



Colloquium

AUGUST 31, 2026

3:30 PM - 4:30 PM | 2048 CB

SUMMER REU STUDENT RESEARCH SYMPOSIUM



Edge-Informed PSF Estimation

Speaker: Nicholas Yamine (joint work with Toby Shu)

Abstract: Imaging devices capture real-world scenes with a blur traditionally modeled by a point spread function (PSF). Instead of using idealized point sources, this approach estimates PSFs from realistic, piecewise-smooth images by converting edges into diagnostic points using a convolutional edge detection kernel. Read more at Google Blog.



Quantum Error Correction Using Low-Density Parity-Check Codes

Speaker: Olivia Carzon

Abstract: Quantum computing overcomes classical limits in balancing efficiency with data retention, but requires error correction to survive noise. We address this by constructing advanced quantum low-density parity-check (QLDPC) codes. By leveraging the algebraic structure of 19th-century Dickson polynomials, we streamlined our search space to build high-girth, low-lifting-factor codes that outperform prior benchmarks for practical quantum scalability.



Covering the Numerical Range of Operators with Berezin Ranges on Subspaces of the Hardy Space

Speaker: Greg Yeghiyan (joint work with Caleb Cadez)

Abstract: This talk explores whether the numerical range of an operator can be covered by Berezin ranges of its unitary conjugates. For weighted shifts on finite-dimensional polynomial subspaces of the Hardy space, the authors show that—unlike the two-dimensional case—a countable collection of Berezin ranges is not enough; uncountably many are required. They also establish broader results for operators with finite-dimensional reducing subspaces and apply them to classify rank-one operators according to whether finitely or uncountably many Berezin ranges are needed.

Refreshments will be provided!