

At the chair of Management of Digital Food Businesses, we are looking for interested and qualified students to conduct a

Master or Bachelor thesis

on the topic of

Multi-Objective Optimization in Sustainability / Food Systems

Many real-world decision problems—especially in sustainability and food systems—require balancing multiple, often conflicting objectives, such as cost, environmental impact, and nutritional quality. Multi-objective optimization provides a powerful framework to analyze such trade-offs, yet a wide range of methods exists, each with different strengths, limitations, and areas of application.

This thesis aims to develop a structured understanding of multi-objective optimization methods and their practical relevance. The student will first conduct a focused and systematic review of existing approaches (e.g., weighted sum methods, ϵ -constraint methods, Pareto optimization techniques, evolutionary algorithms), comparing their applicability and limitations.

Building on this foundation, the student will apply selected methods to a concrete problem in sustainability or food systems (e.g., diet optimization, supply chain design, or resource allocation). While the primary focus is on developing a clear methodological understanding, the thesis will also include a practical implementation to illustrate and compare the approaches.

Your tasks include

- Conduct a structured literature review on multi-objective optimization methods
- Systematically compare methods (assumptions, strengths, limitations, use cases)
- Select and formulate a suitable application problem (e.g., food or sustainability context)
- Implement and compare at least one or two methods on the chosen problem
- Analyze trade-offs and interpret results
- Derive insights on method selection and practical applicability

Desired Qualifications

- Strong quantitative background (e.g., optimization, operations research, mathematics, or data science)
- Experience with programming (e.g., Python, R, or similar)
- Familiarity with optimization or mathematical modelling
- Ability to work independently and structure a research problem

- Interest in sustainability or food-related applications is a plus

Application

If you are interested, please send an email to dfblehre@mgt.tum.de to express your interest. The following information should be included in the email:

- CV
- Transcript of records of MSc and/or BSc degree
- Preferred starting time
- Short motivation