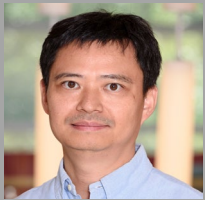# RUTGERS-CAMDEN
MATH SEMINAR SERIES

12:45PM -1:45PM, APRIL 24TH, 2025

ARMITAGE-121

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Stonybrook University

Title: Intelligent Projector Systems for Spatial Augmented Reality

Abstract: The rapid advancement of imaging techniques and artificial intelligence has revolutionized research and applications in visual intelligence (VI). In this talk, I will present our studies covering a broad range of topics in VI, including visual recognition, video understanding, visual enhancement, and relevant machine learning techniques, with applications in virtual/augmented reality, biomedical research, and more.

I will then present our recent work applying AI to projector systems for spatial augmented reality tasks. In particular, image-based relighting, projector compensation and depth/normal reconstruction are three important tasks of projector-camera systems (ProCams) and spatial augmented reality (SAR). Although they share a similar pipeline of finding projector-camera image mappings, in tradition, they are addressed independently, sometimes with different prerequisites, devices and sampling images. In practice, this may be cumbersome for SAR applications to address them one-by-one. In this talk, we propose a novel end-to-end trainable model named DeProCams to explicitly learn the photometric and geometric mappings of ProCams, and once trained, DeProCams can be applied simultaneously to the three tasks. DeProCams explicitly decomposes the projector-camera image mappings into three subprocesses: shading attributes estimation, rough direct light estimation and photorealistic neural rendering. In our experiments, DeProCams shows clear advantages over previous arts with promising quality and meanwhile being fully differentiable. Moreover, by solving the three tasks in a unified model, DeProCams waives the need for additional optical devices, radiometric calibrations and structured light patterns. We will also briefly show our recent work on language-guided projection content generation.

This is a joint work with Bingyao Huang.

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