

The **Vienna Graduate School on Computational Optimization (VGSCO)** is a joint research and training program of the **University of Vienna**, **TU Wien**, **IST Austria** and **Vienna University of Economics and Business** funded by the **Austrian Science Funds (FWF)**. Its main goal is to give PhD candidates a comprehensive training in different areas of optimization with special emphasis on algorithmic and numerical aspects. It fosters scientific collaboration between the PhD students and their advisors representing a broad spectrum of topics and areas in the field of optimization.

The VGSCO currently announces a PhD position in the area of

Hybrid Methods for Combinatorial Optimization (TU Wien, Supervisor: Günther Raidl)

Hard combinatorial optimization problems arise in many highly relevant domains like transport optimization, scheduling, network design, cutting and packing, and bioinformatics. Powerful exact techniques for solving such problems exist, like mixed integer programming, constraint programming, or SAT solving, but on many occasions their applicability is still limited to small-sized problem instances. In such cases one typically turns to heuristic approaches that trade optimality for reasonable speed. The aim of this thesis project is to develop, for a selected class of problems, hybrid optimization approaches that scale better to large instances of practical interest while still being able to deliver reasonable quality guarantees.

More specifically, we aim at the one hand on leveraging data-driven techniques from machine learning, in particular reinforcement learning, to guide more classical optimization algorithms. On the other hand, decomposition techniques, decision diagrams, and multilevel-refinement provide fruitful starting points. Special attention will be paid on the implementation, experimental evaluation, and comparison of methods.

The candidates are expected to have a solid theoretical background in algorithms, data structures, combinatorial optimization as well as strong computer skills.

The advertised position is associated with the Faculty of Informatics of **TU Wien, the Technical University of Vienna**, in the Research Group on Algorithms and Complexity. The successful candidate will become a member of the **Vienna Graduate School on Computational Optimization**. The duration of the employment is of 3 years with possibility of extension. The extent of employment is 30 hours per week. The annual gross salary is approximately 31,000 €. The planned start of the position is autumn 2020.

Application Requirements and Procedure

The candidates must have a master degree (or equivalent) in *Computer Science* or *Mathematics* (or comparable fields) at the moment the PhD position starts. The application documents should contain a letter of motivation; the scientific CV with publication list, if available; higher education certificates/diplomas; the diploma/master thesis and letter(s) of recommendation. Applications have to be submitted at: vgsco.univie.ac.at/positions/application. The deadline for applications is **June 15, 2020**.