Combinatorics, topology and statistical mechanics of polymer models I
(Organizer and Chair / Responsable et président: **Nicholas Beaton** (University of Saskatchewan) and/et **Andrew Rechnitzer** (University of British Columbia))

JAVIER ARSUAGA, UC Davis
Topological analysis of chromosome conformation capture data.

Chromosome conformation capture (CCC) data provides an unprecedented opportunity to analyze the three dimensional organization of genomes. The richness of the data, the apparently endless 3D trajectories that explain the data and their accuracy call for new mathematical methods. In this talk I will present new topological tools for analyzing three dimensional reconstructions of the genome and show that knotted trajectories are consistent with the CCC experimental data available. Since multiple 3D models of he genome fit the CCC data we suggest that CCC data are inconclusive about the topology of the genome.

GERASIM ILIEV, Department of Chemistry, University of Toronto
Order parameters for copolymers interacting with inhomogeneous surfaces

We consider several models of polymers interacting with an impenetrable surface, focusing on the phase diagram in each case. Within each phase, we calculate various order parameters to further explore the polymer configurations in the thermodynamic limit.

EJ JANSE VAN RENSBURG, York University
Forces and Pressures in Models of Partially Directed Paths

A partially directed path in a half-lattice loses entropy if it is confined by vertical walls and this models polymeric entropy in confined spaces. This loss in entropy induces an entropic force on the walls, pushing them apart. In this talk we will determine the generating and partition functions of models of partially directed walks in the half-lattice, and compute the entropic forces and pressures from the partition function. In addition, some results on the asymptotic behaviour of the entropic forces and pressure will be discussed. This work was done in collaboration with Thomas Prellberg.

ALEKS OWCZAREK, The University of Melbourne
Three Interacting Friendly Directed walks; A Simple Model of Polymer Gelation

We study three friendly directed walks in the bulk on the square lattice interacting via site contact potentials. We allow for different potential values depending on how many walks visit a site simultaneously. This provides a simple model of polymer gelation. We demonstrate that the model can be solved using the obstinate kernel method and displays a novel phase diagram.

ERIC RAWDON, University of St. Thomas
What knots lurk inside other knots?

For a fixed knot configuration, subknots are the knot types seen in the open subarcs of the configuration. For nice knot configurations (like ones minimized with respect to some knot energy), the subknots are typically simpler knot types than the host knot type. We compare and contrast the set of subknots coming from KnotPlot configurations, tight knot configurations, and random configurations. This is joint work with Ken Millett and Andrzej Stasiak.