## Combinatorics, topology and statistical mechanics of polymer models III

(Organizer and Chair / Responsable et président: **Nicholas Beaton** (University of Saskatchewan) and/et **Andrew Rechnitzer** (University of British Columbia))

**NICHOLAS BEATON**, University of Saskatchewan

*Solvable self-avoiding walk and polygon models with large growth rates*

I consider subclasses of self-avoiding walks (SAWs) and polygons (SAPs) on two-dimensional regular lattices, for which the generating functions of objects of size $n$ can be explicitly determined. This sets these subclasses apart from the overall SAW and SAP models, for which no expressions for the generating functions are known. These subclasses have exponential growth rates larger than any previously-solved subclasses, and are thus in some sense 'closer' to general SAWs and SAPs than anything that has come before.

**RICHARD BRAK**, The University of Melbourne

*Coxeter Groups and Exactly Solvable Polymer Models*

The talk will discuss how Coxeter and Affine Coxeter groups appear in the various methods of exact solutions of lattice path models of polymer systems.

**GREG BUCK**, Saint Anselm College

*What you can see from here: local recognition*

It now seems very likely that topoisomerase II, the family of enzymes responsible for detangling DNA, uses a kind of local geometric recognition to read global topology. How does this work? What about the larger picture? What are the possibilities for this sort of geometric recognition? That is, when and why does local information carry a signal about global structure?

**JASON CANTARELLA**, University of Georgia

*Random Embedded Planar 4-Regular Graphs and Random Knot Diagrams*

A natural combinatorial model for random knotting is the idea of taking a random knot diagram chosen from the finite set of such diagrams with $n$ crossings and asking for the knot type of the resulting diagram. In this talk, we'll discuss results from a new computer enumeration of all the knot diagrams (for small $n$) based on expanding candidate embedded planar simple graphs with vertex degree $\leq 4$ produced by Brinkmann and McKay's *plantri* code and classifying the resulting embedded planar 4-regular multigraphs by embedded isomorphism type.

**TETSUO DEGUCHI**, Ochanomizu University

*Topological polymers through the quaternionic algorithm*

We study numerically statistical properties of topological polymers [1] by applying the quaternionic algorithm for generating random walks [2].

Ref. [1] E. Uehara, R. Tanaka, M. Inoue, F. Hirose and T. Deguchi, Mean-square radius of gyration and hydrodynamic radius for topological polymers evaluated through the quaternionic algorithm, Reactive and Functional Polymers Vol. 80 (2014) 48-56.

Ref. [2] J. Cantarella, T. Deguchi, and C. Shonkwiler, Probability Theory of Random Polygons from the Quaternionic Viewpoint, Comm. Pure Appl. Math. Vol. 67, 1658-1699 (2014).