

## Description for the general public

The aim of the project is to conduct research on fundamental combinatorial optimization problems with the emphasis on problems revolving around finding optimal traveling salesman routes and the computation of matchings.

The traveling salesman problem and matchings are at the very foundations of combinatorial optimization. Both problems belong to the most heavily researched problems in computer science as well as mathematics, operations research and economy. The traveling salesman problem (TSP) was originally formulated as follows. Given a list of cities and a distance between every pair of them, find the shortest route by which a traveling salesman can visit each city exactly once and return to his starting point. The TSP has applications, among others, in planning, logistics, the manufacture of microchips, DNA-sequencing, vehicle routing and scheduling. A *matching* is a graph-theoretical concept that, given a graph  $G$ , denotes any set of edges without common endpoints. Despite its simple formulation, matchings model a wide variety of assignment problems arising in real-world applications from management and transportation to chemistry, medicine and networking. They are also an important tool in tackling other combinatorial optimization problems.