



DEPARTMENT OF  
MATHEMATICS  
Illinois State University

## ISU Algebra Seminar

**Time:** Thursday, March 23, 2023. 12:00 pm – 12:50 pm.

**Zoom Room ID:** 997 1216 4805

**Passcode:** ISU

**Zoom Room Link:** <https://illinoisstate.zoom.us/j/99712164805>

**Speaker:** Shiva Chidambaram (MIT)

**Title:** Computing isogeny classes of abelian surfaces

**Abstract:** Isogeny classes over  $\mathbb{Q}$  of elliptic curves over  $\mathbb{Q}$  have been widely studied. A result due to Kenku says that any such isogeny class contains at most 8 elliptic curves. Furthermore, Ghiloyan and Lozano-Robledo have classified all possible isogeny graphs. In this talk, we will investigate these questions in dimension 2. Given a principally polarized abelian surface (PPAS) over  $\mathbb{Q}$  with a trivial endomorphism ring, we will describe a practical algorithm to compute all the other PPASs in its isogeny class. We will also discuss the results of running our algorithm on the database of genus 2 curves in the LMFDB, and show several cool isogeny graphs showing up. This is joint work with Raymond van Bommel, Shiva Chidambaram and Jean Kieffer.

**About the Speaker:** Shiva Chidambaram is a research scientist in the Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation at MIT. He completed his Bachelors and Masters from IISER Pune in India, and he received his PhD in 2021 from the University of Chicago under the guidance of Prof. Frank Calegari.