

## Report for SFU Computational Mathematics Day 2010, August 12th

CMD Day built upon the longstanding event of the CECM Summer meeting. Building upon the infrastructure and format of the previous meeting, we actively expanded the mandate to include a wider audience. The end result was an increase of attendance of 50%, and an increased student participation of 100% from typical years. The numbers alone don't tell the whole story.

### \*Impact: Cross Pollination\*

This main impact of this event was that we successfully brought together a very diverse collection of mathematical interests, from applied math, to combinatorics, to number theory, all under the common umbrella of computation. The participants cover a very wide spectrum of our scientific interests, and indeed offer a snapshot of our present department.

### \*Impact: Student Training\*

A second main impact is the training of students. The poster session was a remarkable success: there were 27 posters by grad students, undergraduates, and even one high school student. Smaller print outs of these posters are now on display in the mathematics department. Students had a great opportunity to summarize, and present their work. This experience will prepare the students for wider audiences, such as the student poster session at the upcoming Canadian Mathematical Society meeting. Furthermore, because the talks were targeted at a more general audience around a precise theme (computation), the talks were simultaneously engaging, and accessible even to undergraduates.

### \*Scientific content\*

Speakers:

Andrew Rechnitzer (UBC) GAS Sampling of polygons and knot probability ratios  
Nils Bruin (SFU) Decidability of the existence of rational points on algebraic curves  
Ann Greenbaum (Washington) Crouziex's conjecture and perturbed Jordan blocks  
Nilima Nigam (SFU) How do bones grow? From Lab to desktop, a mathematical journey  
Mary-Catherine Kropinski (SFU) Fast intergral equation methods for the heat equation and the modified Helmholtz equation in two dimensions  
Michael Monagan (SFU) Sparse Polynomial Interpolation

Posters: Two prizes were awarded in each category.

Graduate:

Mahdi Javadi, On Sparse Interpolation over Finite Fields (runner up)  
Bryan Quaife, Fast Integral Equation Methods for the Modified Helmholtz Equation  
Andrew Arnold, A fast recursive algorithm for computing cyclotomic polynomials  
Todd Keeler, Rendering Smoke via Fast Vortex Methods  
Sophie Burrill, On  $k$ -crossings and  $k$ -nestings of permutations  
Cory Ahn, Multiplication of Univariate Polynomials over Algebraic Number Fields  
Radina Droumeva, Image Segmentation: Finding Eyeballs in 3D Brain MRI Images  
Natalia Iwanski, Directionality of Criminal Vectors- Phase 2: Modelling Disruptions along an Offender's Journey to Crime  
Aki Ayukawa Avis, Using a Power Filter to Search for Golay Triads  
Brittany Froese, Fast Finite Difference Methods for the Elliptic Monge-Ampere Equation  
Reanne Bowlby, Simulating  $N$ -class Pedestrian Flow Using CLAWPACK  
Behnam Torabi, Mathematical Models for Self-organization of Biological Groups  
Parousia Rockstroh, The Closest Point Method  
Mariolys Rivas,  $D$ -finite symmetric functions  
Kevin Mitchell, Asymptotics of the rotating shallow water problem (first place)

Undergraduate:

Robert Shih, Plotting Algebraic Plane Curves Containing Singularities  
Niamh Chaparro, An Intro to the Dissipative Particle Dynamics Simulation Method  
Michael de Guzman, A Nonlocal Isoperimetric Problem  
Valerie Chong (highschool), The Math Behind Your Childhood Toys  
Michael Fry, Dynamical Systems in the Cognitive Architecture of Syllabification  
Amy Wiebe, A new construction of Golay sequences of length  $2^m$   
Aleksandar Vlasev & Konrad Duch, Calculation of Feynman Integrals using Dodgson Polynomial Identities  
Yuanxun Bill Bao, Linear Instability of a Wave in a Density Stratified Fluid (first place)  
Gordon Hiscott, A Mathematical Model & Numerical Studies of Cyclical Neutropenia  
Navid Alaei, Study of Trilateral Arabic Root Words (runner up)  
Brad Jones, Permutation bijections

Link: [http://events.irmacs.sfu.ca/Computational\\_Math\\_Day/posters](http://events.irmacs.sfu.ca/Computational_Math_Day/posters)