# Portable light field camera utilizing angle-sensitive pixels

Jason Wright, Electrical & Computer Engineering, M.Eng '13, B.S. '12
Faculty Advisor: Prof. Alyosha Molnar

Goal: Capture light field images that contain information about angle & intensity of incident light.
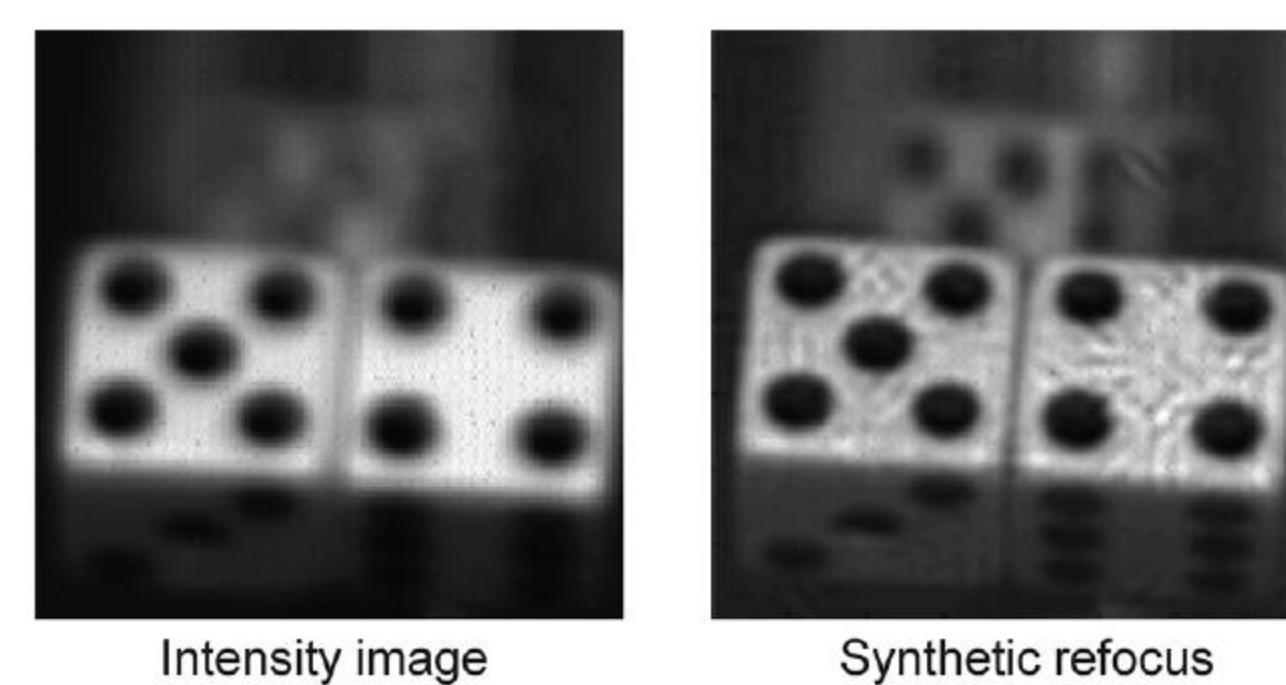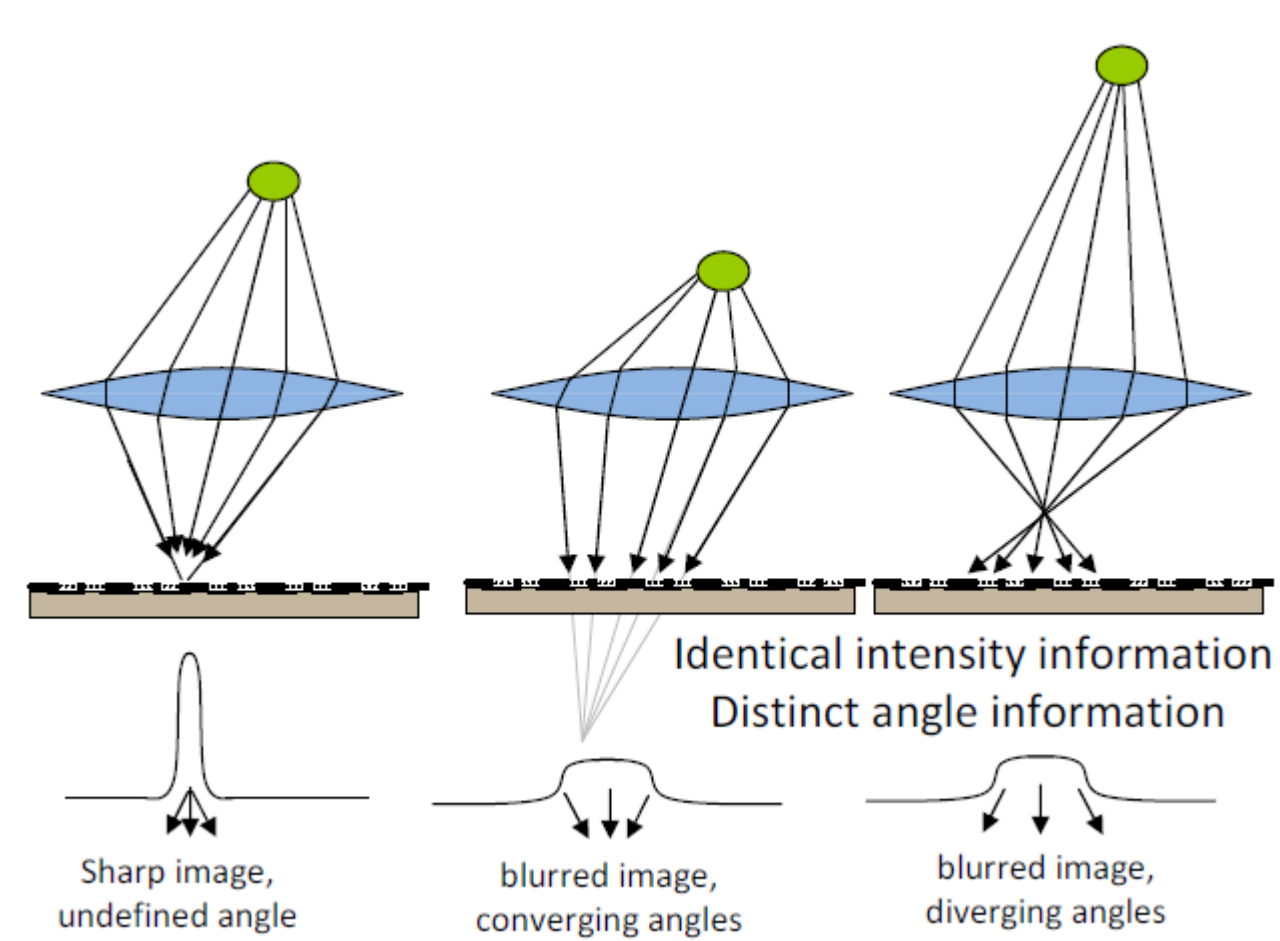
Concept: Angle-sensitive pixels, composed of an array of diffraction gratings above a CMOS imager, have a periodic intensity response to incident angle.
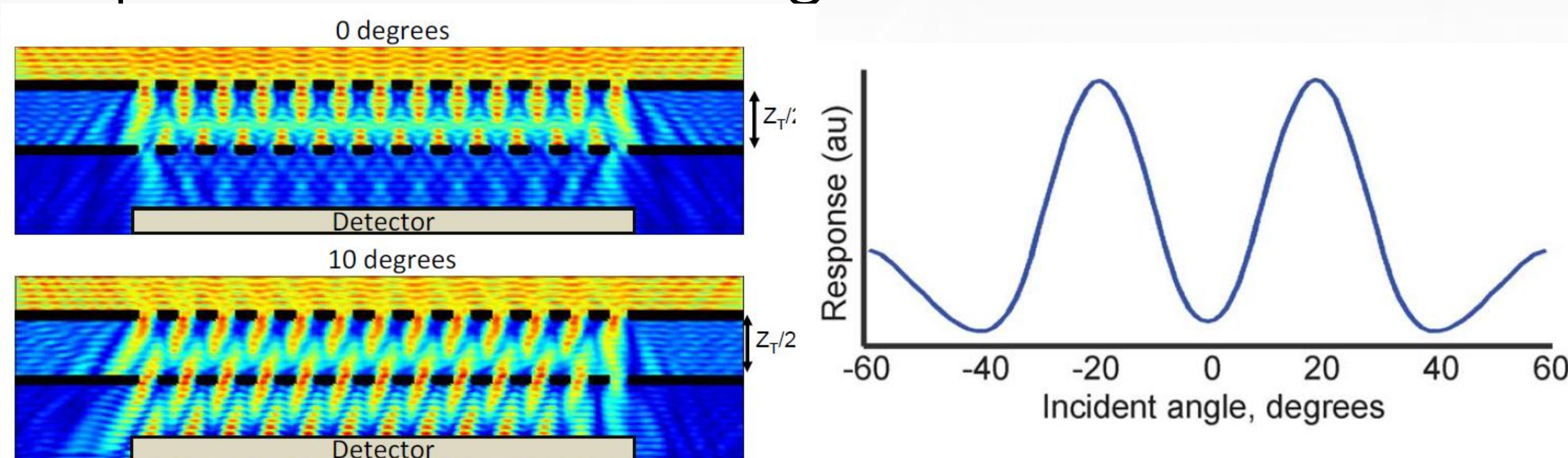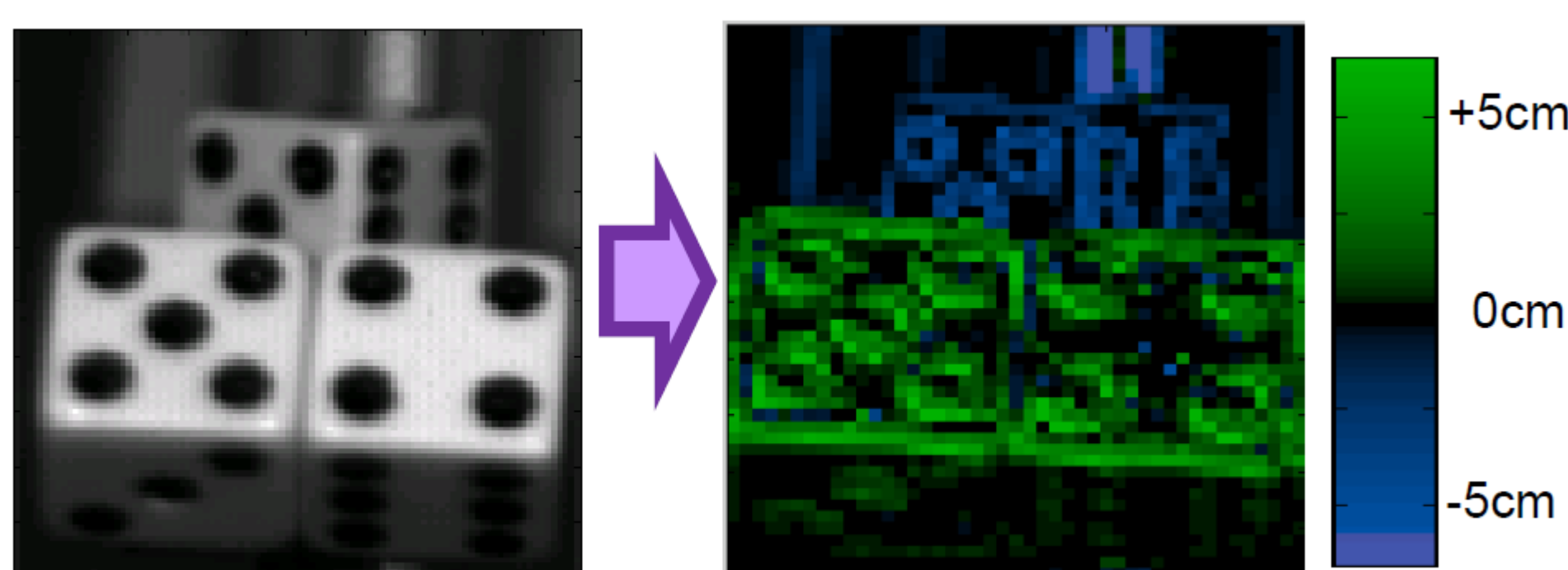

By using a variety of diffraction gratings, the incident angle can be reconstructed.
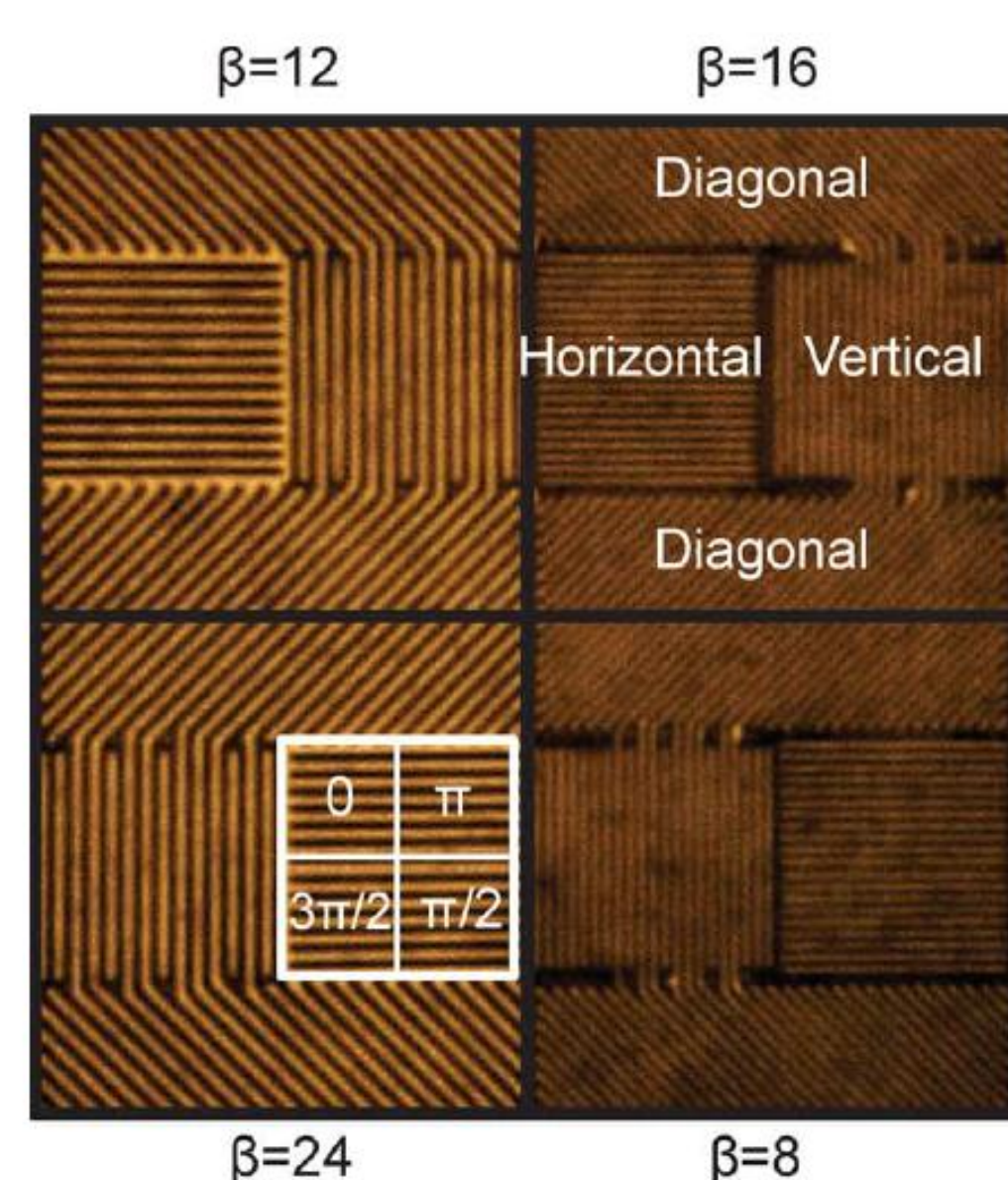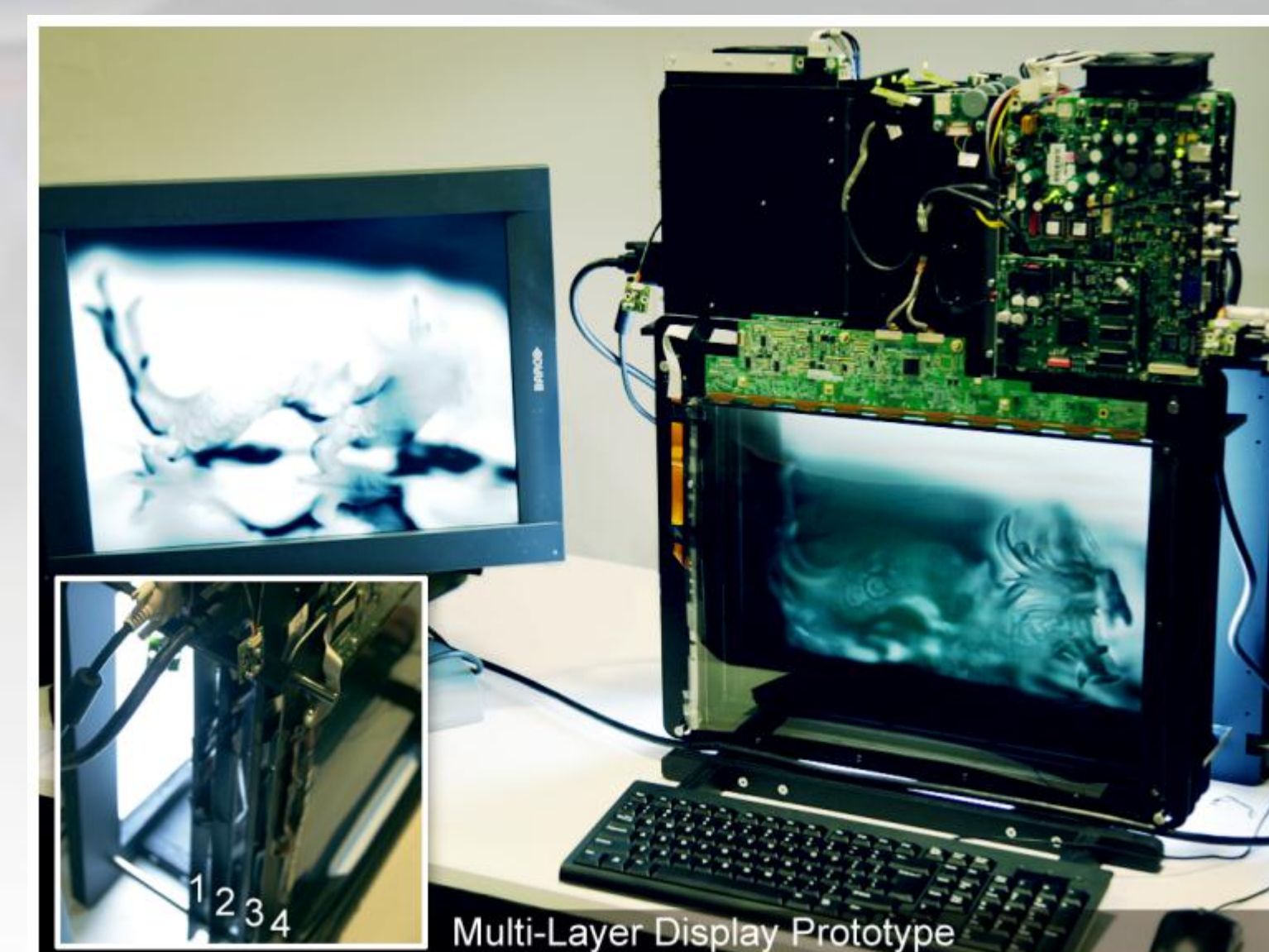

Applications:
Computational refocus

Passive range-finding
Object localization

Imaging for 3D displays

MIT Media Lab
Lanman, et al., 2011. Polarization fields: dynamic light field display using multi-layer LCDs. In *Proceedings of the 2011 SIGGRAPH Asia Conference* (SA '11).
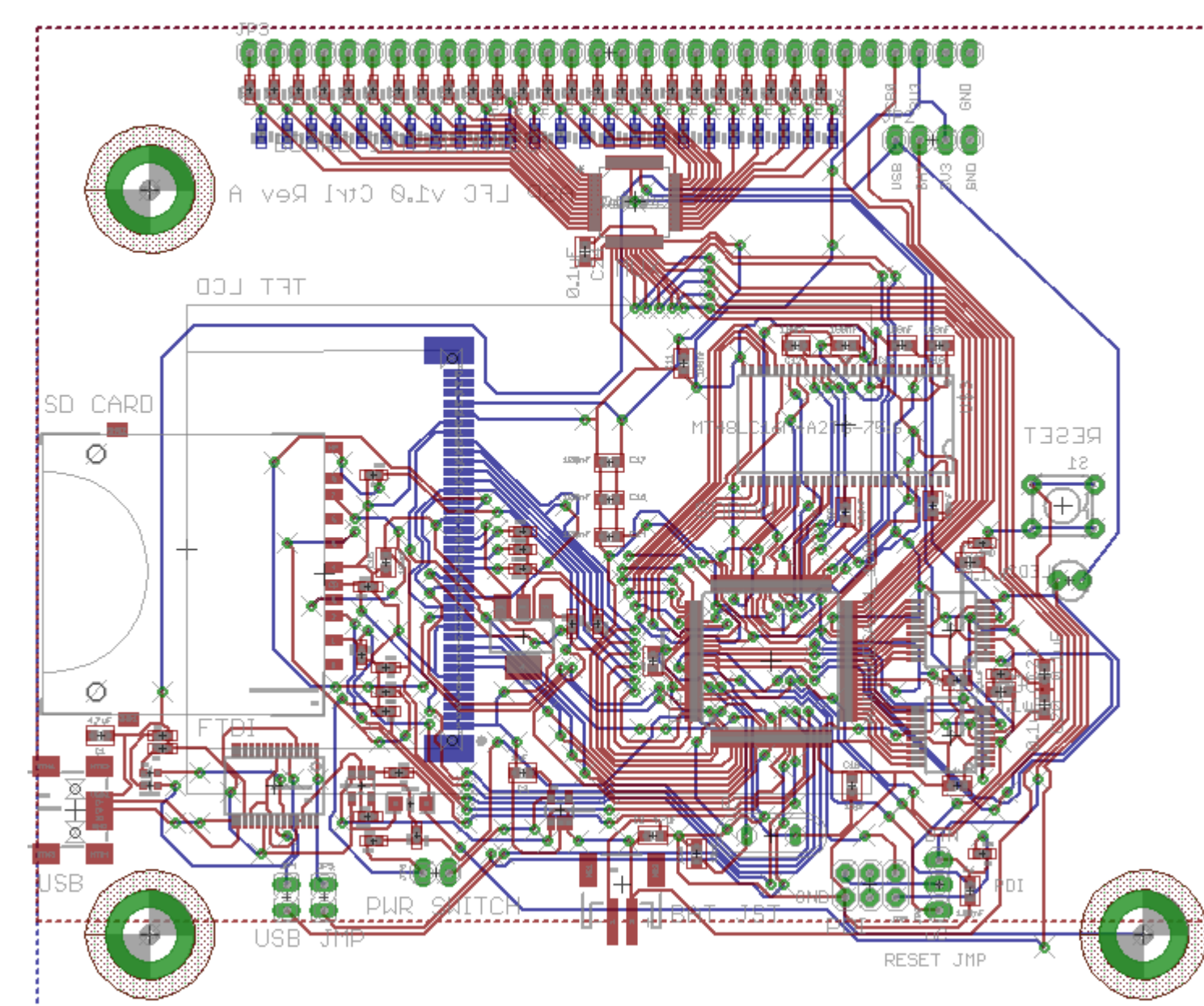
Competing approaches:

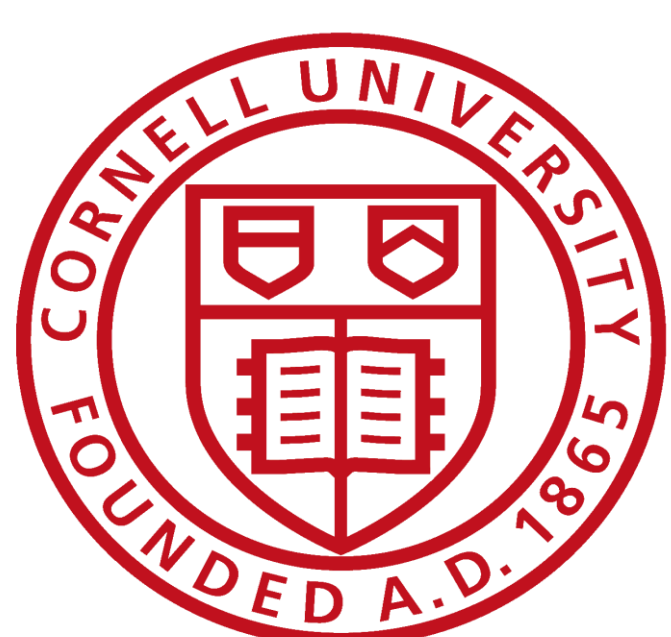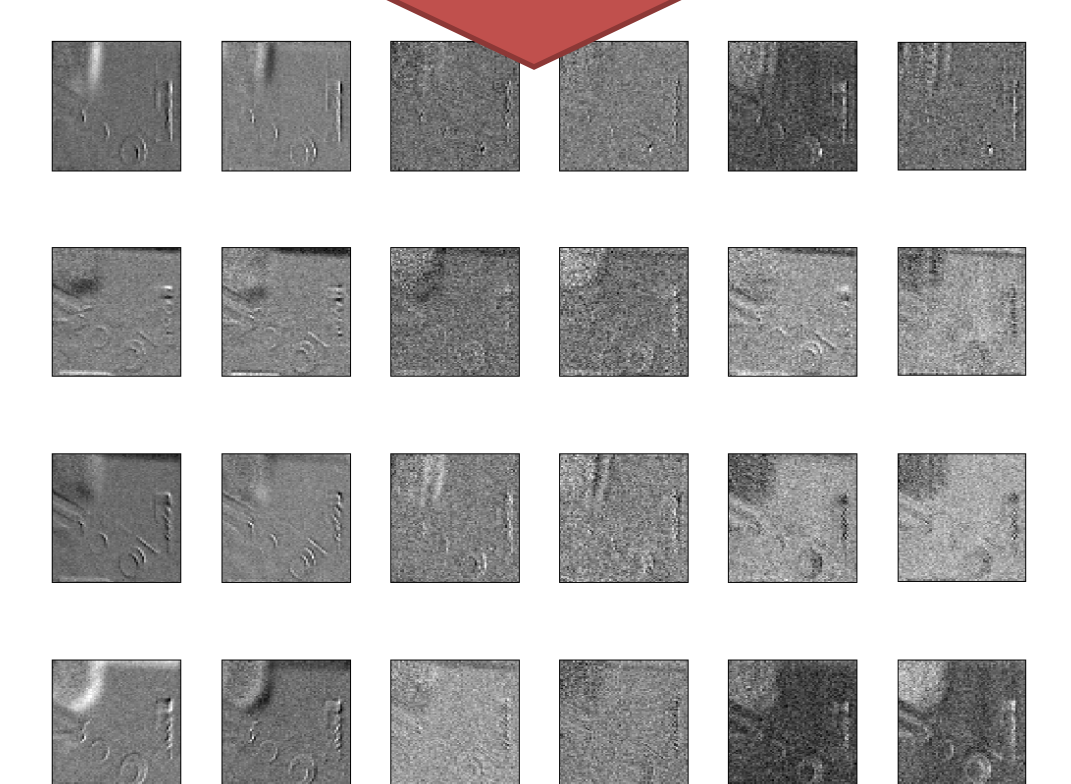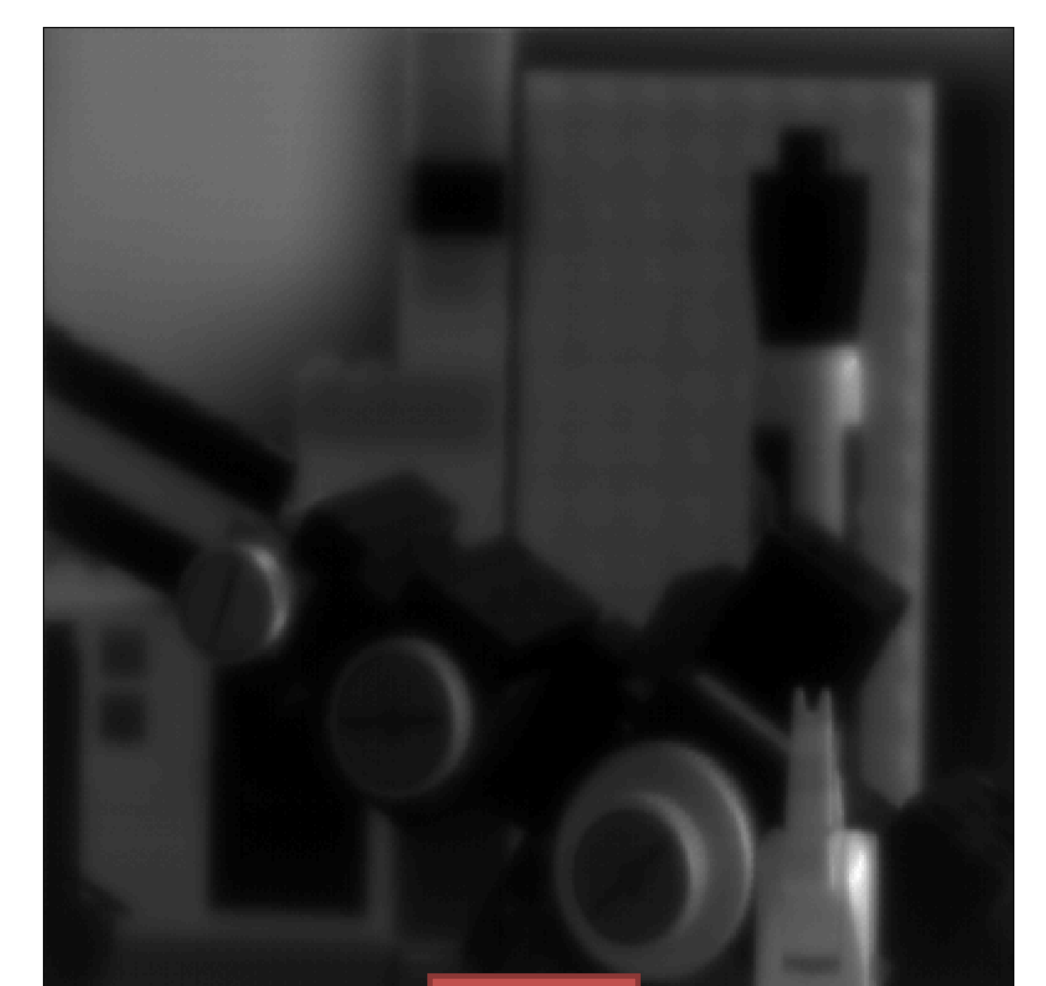Microlens (Lytro)   Macrolens (Adobe)   Pinhole mask (UMD)

ASPs require only a single lens, and have smaller light loss than sensor masks.

Current work:
Designing and building a camera prototype utilizing an ASP-based light field imager.

Atmel XMEGA microcontroller
Dual 80 MSPS ADC
Touchscreen TFT LCD
USB & SD-card enabled
Integrated LiPo battery charger

For more information:

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bits on our minds