

# Prix André-Aisenstadt *Prize* 2008

## **Jonathan Taylor** (Stanford University)

*"The geometry of random fields"*

**Résumé / Abstract:**

This talk will be a survey of the application of geometric techniques to the study of smooth random fields, particularly Gaussian random fields. The talk will focus on two aspects. The first part will use point processes derived from the critical points and values of a smooth random field along with Morse theory to approximate the supremum distribution of the random field, a long studied problem in probability. The second part of the talk will focus on a connection between Gaussian random fields and the uniform distribution on spheres of high dimension. This connection, known as Poincare's limit, allows us to translate (old) integral geometric results on spheres of high dimension to integral geometric properties of Gaussian random fields.

These models of smooth random fields have found applications in many signal detection problems, such as brain imaging, astrophysics and multivariate analysis, though the focus of this survey will be on the techniques rather than the applications.

**Le jeudi 1<sup>er</sup> mai 2008 / Thursday, May 1, 2008**  
**16 h – 4:00 p.m.**

Centre de recherches mathématiques  
Pavillon André-Aisenstadt, 2920, chemin de la Tour  
Université de Montréal  
Salle / Room 6214

Du café et des biscuits seront servis à 15h30 et une réception suivra au Salon Maurice-l'Abbé (salle 6245).  
*Coffee and cookies will be served at 3:30 p.m. and a reception will follow at Salon Maurice-l'Abbé (Room 6245).*

## **Jozsef Solymosi** (University of British Columbia)

*"Problems in additive combinatorics"*

**Résumé / Abstract:**

In this survey-type talk I will introduce my three favourite problems. Like many important questions in additive combinatorics, the problems are originated with Paul Erdos. The three questions are: the distinct distances problem, multidimensional variants of Szemerédi's theorem, and the sum-product conjecture. A common element of the three problems is that one can use techniques from discrete geometry. We will review some recent developments and some possible further research directions.

**Le vendredi 2 mai 2008 / Friday, May 2, 2008**  
**16 h – 4:00 p.m.**

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**Renseignements / Information:**  
**activites@crm.umontreal.ca**