Rational Points, Rational Curves, and Positivity of Projective Varieties
Points rationnels, courbes rationnelles et positivité des variétés projectives
(Org: **Xi Chen** (Alberta) and/et **Nathan Grieve** (UNB))

ROYA BEHESHTI, Washington University
Spaces of rational curves on Fano hypersurfaces

I will discuss the geometry of moduli spaces of rational curves on Fano hypersurfaces focusing on some questions on dimension, irreducibility, and the Kodaira dimension of these spaces.

XI CHEN, University of Alberta
Log rational curves on log K3 surfaces

We prove that there are infinitely many log rational curves on a genuine log K3 surface if and only if it has a log K3 Iitaka model. This is a joint work with Yi Zhu.

CHUCK DORAN, University of Alberta and University of Maryland
Picard-Fuchs Equations and Shimura Subvarieties

We explain, both abstractly and through concrete examples, how the problem of detecting families of lattice-polarized K3 surfaces with higher-than-normal Picard rank can be recast in differential algebraic terms. Starting from the uniformizing differential equation for a moduli space, we provide a complete differential algebraic characterization of the totally geodesic divisors. Rational solutions to these differential equations then correspond to rational divisors on which the Picard rank increases by one. This is joint work with Andrew Harder, building on special cases previously studied with Adrian Clingher, Jacob Lewis, Hossein Movosati, and Ursula Whitcher.

NATHAN GRIEVE, UNB
Approximating rational points of varieties over function fields

I will discuss recent results, motivated by work of McKinnon-Roth in the number field setting, which pertain to approximation constants for points of projective varieties over function fields. My intent is to explain how the subspace theorem and measures of local positivity are used in the proof of these results and also to describe the relation to rational curves.

JAMES LEWIS, University of Albeta.ca
The Business of Height Pairings

In algebraic geometry there is the notion of a height pairing of algebraic cycles, which lies at the confluence of arithmetic, Hodge theory and topology. After explaining a motivating example situation, we introduce new directions in this subject. (This is joint work with Souvik Goswami, and will appear in a special volume in honour of Steven Zucker's 65th birthday.)

DAVID MCKINNON, University of Waterloo
Rational points and rational curves

Rational points should accumulate on rational curves. In this talk, I'll describe some ways in which humanity (in the persons of myself and Mike Roth of Queen's University) have found reasons to believe in this moral, and in some cases even taken the conditional out of that sentence.

JENNIFER PARK, University of Michigan

A heuristic for boundedness of elliptic curves

I will discuss a heuristic that predicts that the ranks of all but finitely many elliptic curves defined over $\mathbb{Q}$ are bounded above by 21. This is joint work with Bjorn Poonen, John Voight, and Melanie Matchett Wood.

DINGXIN ZHANG, Stony Brook University

Degeneration of slopes

Given a smooth family of algebraic varieties over a perfect field of characteristic p, Grothendieck proves that the Newton polygons of their cohomologies jump up under specialization. I shall present a result that generalizes this phenomenon when the family acquires singularities. This could be thought as an equal characteristic version of a theorem of Berthelot, Esnault and Rülling.