Tuesday, September 22, 4:30 p.m. Jeffery 422
Seminar on Free Probability and Random Matrices
Speaker: Jamie Mingo
Title: The Partial Transpose of Unitary and Orthogonal Matrices

Abstract: In quantum information theory a frequently used test for entanglement is the positive partial transpose test. For a Wishart matrix Aubrun found the aspect ratio that guarantees a non-positive positive partial transpose and thus entanglement. Mihai Popa and I considered the interaction between a Wishart matrix and its partial transpose. We showed that the matrix, its full transpose and its partial transposes are asymptotically free. In this talk I will consider what happens when we consider orthogonal and unitary matrices.

Seminar website: http://www.mast.queensu.ca/~mingo/seminar/
Friday, September 25, 11:00 a.m. Jeffery 422
Speaker: Shuntaro Yamagishi
Title: The asymptotic formula for Waring’s problem in function fields

Abstract: Waring’s problem is regarding the integer solutions of the equation \( x_1^k + \ldots + x_s^k = n \) for \( n \in \mathbb{N} \). We know due to T. Wooley that if the number of variables \( s \) satisfies \( s \geq 2k^2 - 2k - 8 \) \( (k \geq 6) \), then the number of solutions to the equation satisfies the expected asymptotic formula. We consider this question in the setting of \( F_q[t] \), where \( F_q \) is the finite field of \( q \) elements.

Friday, September 25, 2:30 p.m. Jeffery 234
Speaker: Andrew McEachern
Title: Woven String Kernels and a problem of Analyzing DNA Sequences

Abstract: Woven string kernels are a form of evolvably, directed, acyclic graphs specialized to perform DNA classification. Part of this talk is devoted to a visualization technique called non-linear projection, an evolvable form of multidimensional scaling that is used in the analysis of experimental results. The woven string kernels are tested on simple and complex synthetic data as well as biological data, using an evolutionary algorithm to find woven string kernels that are acceptable solutions for classification.

Monday, September 28, 4:30 p.m. Jeffery 319
Speaker: Gregory G. Smith
Title: Nonnegativity certificates on real projective curves

Abstract: How can one use sums of squares to characterize nonnegative polynomials? In this talk, we will review some general methods for certifying that a polynomial is nonnegative on a real projective subvariety. We will then present new optimal degree bounds for certificates on real projective curves. This talk is based on joint work with Grigoriy Blekherman and Mauricio Velasco.

Wednesday, September 30, 3:00 p.m. Jeffery 319
Speaker: Mike Roth
Title: Vector bundles in geometry

Abstract: We will discuss some of the reasons for the importance of vector bundles in geometry, and also give a brief overview of some of the topics concerning vector bundles on surfaces that we hope to discuss during the year.