Report on summer school in

Random Geometry

Reykjavik 2011

Summary

The school took place in Reykjavik, Iceland, on 8-12 August 2011. It was attended by a total of 47 participants, including 27 PhD-students, 9 post doctoral researchers, 7 senior researchers and 5 lecturers. Besides RGLIS the school was funded by the NordForsk network in "Random Geometry", and other support was obtained from the University of Iceland and NORDITA, Stockholm. Up to minor amounts the the total budget is identical to the one originally proposed of 42.220 EUR. To this amount RGLIS will contribute 8000 EUR and the NordForsk grant will cover the rest.

Scientific content

The principal purpose of the school was to introduce PhD students and young researchers to a selection of topics in Random Geometry through lecture series by top experts in the field. The core activity of the school consisted of five lecture courses of duration 3-5 lectures each. These were scheduled with adequate breaks allowing discussions with the lecturer to take place. In addition, four contributed research seminars were organized, two of which were presentations by PhD-students.

Lecture courses

• Maria Deijfen, Stockholm University: *Random Graphs and Complex Networks* (3 lectures)

• Bertrand Eynard, CEA Saclay: *Enumeration of discrete surfaces in any topology* (5 lectures)
• Geoffrey Grimmett, Cambridge University: *Discrete random geometry: percolation and random animals* (5 lectures)
• Richard Kenyon, Brown University: *Geometrization of 2D statistical mechanical models* (5 lectures)
• Kalle Kytola, Helsinki University: *Random conformally invariant curves* (3 lectures)

Seminars

• Des Johnston, Heriot-Watt University: *Gonihedric Ising Models and their duals*
• John Wheater, Oxford University: *Scale dependent processes on random graphs*
• Victor Babst, LPT-ENS Paris: *On the spectrum of random regular graphs with random edge weights*
• Marcin Witkowski, University of Poznan: *Topological cliques in random lifts of graphs*

We refer to the school homepage
http://agenda.albanova.se/conferenceDisplay.py?confId=2715
for further information.

Assessment of results

The lecture courses were given by first rate experts in their respective fields of research. Each course contained an introduction to the fundamentals of its subject area and leading on to more advanced subjects and in most cases even introducing current research themes.

In the two courses Discrete Random Geometry and Geometrization of 2D Statistical Mechanical Models, students interested in percolation theory, and more generally in theoretical aspects of statistical mechanics, have been given a solid foundation on which to build their future studies. In addition, they have been exposed to some of the hottest current research themes in the area of exactly solvable models related to or inspired by dimer models, spanning trees and self-avoiding random walks.

In a similar spirit, the lecture course Ennumeration of Discrete Surfaces gave a thorough treatment of the modern unified algebraic-geometric view of the subject of two-dimensional gravity coupled to certain matter fields. It

was of particular interest to participants inclined towards the area of complex analysis or the theory of algebraic curves.

The course Random Conformally Invariant Curves gave an introduction to stochastic Löwner evolution in its modern form, providing a valuable basis for research work on this subject, which will be the main topic of the forthcoming conference "Conformal Invariance, Discret Holomorphicity and Integrability" in Helsinki 2012 supported by the NordForsk grant "Random Geometry". We expect that the two activities together form an important contribution to promoting this very vigorous research area among young researchers on a Nordic as well as European level.

The purpose of the course Random Graphs and Complex Networks was to introduce students to recently developed network concepts, together with applications to a wide variety of phenomena such as the internet, social networks and epidemics. The framework of the discussion was that of classical random graph theory.

Final programme:

	Monday	Tuesday	Wednesday	Thursday	Friday
9:15-10:00	Grimmett	Kenyon	Eynard	Grimmett	Kenyon
10:30-11:15	Eynard	Grimmett	Kenyon	Eynard	Grimmett
11:30-12:15	Kenyon	Eynard	Grimmett	Kenyon	Eynard
13:30-14:15	Deijfen	Kytola		Deijfen	J. Wheater
14:30-15:15	Kytola	Deijfen		Kytola	D. Johnston
15:45-16:15		M. Witkowski		V. Babst	