MATEJA SAJNA, University of Ottawa
Finding Euler tours and Euler families in hypergraphs via edge cuts

An *Euler tour* of a hypergraph H is a closed walk that traverses each edge of H exactly once. The study of Euler tours in hypergraphs was initiated in a 2010 paper by Lonc and Naroski. These authors also proved that the problem of existence of an Euler tour in a general hypergraph (as well as in a 3-uniform hypergraph) is NP-complete. In a 2017 paper, Bahmanian and Šajna defined a relaxation of the concept of Euler tour, namely, *Euler family*, which is a collection of closed walks that jointly traverse each edge of the hypergraph exactly once, and showed that the problem of existence of an Euler family in a general hypergraph is polynomial.

In this talk, we show how the problem of existence of an Euler tour (family) in a hypergraph H can be reduced to the analogous problem in some smaller hypergraphs that are derived from H using an edge cut of H. In the process, new techniques of *edge cut assignments* and *collapsed hypergraphs* will be introduced. Moreover, we shall describe two divide-and-conquer-type algorithms based on these characterizations that construct an Euler tour (family) in a hypergraph if it exists.

This is joint work with Andrew Wagner.