



## Main Focus

---

- Process Engineering
- Machine Learning and Hybrid Models
- Arrangement and Decomposition Problems
- Supply Chain
- Energy and Supply
- Production Planning and Control
- Optimization in Life Sciences
- Quantum Computing

# Optimization

## What does your department deal with and what constitutes its research work?

The “Optimization# area deals with the model-based simulation and optimization of complex technical and organizational processes. The goal here is to master complexity by making promising solutions interactively accessible. We make improvement potentials transparent and comprehensible, so that users can quickly recognize them.

## What potential does your department’s research offer for a better future?

The combination of knowledge-based and data-based approaches to model-based optimization holds enormous potential, precisely because data is available on an increasingly large scale. At the same time, the need for traceability and transparency in decision-making processes is increasing. Both are trends that we are happy to support.

In addition, we are positioned across all industries. This ensures stability as well as an exciting and interdisciplinary innovation climate.

## Where do you see your department in five years?

The business unit keeps growing, largely thanks to long-term industrial partnerships. Surprising them again and again with innovative solutions and winning new customers is an important challenge. We also need creative minds who have high standards for innovative solutions and their implementation. If both succeed, “Optimization” will be able to further increase its visible impact.

## Which three keywords best describe your department?

- Innovative – customer-oriented – with high standards for ourselves

### Department topics in this report:

- Rhineland-Palatinate Promotes Competence Center for Quantum Computing . . . S. 31
- Mathematics Increases Chances of Survival. . . . . S. 39
- Software-Optimized Production Processes at BioNTech . . . . . S. 40
- Corona Pandemic: Fraunhofer ITWM Advises Rhineland-Palatinate State Government...S. 42
- Digitalization and Artificial Intelligence for Energy Management. . . . . S. 56
- Healing Pigments Against Corrosion . . . . . S. 61
- Process Engineering: Using AI for Industrial Processes. . . . . S. 70

### Contact

Prof. Dr. Karl-Heinz Küfer  
 Head of the Division “Optimization”  
 and Head of Department “Optimization in Life Sciences”  
 Phone +49 631 31600-4491  
 karl-heinz.kuefer@itwm.fraunhofer.de

