

# Computational 3D imaging and metrology

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Abstract:

Computational imaging involves the joint design of optical systems and post-processing algorithms to enable new imaging capabilities (e.g. phase, 3D, super-resolution). This talk will describe new approaches that use simple optics and coded sources to recover phase and 3D information. By taking images at various focus positions or with sufficient chromatic aberration, we use intensity transport equations to recover shape and density of thick samples. Or, by replacing the light source of the microscope with a programmable LED array, we use illumination coding techniques to achieve brightfield, dark field, and 3D phase contrast images simultaneously, without changing the imaging optics. Such computational approaches add significant new capabilities to standard microscopes, without extra cost or hardware modification.