

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

Complexity of Discrete Optimization **(IST Austria, Supervisor: Vladimir Kolmogorov)**

*Some classical problems in combinatorial optimization can be solved in polynomial time (finding maximum-weight spanning tree or maximum-weight matching in an undirected graph, minimizing a submodular function, ...), while other problems are NP-hard (MAX-CUT, k-coloring, ...). The focus of this project will be to understand better the boundary between easy and hard discrete optimization problems. Recently there has been a lot of progress on one particular framework, namely **(Valued) Constraint Satisfaction Problem (VCSP)**. It culminated in a resolution of a long-standing “CSP dichotomy conjecture”. The goal will be to study some extensions of VCSPs. Potential topics include algorithms for NP-hard VCSP classes with “partial optimality” guarantees, i.e. algorithms that identify a part of an optimal solution. Another direction is studying “Boolean Edge CSPs” that generalize the perfect matching problem.*

The candidates are expected to have strong mathematical skills. Background in combinatorial optimization and strong computer skills are also a plus.

The advertised position is associated with IST Austria in the Research Group on Discrete Optimization of **Prof. Vladimir Kolmogorov**. 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. Employment is as a full-time PhD student at IST, and the planned start of the position is fall 2020.

Application Requirements and Procedure

The candidates must have a master degree (or equivalent) in *Mathematics* 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**.