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Configurations in projective spaces and related research in commutative algebra and algebraic geometry
Special Session A8

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The study of subvariety arrangements in projective spaces is a well-established and highly fruitful area of research. This field has produced numerous profound discoveries that have had a significant impact across various branches of mathematics.

In recent years, there has been a growing interest in studying configurations of points, lines, conics, and hyperplanes. These configurations are not only intriguing in their own right but also serve as powerful tools for uncovering unexpected properties within Commutative Algebra and Algebraic Geometry.

Representative examples of the importance of subvariety arrangements in Commutative Algebra and Algebraic Geometry include the use of grids, root systems, and Kochen-Specker Sets (including the Penrose dodecahedron) to analyze properties related to projections (such as Geproci sets, Weddle varieties). Several configurations give examples of unexpected curves, cones, and hypersurfaces. Contact star configurations were used to give a geometrical interpretation of some variety defined by Hadamard products. Additionally, arrangements like the Fermat arrangement, Star and Steiner configurations, and various others have played a crucial role in investigating containment problems, with a focus on the Waldschmidt constant, resurgence, and the conjectures of Demailly and Chudnovsky. Such research is often connected with the study of monomial ideals and, in particular, ideals defined over graphs and hypergraphs.

Our central aim is to stimulate open dialogue among researchers, promoting the sharing of progress and novel ideas. Through this, we want to encourage experts from different mathematical areas to collaborate on problems collectively. We hope to establish an enduring connection among researchers, fostering a spirit of collaboration that persists even after the session ends.

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