UNIVERSITY OF NOTRE DAME

Algebraic Geometry and Commutative Algebra Seminar

Department of Mathematics

Guest Speaker: Bruno De Oliveira

University of Miami

Lecture Title:

Horikawa surfaces and extremal cotangent dimension

Date: Thursday, November 5, 2026

Time: 3:30 PM

Location: 258 Hurley Hall

Abstract:

Extremal cotangent dimension corresponds to two cases: Minimal, where there are no non-trivial symmetric differentials and Maximal, where there is maximal asymptotic abundance of symmetric differentials (i.e. the cotangent bundle is big). For surfaces maximal cotangent dimension implies the Green-Griffiths-Lang conjecture. Minimal Surfaces of general type with Chern numbers ratio $c_1^2/c_2 > 1$ have maximal cotangent dimension, while for $c_1^2/c_2 < 1$ maximality is dependent on the complex structure and in general hard to establish, more so the lower the ratio is. We examine the case with the lowest ratio, Horikawa surfaces. We show that the general Horikawa surface has minimal cotangent dimension (via a double cover approach) and unexpectedly show that there are Horikawa surfaces with maximal cotangent dimension (via a genus 2 fibration approach).