Department of Mathematics, BGU

Combinatorics Seminar

On *Tuesday, January ,15 2019*

At *10:45 – 11:45*

In *101-*

Csaba Toth (CSUN)

will talk about

Polygonizations for Disjoint Line Segments

Abstract: Given a planar straight-line graph $G=(V,E)$ in $\mathbb{R}^2$, a *circumscribing polygon* of G is a simple polygon P whose vertex set is V, and every edge in E is either an edge or an internal diagonal of P. A circumscribing polygon is a \emph{polygonization} for G fi every edge in E is an edge of P.

We prove that every arrangement of n disjoint line segments in the plane (i.e., a geometric perfect matching) has a subset of size $\Omega(\sqrt{n})$ that admits a circumscribing polygon, which is the first improvement on this bound in 20 years. We explore relations between circumscribing polygons and other problems in combinatorial geometry, and generalizations to $\mathbb{R}^3$.

We show that it is NP-complete to decide whether a given graph G admits a circumscribing polygon, even fi G is 2-regular. Settling a 30-year old conjecture by Rappaport, we also show that it is NP-complete to determine whether a geometric matching admits a polygonization. (Joint work with Hugo A. Akitaya, Matias Korman, Mikhail Rudoy, and Diane L. Souvaine.)

Please Note the Unusual Time!