CCSU

DEPARTMENT OF MATHEMATICAL SCIENCES

COLLOQUIUM

Friday, March 8
3:00 – 4:00 PM
Maria Sanford, Room 101

SYNTHETIC PROOF
OF RADON'S THEOREM

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Abstract: In this talk, I will explore synthetic proofs of results in Geometry. Synthetic proofs as opposed to analytic use as few of the primitive axioms as possible to solve the problem in its own realm. I will introduce convex sets and convex hulls using Hilbert's axioms of incidence and order, among which is the famous Pasch's Axiom. I will then prove the well-known Radon's Theorem using only those axioms. Radon's Theorem states that any set of $d + 2$ points in $\mathbb{R}^d$ can be partitioned into two disjoint sets whose convex hulls intersect. J. Radon proved this using linear algebra. By avoiding the notion of distance and proving Radon's Theorem using only Hilbert's axioms of incidence and order, Radon's Theorem will become applicable in other geometries, e.g. Hyperbolic Geometry.