This mini-course covers the basics of convex geometry with a focus on combinatorial and algebraic structures. Optimization serves as motivation. Lectures and exercise sessions on the fundamentals lead into problem-solving sessions that explore research questions. Currently all sessions are planned to be virtual. Familiarity with basics on convex sets, discrete geometry, and algebraic methods is a plus, but will not be assumed. Fundamentals will be covered in the lectures. This includes introductions to:

- Convex optimization
- Facial structure of convex bodies
- Non-polyhedral convex bodies such as spectrahedra

Participants will be given an opportunity to present research questions they are interested in or working on.