THE UNIVERSITY OF CHICAGO

Departments of Statistics and Mathematics
BILLINGSLEY LECTURES ON PROBABILITY

YUVAL PERES

Theory Group, Microsoft Research,
Redmond, Washington

Gravitational Allocation to Uniform Points on the Sphere

THURSDAY, October 5, 2017, at 4:30 PM
1028 East 58th Street, Kent 120

*Reception following the seminar in **Jones 111**, 5747 S. Ellis Avenue*

ABSTRACT

Given uniform points on the surface of a two-dimensional sphere, how can we partition the sphere fairly among them? "Fairly" means that each region has the same area. It turns out that if the given points apply a two-dimensional gravity force to the rest of the sphere, then the basins of attraction for the resulting gradient flow yield such a partition-with exactly equal areas, no matter how the points are distributed. (See the cover of the AMS Notices at http://www.ams.org/publications/journals/notices/201705/rnoti-cvr1.pdf.) Our main result is that this partition minimizes, up to a bounded factor, the average distance between points in the same cell. I will also present an application to almost optimal matching of n uniform blue points to n uniform red points on the sphere, connecting to a classical result of Ajtai, Komlos and Tusnady (Combinatorica 1984).

Joint work with Nina Holden and Alex Zhai.

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