

# Case Studies Optimization

## Summer Semester 2023

**Dr. Johannes Pfefferer, Dr. Michael Ritter**

Technical University of Munich, Department of Mathematics

09 February 2023

# Welcome

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# People

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# Who are we?



Johannes Pfefferer



Michael Ritter

# About the course

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# What will you learn?

- apply optimization to practical problems
- analyze and model problems
- evaluate solution techniques
- implement suitable algorithms
- assess solutions

# What will you learn?

- work with practitioners
- experience real-world challenges
- communicate at different levels
- outreach
- your work has an impact

# What will you learn?

- teamwork is essential
- self / team management
- organization / documentation
- presentation skills



# All Projects

## Nonlinear Optimization

1. Optimal Routing of Trains
2. Learning in Spiking Neural Networks
3. Parameter Estimation from Measurements with Position Noise

## Discrete Optimization

1. Order Batching in Retail Logistics
2. Charging Infrastructure for E-Mobility
3. School Timetabling

# Preliminaries

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# What do we expect?

- dedication
- open mindedness & creativity
- motivated by real-world challenges
- teamwork & communication

# Required courses

- Einführung in die Optimierung (basic linear / nonlinear optimization)
- project specific skills

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### Nonlinear Optimization

- Numerical Linear Algebra
- Nonlinear Optimization: Advanced
- Modern Methods of Nonlinear Optimization (optional)

## Required courses

- Einführung in die Optimierung (basic linear / nonlinear optimization)
- project specific skills

### Discrete Optimization

- Integer / Discrete Optimization
- Combinatorial Optimization (optional)

# Why should you do it?

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# Why should you do it?

Mathematics

Management

Marketing



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- apply theory to real-world challenges

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- project management, team organization
- communication and presentation skills

# What to do next?

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# Application

- limited intake
- application until **05 March 2023**
- by email to `michael.ritter@tum.de`  
include courses, skills, project ranking, preferred team members  
→ see website for details
- acknowledgement of receipt
- final allocation until **01 April 2023**

# Important Dates

**Kickoff** Mon, 17 April 16:00

**Poster Workshop** Fri/Sat, 05+06 May (whole day)

**Poster Presentation** Fri, 02 June 13:00 - 15:00

**Final Workshop** Mon/Tue, 10+11 July (afternoon / evening)

## Further Questions



`https://ma.tum.de/csopt`



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