KNOTS & APPLICATIONS

Workshop
Numerical Knots: Models and Simulations

8-9 June, 2011

Mathematical Research Centre (CRM) "Ennio De Giorgi"
Scuola Normale Superiore – Pisa, Italy

URL: http://www.crm.sns.it/hpp/events/event.html?id=146

Since its birth, knot theory has confronted the challenges of effective representation and recognition of distinct knot types and the efficient simplification of knot representations. Now, knots endowed with physical properties of length, curvature, torsion, and thickness define spaces of such configurations whose knot types are largely unknown. Knots and other forms of entanglement occur in single polymers and in large collections, in DNA, in bacteria, in proteins, in melts and in solution. What proportion consists of knots of a given topological or physical type? What are the biological or physical implications of the structure? Are there "ideal" or "average" conformations? In addition, given an appropriate definition of knotting of "open" curves, these same questions arise in this new context.

While there has been theoretical progress on some of these problems, at least in some contexts, in many cases numerical methods have been essential to gain insight if not provide answers. In this workshop we will focus on modeling open and closed chains in a variety of biological and physical contexts, on the analysis of the topological, geometric, and other properties of the modeled chains. Examples include lattice models, wormlike chains, ideal knots, shape and scale of knotting, localization, constrained environments, and knot energies with applications to DNA, proteins, viral capsids and polymer melts.

Plenary Speakers
Jason Cantarella, UG, Athens, USA
Cristian Micheletti, SISSA, Trieste, IT
Enzo Orlandini, INFN, IT
Eric Rawdon, STU, St. Paul, USA
Rob Scharein, SFSU, San Francisco, USA
Doros Theodorou, NTUA, Athens, GR
Mariel Vazquez*, SFSU, San Francisco, USA
Peter Virnau, UM, Mainz, DE

* To be confirmed

Short Talks
Eleni Panagioutou, NTUA, Athens, GR
Luca Tubiana, SISSA, Trieste, IT
Christos Tzoumanekas*, NTUA, Athens, GR
Guillaume Witz*, EPFL, Lausanne, CH
… …

Thematic Workshop Conveners
Ken Millett
Eric Rawdon
Rob Scharein

Program: Plenary lectures, short talks, thematic discussion, poster session.
Registration: Required via the website above.
Financial support: Prospective participants should seek grant/university support towards travel expenses. Limited funding towards participant local expenses may be provided by CRM and INdAM upon application. Participants seeking support should send their CV and list of publications to millett@math.ucsb.edu, before **13 March, 2011**.

Centro di Ricerca Matematica Ennio De Giorgi

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