

COMBINATORICS

Nati Linial (Hebrew University)

Adventures with polytopes

To the best of my recollection, I first heard about polytopes only when I started to attend Micha's seminar, but with time, I found myself studying them myself. Fondly remembering the many things that I learned from Micha, I will tell about my most recent foray into this realm. The $n \times n$ bi-stochastic matrices form a polytope, in which every permutation matrix is clearly a vertex. The Birkhoff-von-Neumann theorem says that this exhausts the list of vertices. An $n \times n \times n$ array of non-negative reals is called tri-stochastic if every row, column, and shaft in it sums to 1. These arrays form a polytope too, where every Latin square is clearly a vertex. However, as we show, Latin squares are only a vanishingly small minority of the vertices.

Joint with Zur Luria and Maya Trakhtman arXiv:2604.09290.

Gil Kalai (Hebrew University and Reichman University)

Reflections on some old problems and results

I will describe some problems and results of Micha A. Perles, and his students about polytopes, convex sets and point configurations, from the seventies and eighties of the 20th century, and some progress made over the past decades.

Noga Alon (Tel Aviv University and Princeton University)

Micha and shattering

The Sauer-Perles-Shelah lemma is a fundamental result in extremal combinatorics with applications in discrete geometry, computational learning, probability, combinatorics, model theory, property testing, social choice, and more. After very brief comments about the original result, I will describe some recent variants and extensions.

Ron Adin (Bar-Ilan University)

Circular sorting

What is the maximal number of steps required to sort n labeled points on a circle, by swapping points in adjacent positions? What if we swap adjacent values, rather than adjacent positions? What if we allow arbitrary (not necessarily adjacent) swaps?

These are circular analogues of well-known sorting problems, with applications in various computational sciences. We will describe exact results, as well as bounds, obtained using combinatorial, probabilistic and number theoretic methods. Based on joint works with Noga Alon, Eli Bagno and Yuval Roichman.

Rom Pinchasi (Technion)

30 years later— on the occasion of the 90th anniversary of Micha Perles

In honor of Micha Perles' 90th anniversary we will bring some of the many anecdotes that were not mentioned by previous speakers. We will combine these fun and beautiful memories from 30 years ago with some research and results that constitute my own private memories with Micha. The 90th anniversary of Micha Perles is a milestone for many people in the community of discrete geometry and combinatorics. Could it also be the end of the classical era of mathematics in some sense? We will know the answer by the 100th anniversary of Micha Perles. I promise many more anecdotes then.