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**João Gouveia\*** (jgouveia@mat.uc.pt), Departamento de Matemática, Faculdade de Ciências e Tecnologia, Universidade de Coimbra, 3001-501 Coimbra, Portugal. *Slack ideals and semidefinite representations of polytopes.*

In this talk, we will introduce the concept of slack ideal, an algebraic object that codifies the geometry of a polytope. This notion is motivated by our study of psd minimality.

A  $d$ -polytope is said to be psd minimal if it can be written as a projection of a slice of the cone of  $d + 1$  by  $d + 1$  positive semidefinite matrices, the smallest possible size for which this may happen. We will show how the slack ideal can be used to extract conditions on psd minimality, and use it to complete the classification of psd minimal 4-polytopes, settling some open questions and creating new ones.

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