

The Ivan and Betty Niven Distinguished Lectures

University of British Columbia

March 5 - 6, 2007

The UBC Department of Mathematics is proud to present a series of lectures on Number Theory presented by Fernando Rodríguez-Villegas of the University of Texas at Austin.



These lecture series were made possible through a generous bequest received from Ivan and Betty Niven.

In honor of their generous support, the Department of Mathematics has established a permanent endowment fund, "The Ivan and Betty Niven Distinguished Lectures Fund", the income from which will fund a series of annual lectures on a broad array of topics in Mathematics.

Lecture # 1 (Mathematics Colloquium) Monday, March 5, 4:00-5:00, MATX 1100 Combinatorics as geometry

Ever since Weil we know that counting points of varieties over finite fields yields topological information about them. In this talk I will describe such a calculation for certain character varieties, parameterizing representations of the fundamental group of a Riemann surface into GL_n .

I will discuss the main ingredients of the calculation, which involves an array of techniques from combinatorics and representation theory of finite groups of Lie type. The outcome of the calculation has several geometric consequences about the varieties; for example, it allows us to compute their topological Euler characteristic. But more importantly they naturally suggest interesting conjectures about their mixed Hodge polynomials.

Besides their intrinsic interest the varieties in question are closely related to the moduli spaces of Higgs bundles on the surface. Somewhat surprisingly we discover a tight connection between the geometry of these character varieties and the Macdonald polynomials of combinatorics.

This is joint work with T. Hausel and E. Letellier.

Tea, 3:45, MATX 1115

Lecture # 2 (Student Lecture) Tuesday, March 6, 3:30-4:30, MATH 203 Puzzles and groups

In this talk I will discuss several puzzles (15-puzzle, lights-out, Rubik's cube, Blet, etc.) and how they are related to group theory. We will see how group theory can give important insights into the structure of the puzzles and, in some cases, provides a complete solution.

Refreshments, 4:30, MATX 1115

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<http://www.math.ubc.ca/~mlalin/niven.html>