

# Combinatorics of Phylogenetic Networks

Michael Fuchs

Chengchi University, Taipei

## Abstract

The area of combinatorial phylogenetics is concerned with the investigation of graph-theoretical structures that are used for modeling the ancestor-relationship of taxa. While for a long time, phylogenetic trees were used for this, in the last few decades, they have been replaced by the more general class of phylogenetic networks. Most of the research nowadays is concerned with combinatorial properties of these networks and their subclasses (of which there are many). In this talk, we will survey our recent work on enumerating phylogenetic network classes and understanding random properties of phylogenetic networks when they are uniformly sampled from a given class, where we will mainly focus on the class of tree-child networks and their generalizations. The talk is based on joint work(s) with Yu-Sheng Chang (Chengchi University), Hexuan Liu (Taiwan Sun Yat-sen University), En-Yu Huang (Chengchi University), Michael Wallner (TU Wien), Guan-Ru Yu (Kaohsiung Normal University), and Louxin Zhang (National University of Singapore).

**Keywords:** combinatorial phylogenetics, phylogenetic networks, tree-child networks, enumeration, stochastic properties.