# Convex and Discrete Geometry

## Tuesday 31 May 2016

### Room 3B075
### 3rd floor (Copernic building)

**10:00**   **Welcome coffee on the 4th floor**

**10:30-11:20**   **Imre BÁRÁNY** (Rényi Institute of Mathematics Hungarian Academy of Sciences, UCL)
*Block partitions of sequences*

*Abstract : Given a sequence A=(a_1,...,a_n) of real numbers, a block B of A is either a set B={a_i,a_{i+1},...,a_j} where i ≤ j or the empty set. The size b of a block B is the sum of its elements. We show that when each a_i lies in [0,1] and k is a positive integer, then there is a partition of A into k blocks B_1,...,B_k such that |b_i-b_j| is at most one for every i,j. We extend this result in several directions. This is joint work with Victor Grinberg.*

**11:30-12:20**   **Artem ZVAVITCH** (Kent State University)
*On the Mahler conjecture for convex bodies*

*Abstract : Let K be a convex, symmetric, with respect to the origin, body in R^n. One of the major open problems in convex geometry is to understand the connection between the volumes of K and K*, where, K* is the polar body of K: K*:={x\in R^n:<x,y> ≤ 1, forall y in K}. The Mahler conjecture is related to this problem and it asks for the minimum of the volume product P(K)= Vol(K)Vol(K^{*}).*
*It was first proved by Blaschke in 1923 that in dimensions 2 and 3 the maximum of P(K) is attained on the Euclidean ball, in 1948 the result was extended by Santalo for higher dimensions. In 1939, Mahler conjectured that the minimum should be attained on the unit cube or its dual the cross-polytope. Mahler himself proved the conjectured inequality in R^2. But the question is still open even in the three-dimensional case !*
*In this talk, we will give an introduction to conjecture, discuss some history and applications to the Geometry of Numbers. We will also show the connections with Graph Theory and present some recent progresses, ideas and possible old and new methods on how to attack this amazing conjecture.*

**12:30-14:00**   **Lunch**

**14:00-14:50**   **Elisabeth WERNER** (Case Western Reserve University, Cleveland)
*Approximation of convex bodies by polytopes*

*Abstract : How well can a convex body be approximated by a polytope ?*
*This is a fundamental question in convex geometry, also in view of applications in many other areas of mathematics and related fields, like geometric tomography, geometric algorithms, computer science. It often involves side conditions like a prescribed number of vertices, or, more generally, k-dimensional faces and a requirement that the body contains the polytope or vice versa. Accuracy of approximation is measured using various metrics.*
*We will present recent results, joint with Steven Hoehner and Carsten Schütt, on these issues.*

**15:00-15:50**   **Carsten SCHÜTT** (Christian Albrechts Universität, Kiel)
*Affine invariant points*

*Abstract : Affine invariant points of convex bodies show up naturally and are characteristics of those bodies. The first example is the centroid and others are the Santaló point and the center of the ellipsoid of maximal volume contained in the body. The presence of many affine invariant points reflects a lack of symmetries of the body. We study the basic properties and the duality of affine invariant points.*

**16:00**   **Tea**