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INFORMAL ANALYSIS SEMINAR
Saturday and Sunday, November 9-10, 2019

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LECTURES: Mathematical Sciences Building, Room 228., Second floor.
POSTER SESSION/REFRESHMENTS/LUNCHES: SCALE-UP Mathematics Lab, room 319 Mathematical Sciences Bldg., Third floor.

The Mathematical Sciences Building is located on 1300 Lefton Esplanade, Kent, OH 44242. To search it on Google Maps, please, use Mathematics and Computer Science Building, Kent, OH 44243.

Saturday, November 9

11:00 - 11:30	Coffee in Room 319 MSB
11:30 - 12:30	Almut Burchard
12:30 - 1:30	Lunch in Room 319 MSB
1:30 - 2:30	Konstantin Tikhomirov
2:30 - 3:30	Break/Poster Session
3:30 - 4:30	Almut Burchard
4:30 - 5:00	Break
5:00 - 6:00	Konstantin Tikhomirov
6:30pm	Dinner: Pacific East Restaurant (100 E Main St, Kent, OH 44240).

Sunday, November 10

09:00 - 09:30	Coffee in Room 319 MSB
09:30 - 10:30	Almut Burchard
10:30 - 11:00	Break
11:00 - 12:00	Konstantin Tikhomirov
12:00 - 1:00	Lunch in Room 319 MSB
1:00 - 2:00	Almut Burchard
2:00 - 2:30	Break
2:30 - 3:30	Konstantin Tikhomirov

Nonlocal shape optimization problems, from rearrangement inequalities to aggregation in flocks.

Almut Burchard

Abstract: We will discuss geometric shape optimization with objective functionals that arise from pair interactions. Examples are the electrostatic energy where a charge distribution interacts with itself through the Newton potential, and the attractive-repulsive functionals of biological aggregation models. Such problems are called "non-local" because their Euler-Lagrange equations are integral equations that relate the optimal solution at one point to an integral over the entire configuration. Starting from basic inequalities for convolutions, we will explore recent results and open problems, regarding extremals and near-extremals, sumsets, isodiametric constraints, as well as questions of phase transitions and symmetry-breaking in simple aggregation models.

The average-case analysis in the Littlewood–Offord theory.

Konstantin Tikhomirov

Abstract: The 'classical' Littlewood-Offord theory is concerned with studying anticoncentration properties of linear combinations of random variables, where the vector of non-random coefficients is assumed to satisfy certain structural assumptions such as a lower bound on the distance to the set of sparse vectors, on the number of non-zero components, or on its essential least common denominator. However, in applications to estimating singularity probability of random matrices, it is often important to measure the *typical* anticoncentration properties, when the coefficient vector is uniformly distributed on a finite set in $\mathbb{R}^n$. This average-case analysis has recently been employed in a solution of an old conjecture about singularity of random ± 1 matrices, as well as in several more recent works. The goal of the talk is to give a detailed description of this new technique.