can be overcome. A similar design paradigm also applies to light field and multi-spectral image acquisition, super-resolution and high dynamic range display, glasses-free 3D projection, computational lithography, microscopy, and many other applications. In this talk, we review the fundamentals of compressive camera and display systems and discuss their impact on future consumer electronics, remote sensing, scientific imaging, and human-computer interaction.



Bio:

Gordon Wetzstein is a Research Scientist in the Camera Culture Group at the Massachusetts Institute of Technology. His research focuses on computational imaging and display systems as well as computational light transport. At the intersection of computer graphics, machine vision, optics, scientific computing, and perception, this research has a wide range of applications in next-generation consumer electronics, scientific imaging, human-computer interaction, remote sensing, and many other areas. Gordon's cross-disciplinary approach to research has been funded by DARPA, NSF, Samsung, and other grants from industry sponsors and research councils. In 2006, Gordon graduated with Honors from the Bauhaus in Weimar, Germany, and he received a Ph.D. in Computer Science from the University of British Columbia in 2011. His doctoral dissertation focuses on computational light modulation for image acquisition and display and won the Alain Fournier Ph.D. Dissertation Annual Award. He organized the IEEE 2012 and 2013 International Workshops on Computational Cameras and Displays, founded displayblocks.org as a forum for sharing computational display design instructions with the DIY community, and presented a number of courses on Computational Displays and Computational Photography at ACM SIGGRAPH. Gordon won the best paper award for "Hand-Held Schlieren Photography with Light Field Probes" at ICCP 2011 and a Laval Virtual Award in 2005.

Monday, April 21
10:00 a.m. GHC 6115

Host: Srinivasa Narasimhan

For Appointments: Contact Kimm Mills (kimmills@cs.cmu.edu, x8-4985)