Prize Lectures

ANDREI BULATOV, Simon Fraser University
Counting Problems: Complexity and Applications

The problem of finding the number of solutions of combinatorial problems have found a wide range of applications from discrete mathematics, to sampling and approximation, to statistical physics. In this talk we focus on one of the problems of this kind: counting homomorphisms between relational structures, also known as the Counting Constraint Satisfaction Problem (Counting CSP). We review the connections of the Counting CSPs to other areas of mathematics and computer science, and survey (relatively) recent results that have led to an exhaustive classification of such problems in terms of their computational complexity.

ANDRE JOYAL, UNIVERSITÉ DU QUÉBEC À MONTRÉAL

MATILDE LALIN, Université de Montréal
Special values of L-functions up close and from afar

L-functions are generalizations of the Riemann zeta function and play a central role in our understanding of certain arithmetic objects. In this talk we will introduce these objects and some of their amazing properties. We will see two points of view for understanding their special values: looking at them individually (for example, as arising from regulators and Mahler measure) and looking at them in families and studying their distribution (for example, by using moments).

DAN WOLCZUK, Waterloo
Enhancing Student Engagement

One of the most vital components in any learning activity is that the students are actually engaged in the learning process. The quality of an activity is irrelevant for students who are inattentive and uninterested. So, how do we grab these students' attention? How do we change the meaning of 'attendance issues' from 'how do we get more students to attend lectures' to 'there aren't enough seats for all the students wanting to come to class'?

In this talk I'll discuss the strategies, some definitely non-standard, that I have found the most successful for enhancing student engagement. In the process, I hope to share with you my enthusiasm and passion for teaching and student learning.