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POLYNOMIAL PARTITIONING AND ITS IMPACT ON COMBINATORIAL (AND COMPUTATIONAL) GEOMETRY

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Nearly 15 years ago, Larry Guth and Nets Hawk Katz have developed the polynomial partitioning technique, and have used it to obtain a nearly complete solution of the famous distinct distances problem of Paul Erdős. The technique has turned out to be extremely powerful, and has since been used to make dramatic progress on many problems in combinatorial geometry, and more recently in computational geometry too.

In the talk, as time permits, I will review the technique and some of its many applications, including distinct distances, incidences, cycle elimination amid lines in 3D, and more. I also hope to cover some more recent progress in algorithms that involve polynomial partitions, especially for semi-algebraic range searching.