



COLLOQUIUM

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Monomials, convex bodies, and optimization

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<https://csuohio.zoom.us/j/91945126460>

Bio: Alexandra Seceleanu is a mathematician working in commutative algebra, where she applies homological and computational methods to problems with geometric and combinatorial flavor. After spending her formative years in Romania, she received her Ph.D. in Mathematics from the University of Illinois at Urbana-Champaign in 2011. Since 2015, she has been appointed assistant professor at the University of Nebraska-Lincoln. She enjoys tackling a range of challenging and interesting mathematical questions and is always open to collaborations with mathematicians from all areas.

Abstract: Monomials are deceptively simple algebraic expressions that consist of products of variables. However, when monomials are grouped together to form monomial ideals, they can be responsible for creating intricate patterns. For example, any hypergraph, as well as any collection of linear spaces spanned by standard basis vectors in a Euclidean space of arbitrary dimension can be encoded by monomial ideals. In this talk, we give monomial ideals geometric shape as we associate to them certain convex geometric bodies, namely the classical Newton polyhedron and the more modern symbolic polyhedron. We consider two linear optimization problems having these convex bodies as feasible sets and use them to establish a relationship between combinatorial commutative algebra and discrete optimization. This is based on joint work with the participants of the 2020 Polymath REU.