

# ITeG Research Talk

## Professor Dr. Thomas Weise

Institute of Applied Optimization, Hefei University, Hefei, Anhui, China

### „A Framework for the Inspection of Optimization Algorithms“



Prof. Dr. Thomas Weise obtained his *Diplom Informatiker* (Master of Computer Science) in 2005 from the Chemnitz University of Technology and his PhD from the University of Kassel in 2009. He then joined the University of Science and Technology of China (USTC) as PostDoc and was promoted to Associate Professor at USTC in 2011. In 2016, he joined Hefei University as Full Professor to found the *Institute of Applied Optimization* at the Faculty of Computer Science and Technology. Prof. Weise has more than 80 scientific publications in international peer reviewed journals and conferences. His book *“Global Optimization Algorithms – Theory and Application”* has been cited widely. He has obtained funding from competitive national Chinese sources such as the Chinese National Natural Science Foundation, the Chinese Academy of Sciences, and the China Postdoctoral Science Foundation.

#### Abstract:

In the fields of heuristic optimization, we aim to get good solutions for computationally hard problems. Solving the Travelling Salesman Problem, for instance, means to find the shortest tour that goes through  $n$  cities and returns back to the starting point. Such problems often cannot be solved to optimality in feasible time due to their complexity. Thus, algorithms often start with a more or less random initial guess about the solution and then improve it step-by-step. This means performance has two dimensions: granted runtime until we stop the algorithm and take the best-so-far result, *and* the solution quality of that best-so-far result. Sufficient theoretical tools to assess the performance of such algorithms are still lacking. Thus, researchers conduct many experiments and compare the results. Evaluating such experimental data is not easy. We do not just want to know which algorithm performs best and which problem is the hardest – we want to know *why*. We present a process which can 1) automatically model the progress of algorithm setups on different problem instances based on data collected in experiments, 2) use these models to discover clusters of algorithm behaviors, and 3) propose reasons why a certain algorithm setup belongs to a certain algorithm cluster. Our process is implemented as open source software and tested in two case studies, on the Maximum Satisfiability Problem and the Traveling Salesman Problem.



[institute website](#)

The Institute of Applied Optimization (IAO) in Hefei, Anhui, China, has open positions for researchers with a German PhD degree. Our research focus is Computational Intelligence, Optimization, and Operations Research, but we are also interested in researchers with backgrounds in related topics, e.g., in Machine Learning. The conditions we offer are competitive.



[Prof. Weise WeChat](#)

**Dienstag, 23. Oktober 2018, 13:00 Uhr**

**Wiss. Zentrum ITeG, Pfannkuchstr. 1, 34121 Kassel, Room 0420**