INFO SHEET

September 28, 2010

QUEEN'S UNIVERSITY AT KINGSTON
Department of Mathematics and Statistics
http://www.mast.queensu.ca

CALENDAR		
Wednesday, September 29	**Statistical Methods Seminar** **Time: 3:30 p.m.** **Place: Jeffery 115**	**Speaker:** Wesley Burr, Queen's University **Title:** The Jackknife: An Introduction **Abstract Attached**
Wednesday, September 29	**Curves Seminar** **Time: 3:30 p.m. – 5:00 p.m.** **Place: Jeffery 319**	**Speaker:** Tony Geramita, Queen's University **Note:** We will meet even though there is a department meeting. **Abstract Attached**
Friday, October 1	**Number Theory Seminar** **Time: 11:30 a.m. – 12:20 p.m.** **Place: Jeffery 422**	**Speaker:** Adam Felix, Queen's University **Title:** Generalizing Artin's Conjecture **Abstract attached**
Friday, October 1	**Department Colloquium** **Time: 2:30 p.m.** **Place: Jeffery 234**	**Speaker:** Michael Dewar, Queen's University **Title:** Combinatorics via modular forms **Abstract Attached**
Monday, October 4	**Statistics Seminar** **Time: 3:30 pm – 4:30 pm** **Place: Jeffery 225**	**Speaker:** Granville Tunnicliffe-Wilson, Lancaster University, UK **Title:** Atmospheric CO2 and global temperatures: The strength and nature of their dependence **Abstract Attached**
Monday, October 4	**Algebraic Geometry Seminar** **Time: 4:30 pm – 5:30 p.m.** **Place: Jeffery 319**	**Speaker:** Jaimal Thind, Queen's University **Title:** Quiver representations in super-category **Abstract Attached**

Items for the Info Sheet should reach Anne (burnsa@mast.queensu.ca) by noon on Monday. The Info Sheet is published every Tuesday.

Data Projectors and Notebook Computers for Class Use
The Department has 4 Toshiba laptops, 2 external DVD-RW drives two NEC projectors and one Panasonic projector. Please see Anne Burns (burnsa@mast.queensu.ca) in the Main Office to reserve the notebook computers and data projectors.

Wednesday, September 29, 3:30 p.m. Jeffery 115 **Statistical Methods Seminar**
Speaker: Wesley Burr
Title: The Jackknife: An Introduction

Abstract: We will examine several of the seminal papers that led up to the formulation of the jackknife and explore the fundamental algorithm. If time allows, we will begin exploring some of the possible applications through several examples, although this will likely be left until next week.

Wednesday, September 29, 3:30 p.m. Jeffery 319 **Curves Seminar**
Speaker: Tony Geramita

Abstract: This week I will finish the general description of projective varieties and introduce the notion of the Hilbert Function of the Homogeneous Coordinate ring of a projective Variety.

We will calculate the Hilbert function of some simple algebraic varieties and see what those calculations tell us.

Friday, October 1, 11:30 a.m. Jeffery 422 **Number Theory Seminar**
Speaker: Adam Felix
Title: Generalizing Artin's Conjecture

Abstract: In this talk we will generalize Artin's conjecture for primitive roots to multiple settings, and in some cases with much improved error terms.

Friday, October 1, 2:30 p.m. Jeffery 234 **Department Colloquium**
Speaker: Michael Dewar
Title: Combinatorics via modular forms

Abstract: We show how to answer some fundamental questions in combinatorial number theory using modular forms. Modular forms are analytic functions which play a central role in modern number theory. We describe a beautiful application to the theory of partitions. Ramanujan famously proved congruences modulo 5, 7, and 11 for the partition-counting function (for example, he showed that $p(5n+4) = 0$ modulo 5). He speculated that there were no other such congruences, and in 2003 Ahlgren and Boylan proved that this was indeed the case. We provide a broad generalization of this phenomenon. We illustrate with several examples and place this phenomenon in context by giving the exact probability of having a "Ramanujan Congruence".

Monday, October 4, 3:30 p.m. Jeffery 225 **Statistics Seminar**
Speaker: Granville Tunnicliffe-Wilson
Title: Atmospheric CO2 and global temperatures: The strength and nature of their dependence

Abstract: If global temperatures increase as predicted, the economic impact will be serious. Yet many question the reliability of past records of temperature trends and also the presumed dependence of these trends on the increasing levels of atmospheric CO2. The nature of the records of these two series is very different; atmospheric CO2 levels have been measured with extreme relative accuracy and objectivity at one site (Mauna Loa) for over 50 years, whilst over the same period global temperature anomalies of less than plus or minus half of one degree (Celsius) have been compiled from many hundreds of sources with highly variable diurnal and seasonal variation. In this study I apply well established time series methods to a statistical investigation of the dependence between annual records of these two series, and find a surprisingly strong relationship between the variations about their respective trends. This is seen most directly in their high spectral coherency across a broad frequency range. One of the main conclusions is that a signal can be simply extracted from the CO2 levels that fits global temperatures remarkably well. An important implication is that these (temperature) records constitute a genuine and accurate environmental measure. I go on to construct both structural VAR models and transfer function models that I believe will help to inform scientific understanding of the causal nature of the dependence between these series. This understanding is aided by including, at an early stage of the analysis, a further, mutually dependent, series, the Southern Oscillation Index. As a final note we demonstrate statistical evidence for the effect of changes in oil prices on changes in atmospheric CO2

Monday, October 4, 4:30 p.m. Jeffery 319 **Algebraic Geometry Seminar**

Speaker: Jaimal Thind

Title: Quiver representations in super-category

Abstract: Briefly, a quiver is an oriented graph, and a representation of a quiver, is the choice of vector spaces at each vertex and linear maps corresponding to each edge. Gabriel's Theorem establishes a combinatorial connection between quiver representations and Lie Theory. Studying representations of quivers has also allowed for geometric constructions of bases for representations of Lie algebras, called crystal bases. For the Lie super-algebra gl(m,n), crystal bases have been shown to exist by Benkart, Kang and Kashiwara. Currently, we are interested in attempting to use representations of quivers in the super-category to obtain a geometric construction of the crystal bases for gl(m,n) similar to the classical constructions.

In this talk, after reviewing the classical picture, we will define the category of super-representations of a quiver and explain how, in the case of quivers of type A(m,n), Gabriel's Theorem extends. We will also describe the representation varieties in the super-category, which should serve as the starting point for any future geometric constructions.