

KEYNOTE TALK

Tuesday, November 18, 2025 at 1:30 pm

Computational Lensing

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Abstract: From the cameras in our phones to the lenses in VR headsets, optics shape how we capture and experience the world. In this talk, we explore the concept and implementation of a computational lens—a device that combines conventional optics and programmable elements to offer unprecedented control over how light is manipulated. Such lenses, for example, can enable spatially selective focusing or redistribute light to form arbitrary illumination patterns. These capabilities open new possibilities for imaging and display applications, including for 3D sensing, multifocal displays, and all-in-focus imaging.



Speaker Bio-Sketch: Matthew O'Toole is an Associate Professor with the Robotics Institute and Computer Science Department at Carnegie Mellon University. His research focuses on computational imaging: a field that combines optics, electronics, and computational processing to capture or display new forms of visual information. He received his Ph.D. from the University of Toronto, and was a Banting Postdoctoral Scholar at Stanford University. He is also the recipient of various awards, including an NSF CAREER award, a ACM SIGGRAPH Outstanding Thesis Honourable Mention award, several paper awards (ICCV 2025, CVPR 2025, SIGGRAPH 2023, CVPR 2022, CVPR 2014, and ICCV 2007), and best demo awards (ICCP 2023, CVPR 2015, and ICCP 2015).