High Dimensions, Inference and Combinatorics
A Journey Through the Data Jungle

Abstract: This talk takes us on a journey through modern high-dimensional statistics. We begin with a brief discussion on variable selection and estimation and the challenges they bring to high-dimensional inference, and we formulate a new family of inferential problems for graphical models. Our aim is to conduct hypothesis tests on graph properties such as connectivity, maximum degree and cycle presence. The testing algorithms we introduce are applicable to properties which are invariant under edge addition. In parallel, we also develop a minimax lower bound showing the optimality of our tests over a broad family of graph properties. We apply our methods to study neuroimaging data.