

Colloquium

University of Notre Dame
Department of Mathematics

Lena Ji - University of Michigan

Speaker: Lena Ji
University of Michigan



Will give a lecture entitled
Curve fibrations on hypersurfaces

Date: Tuesday, November 14, 2023

Time: 4:00 PM

Location: 117 Hayes-Healy Bldg

Departmental Tea: Tea in Room 257 (lounge in Hurley Hall) at 3:30 p.m.

Zoom URL: <https://notredame.zoom.us/j/94209026501?pwd=d0hDdmRua0JETFV6MkpPSWFJZkZDQT09>
Meeting ID: 942 0902 6501 Passcode: 596816

Abstract:

The most basic algebraic varieties are projective spaces, and their closest relatives are rational varieties, i.e. varieties that admit a 1-to-1 parametrization by projective space on a dense open subset. Historically, rationality problems have been of great importance in algebraic geometry; for example, Severi was interested in finding rational parametrizations for moduli spaces, and the Lüroth problem was concerned with determining the rationality of certain varieties. Already for hypersurfaces, which are defined by a single polynomial equation in projective space, the rationality question is very difficult and subtle, especially when the degree of the hypersurface is low. On the other hand, if a variety is known to be non-rational, one can ask how different it is from projective space. Projective space (birationally) admits many fibration structures; for example, it is birational to $\mathbb{P}^1 \times \mathbb{P}^{n-1}$, and projection to each factor gives a fibration structure. Thus, restrictions on the fibration structures that a variety admits (on a dense open subset) give one way to measure “how irrational” a given variety is. We investigate this question for hypersurfaces, focusing on those of low degree. After giving a survey of some results on rationality of hypersurfaces, I will explain a result studying the structures of curve fibrations on hypersurfaces, and I’ll give an application to fibrations by higher-dimensional varieties. This talk is based on joint work with Nathan Chen, Benjamin Church, and David Stapleton.