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Point configurations: energy, designs, and discrepancy
Special Session B3

Dmitriy Bilyk
University of Minnesota, USA
Bianca Gariboldi
Università degli Studi di Bergamo, ITALY
Giacomo Gigante
Università degli Studi di Bergamo, ITALY

Uniformly distributing a large number of points in a domain or on a manifold is a question that arises naturally both in pure mathematics (discrete geometry, probability, analysis) and applications (numerical integration, sampling, frame theory etc), and there are numerous ways to measure the quality of a distribution of points: discrepancy, energy minimization, packing and covering radii, lattices, cubature formulas, designs etc, many of which are closely connected to each other. The methods used to address such problems involve a mixture of a variety of areas of mathematics: discrete geometry (polytopes, equiangular lines), combinatorics (combinatorial discrepancy, combinatorial designs, Latin squares), probability (random point processes, large and small deviation bounds), number theory (lattices, diophantine approximation), approximation theory (cubature formulas, spherical designs, interpolation), applied mathematics (compressed sensing, frames), and others. Moreover, a central role in these topics is played by various branches of analysis, in particular, Fourier, harmonic, and functional analysis, as well as potential theory, orthogonal polynomials, and special functions.

The session will concentrate on numerous problems about distributions of points, with a strong focus on the application of the methods of analysis in this circle of questions.

For more information visit `https://sites.google.com/view/point-configurations/home`.

E–mail: `dbilyk@umn.edu`.