Menos

Texas Algebraic Geometry Seminar 2019
Fall Program:

The Texas Algebraic Geometry Symposium is a joint seminar of Rice University, Texas A&M University, and the University of Texas at Austin. This conference aims to bring to a regional audience the latest developments in Algebraic Geometry.

This Fall there will be a weekend program to complement the main conference series. These events will be held at Texas A&M campus on October 5 and October 6.

Jennifer Balakrishnan, Boston University.
Matthew Ballard, University of South Carolina.
Daniel Erman, University of Wisconsin-Madison
Sarah Frei, Rice University.
Jessica Sidman, Mt. Holyoke College
Emanuele Ventura, Texas A&M University.
Ursula Whitcher, University of Michigan.

Organizers: Gregory Pearlstein, Anne Shiu, Frank Sottile, Anthony Várilly-Alvarado.
Registration: If you would like to attend the conference and you are not a speaker or affiliated with Texas A&M, please contact Gregory Pearlstein via email by September 5'th. Limited travel support is available to graduate students and early career faculty.
Local Information: www.math.tamu.edu/~laura/TAGS2015/local.html.
Contact Email: gpearl@math.tamu.edu

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Schedule: All talks in Blocher 166.

October 5'th	October 6'th.
10:30 – 11:00: Registration (Blocker 141)	9:00 – 10:00: Matthew Ballard.
11:00 – 12:00: Jennifer Balakrishnan	10:00 – 10:15: Break. (Blocker 141)
12:00 – 1:30: Lunch	10:15 – 11:15: Ursula Whitcher
1:30 – 2:30: Sarah Frei	11:15 – 11:30: Break (Blocker 141)
2:30 – 3:00: Tea (Blocker 141)	11:30 – 12:30: Emanuele Ventura
3:00 – 4:00: Jessica Sidman	
4:00 – 4:20: Break (Blocker 141)	
4:20 – 5:20: Daniel Erman	

Titles and Abstracts:

Jennifer Balakrishnan
Title: Chabauty-Coleman experiments for genus 3 hyperelliptic curves
Abstract: We describe a Chabauty--Coleman computation of rational points on genus 3 hyperelliptic curves defined over the rationals whose Jacobians have Mordell--Weil rank 1, which was carried out on approximately 17,000 curves from a forthcoming database of genus 3 hyperelliptic curves. We discuss a few surprising examples where the zero locus includes global points not found in the set of rational points. This is joint work with Francesca Bianchi, Victoria Cantoral-Farfán, Mirela Çiperiani and Anastassia Etropolski.

Matthew Ballard
Title: Rationality for tori and permutation modules
Abstract: Given a variety X over a field k is the field of functions k(X) a purely transcendental extension of k. Understanding this question and similar ones tackling the birational geometry of algebraic varieties has been a prime motivating factor in the field. In general, it is a deep and difficult question. For this talk, I will focus on the situation of tori - those algebraic groups that base change to group of units of a field. Due to work of Voskresenskii and others, rationality questions can be repackaged in terms of properties of finite group actions on free finite rank abelian groups. We will give an overview of these ideas.

Daniel Erman
Title: Limits of polynomials rings.
Abstract: I will discuss some ways to think about a limit of a polynomial ring in n variables as n goes to infinity, and how this can be to study complexity problems in algebraic geometry. This is joint work with Steven V Sam and Andrew Snowden.

Sarah Frei
Title: Moduli spaces of sheaves on K3 surfaces
Abstract: Moduli spaces of sheaves on K3 surfaces provide rich and interesting examples of higher dimensional varieties. They have been well-studied when defined over the complex numbers because they are one of the known families of hyperkaehler varieties. However, many of their arithmetic properties when defined over an arbitrary field are still unknown. In this talk, I will tell you about some new results in this direction.

Jessica Sidman
Title: Equations for matroid varieties
Abstract: Each point x in G(k,n) corresponds to a k x n matrix A_x which gives rise to a matroid M_x on the columns of A_x. Gelfand, Goresky, MacPherson, and Serganova showed that the sets {y in G(k,n) | M_y = M_x} form a stratification of G(k,n) with many beautiful properties. However, results of Mnev and Sturmfels show that these strata can be quite complicated, and in particular may have arbitrary singularities. In this talk we will focus on constructions giving defining equations of the matroid variety V_x given by the closure of the stratum associated to M_x. If M_x is a positroid, then Knutson, Lam, and Speyer have shown that the ideal of V_x is generated by Plucker coordinates, but this is not true for arbitrary matroids. We describe how the Grassmann-Cayley algebra may be used to generate non-trivial equations in the ideal of V_x when the geometry of M_x is sufficiently rich. This work is joint with Will Traves and Ashley Wheeler.

Emanuele Ventura
Title: Singular curves and osculating spaces
Abstract: How bad can the singularities of a curve of degree d in projective n-space be? The study of this question is very classical. Even for plane curves, all possible configurations of singularities are only known in low degrees. In higher dimensions, much less is known. In the eighties, Piene and Eisenbud-Harris studied flags of osculating spaces attached to linear series on curves. In this talk, we introduce a gadget (called multifiltration) obtained by combining those flags. We use it to give upper bounds on the arithmetic genus of projective curves in some ranges. We classify all configurations of singularities that can arise when any smooth curve (embedded by a complete linear system) is projected from a linear space of dimension at most two. With these techniques, one can describe the Schubert cycles giving rise to these projections. This is joint work with J. Buczyński and N. Ilten.

Ursula Whitcher

Title: Hasse-Witt matrices and mirror toric pencils

Abstract: Mirror symmetry suggests unexpected relationships between arithmetic properties of distinct families of algebraic varieties. For example, Wan and others have shown that for some mirror pairs, the number of rational points over a finite field matches modulo the order of the field. We obtain a similar result for certain mirror pairs of toric hypersurfaces. We use recent results by Huang, Lian, Yau and Yu describing the relationship between the Picard-Fuchs equations of these varieties and their Hasse-Witt matrices, which encapsulate information about the number of points. The result allows us to compute the number of points modulo the order of the field explicitly. We illustrate this by computing K3 surface examples related to hypergeometric functions. This talk is joint work with Adriana Salerno (Bates College).

Participants

Kashi Bari	Texas A&M University
Roberto Barrera	Texas State.
Christopher Bott	Texas A&M University
Taylor Brysiewicz	Texas A&M University
Chia Yu Chang	Texas A&M University
Austin Conner	Texas A&M University
Matthew Faust	Texas A&M University
Soumendra Ganguly	Texas A&M University
Tom Gannon	UT Austin
Luis Garcia Puente	Sam Houston State University
Souvik Goswami	Texas A&M University
Rok Gregoric	UT Austin
Tanuj Gupta	Texas A&M University
Alicia Harper	Texas A&M University
Hang Huang	Texas A&M University
Wei-Cheng Huang	Texas A&M University
Austen James	Rice University
Hooshen Li	Texas A&M University
Zai Feng Lin	Texas A&M University
Laura Matusevich	Texas A&M University
Dustin McPhate	Texas A&M University
Scott Nollet	Texas Christian University
Nida Obatake	Texas A&M University
Matt Papanikolas	Texas A&M University
Gregory Pearlstein	Texas A&M University
Jack Petok	Rice University
Kaitlyn Phillipson	St. Edwards University
Alexander RuysdePerez	Texas A&M University
Shuhui Shi	Texas A&M University
Anne Shiu	Texas A&M University
Aleksandra Sobieska-Snyder	Texas A&M University
Frank Sottile	Texas A&M University
Peter Stiller	Texas A&M University
Zonglin Tian	Texas A&M University

Anthony Várilly-Alvarado	Rice University
Elise Walker	Texas A&M University
Nate Welty	Texas A&M University
Robert Williams	Sam Houston State University
Guangbo Xu	Texas A&M University
Thomas Yahl	Texas A&M University
Byeongsu Yu	Texas A&M University
Shifan Zhao	Texas A&M University