De: **CRM** CRM@CRM.UMontreal.CA

Objet: Série de conférences Chaire Aisenstadt - Yuval Peres (Microsoft Research) & Scott Sheffield (MIT) - 2-5 septembre 2016

Date: 29 août 2016 10:47

À: activites@crm.umontreal.ca

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CHAIRE AISENSTADT CHAIR 2016
Centre de recherches mathématiques
Série de conférences / Series of lectures

Semestre thématique du CRM
Méthodes probabilistes en géométrie, topologie et théorie spectrale

CRM Thematic Semester
Probabilistic Methods in Geometry, Topology and Spectral Theory

Yuval Peres (Microsoft Research)
http://www.crm.math.ca/Peres

Scott Sheffield (MIT)
http://www.crm.math.ca/Sheffield

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Centre de recherches mathématiques
Pavillon André-Aisenstadt, Universite de Montreal
Salle / Room 6214

Vendredi 2 septembre / Friday, September 2
Conférences s'adressant à un large auditoire scientifique
Lectures suitable for a general scientific audience

16h00 / 4:00 pm

Scott Sheffield (MIT)

"Universal randomness in 2D"

I will introduce several universal and canonical random objects that are (at least in some sense) two dimensional or planar, along with discrete analogs of these objects. In particular, I will introduce probability measures on the space of paths, the space of trees, the space of surfaces, and the space of growth processes. I will argue that these are in some sense the most natural and symmetric probability measures on the corresponding spaces. I will then describe several surprising relationships between these canonical objects. Many of these ideas have been historically motivated by physics —- especially string theory, conformal field theory, and statistical mechanics.

17h00 / 5:00 pm

Yuval Peres (Microsoft Research)

"From Laplacian growth to competitive erosion"

Laplacian growth is the study of interfaces that move in proportion to harmonic measure. Physically, it arises in fluid flow and electrical problems involving a moving boundary. We survey progress over the last decade on discrete models of (internal) Laplacian growth, including the abelian sandpile, internal DLA (first analyzed by Lawler, Bramson and Griffeath in 1992), rotor aggregation, and the scaling limits of these models on the lattice as the mesh size goes to zero. (My own work on the subject has been joint with Lionel Levine.) Most growth models can induce a model of competing growth; for internal DLA, this leads to competitive erosion (introduced by Jim Propp), the subject of the second lecture.

Une réception suivra au salon Maurice L'Abbé, Pavillon André-Aisenstadt (salle 6245).

A reception will follow at the Salon Maurice-L'Abbé, Pavillon André-Aisenstadt (room 6245).

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Samedi 3 septembre / Saturday, September 3
15h30 / 3:30 pm

Yuval Peres (Microsoft Research)

"Competitive erosion is conformally invariant"

Suppose that each vertex of the graph is occupied by a particle, which can be either red or blue. New red and blue particles are emitted alternately from their respective sources and perform random walk. On encountering a particle of the opposite color they remove it and occupy its position.   We establish conformal invariance of competitive erosion on discretizations of smooth, simply connected planar domains. This is done by showing that at stationarity, with high probability the blue and the red regions are separated by an orthogonal circular arc on the disc and more generally by a hyperbolic geodesic.

(Joint work with Shirshendu Ganguly, available at http://arxiv.org/abs/1503.06989 .)

At the end of the talk, I will introduce the tools needed for the third lecture: Dynamical Percolation, Markov Type, and Evolving sets.

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Dimanche 4 septembre / Sunday, September 4
10h30 / 10:30 am

Scott Sheffield (MIT)

"More universal randomness in 2D and its relationship to gauge theory - I"

I will continue the narrative begun in the public lecture while also comparing the universal random surfaces we now understand well (SLE-decorated Liouville quantum gravity and the Brownian map) to those that arise in random matrix theory and gauge theory.

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Lundi 5 septembre / Monday, September 5
10h00 / 10:00 am

Yuval Peres (Microsoft Research)

"Random walks on dynamical percolation"

We study the behavior of random walk on dynamical percolation. In this model, the edges of a graph G are either open or closed and refresh their status at rate μ, while at the same time a random walker moves on G at rate 1, but only along edges which are open.On the d-dimensional torus with side length n, when the bond parameter is subcritical, we determined (with A. Stauffer and J. Steif) the mixing times for both the full system and the random walker. The supercritical case is harder, but can be analyzed using evolving sets (joint work with P. Sousi and J. Steif).

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Lundi 5 septembre / Monday, September 5
15h30 / 3:30 pm

Scott Sheffield (MIT)

"More universal randomness in 2D and its relationship to gauge theory - II"

I will continue the narrative begun in the public lecture while also comparing the universal random surfaces we now understand well (SLE-decorated Liouville quantum gravity and the Brownian map) to those that arise in random matrix theory and gauge theory.

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