

# Specialization Simulation and Optimization

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- techniques, tools, and architectures for the large scale simulation and optimization of discrete and continuous models
- Efficient numerical methods: analysis and implementation
- High-Performance Computing
- Themes:
  - ▶ Numerical solution of ordinary and partial differential equations
  - ▶ Continuous optimization, e.g. parameter estimation
  - ▶ Discrete optimization
  - ▶ Parallelization
  - ▶ Software design and object-oriented programming
- Overlap with: Statistics, Visualization, Image Processing, Applied Analysis and Modeling
- Involved persons: Bastian, Bock, Heuveline, Kanschat, Kirches, Körkel, Mombaur, Potschka, Rannacher, Richter, Reinelt

- Foundation courses
  - ▶ Numerical Linear Algebra (MH5)
  - ▶ Introduction to High Performance Computing (MScTI\_INTROHPC)
  - ▶ Object-Oriented Programming for Scientific Computing (IOPWR)
- Practicals and seminars: See “Vorlesungsverzeichnis” under “Praktika und Kurse”. Listed in german but ask for english! (Contact Michael/Myself if there are problems)
- For a list of relevant lectures see <http://www.mathcomp.uni-heidelberg.de/index.php?id=231>

# Courses Offered This Semester

- Numerik partieller Differentialgleichungen (Heuveline, ask for english)
- Nonlinear Optimization (Schick)
- Modellierung, Optimierung und Regelung mechanischer Systeme (Mombaur, ask for english)
- Fundamentals of Computational Environmental Physics (Bastian, Roth)
- Effiziente Algorithmen 2 (Reinelt, ask for english)
- Parallel High-Performance Computing (Lang, can replace foundation course)
- GPU Computing (Fröning)
- Parallel Computer Architecture (Brüning)
- Introduction to High Performance Computing (Fröning, foundation course)