

BSc and MSc thesis projects at DTU Management

Fall 2026



Last update: April 24, 2026



How to apply for a BSc or MSc thesis project at DTU Management

DTU Management has four divisions, responsible for research and teaching in different areas:

- **Management Science:** If you want to write BSc or MSc thesis in the Fall 2026, keep reading: this folder is for you
- **Transportation Science:** See here
- **Technology and Business Studies:** See here and here
- **Climate and Energy Policy:** See here

We will prioritize **groups of at least two students** for both BSc and MSc thesis projects. If you want to write a BSc thesis or an MSc thesis in the Fall of 2026 in the Management Science Division, Climate and Energy Policy or with the Transportation Science division, you and your thesis partner(s) **MUST** start the process by completing the DTU Management - MSc/BSc thesis request form, **before 1/5 2026** using the link below:

<https://forms.office.com/e/D3eCVFYuFx>

The possible starting dates for an MSc thesis in the Fall semester 2026 are:

- Monday 3/8 2026 or Monday 24/8 2026

An MSc thesis can be 30, 32.5, or 35 ECTS points and can last for five to six months, depending on the size of the project and/or if you have coursework in parallel to the thesis. A BSc thesis can be 15, 17.5 or 20 ECTS points and is usually carried out in parallel to taking a number of courses. For further information about the rules for thesis projects, please check: Rules

In this form, you are asked to enter which faculty member you and your thesis group partner would like as your supervisor. We kindly ask you to submit **one request per thesis group** before 1/5 2026. We will get back to all applicants 15/5 2026. As stated in the form, this does not guarantee that you will be assigned a supervisor and a suitable topic.

You can find this project folder as a pdf file at:

<https://www.man.dtu.dk/english/education/thesis-projects>

Welcome

In this folder, the Division of Management Science, and a guest from the Division Transportation Science, present a wide range of exciting topics for BSc or MSc theses. Every year, we offer many different projects and update this folder at the end of each semester. The primary aim of the folder is to serve as a source of inspiration. If doing one of these topics, your main supervisor must be a faculty member from the list; please refer to the list of faculty members mentioned in the following pages. In addition to our faculty, our PhD students and PostDocs often participate in the supervision with their fresh ideas and hands-on knowledge.

As this folder will show you, we offer a wide variety of topics. An extensive network of industrial contacts enables us to offer you projects in cooperation with many different companies. You can also choose a project that requires you to have a strong theoretical background.

Management Science

In the Management Science Division, we conduct research on how companies and authorities make managerial decisions based on the best possible foundation. We provide decision support methods and tools at strategic, tactical and operational levels. The two sections in Management Science are:

Decision Science

The typical requirement for starting an MSc thesis in Decision Science is that you have followed an advanced Decision Science course (beyond our introductory course number 42101). The Section for Decision Science consists of more than 15 people working on different aspects of Decision Science. The department is proud to be a member of the Danish Operations Research Society – the largest OR network in Scandinavia.

Operations & Supply Chain Management (O&SCM)

We expect you to have taken at least two courses within O&SCM to qualify for your thesis with us. In most cases the student projects within O&SCM are carried out in close collaboration with a company or public institution. This often implies that the resulting thesis is kept confidential when this is deemed necessary by the external host. The Section for Operations & Supply Chain Management employs approx. 20 researchers, including professors, postdocs, and PhD students.

Transportation Science

The Transportation Science Division studies transport behavior and systems to improve mobility while addressing key challenges: climate impact, congestion, and safety. Using statistical analyses, we assess service, network, mobility and socio-economic impacts, advancing research, advising the public sector and collaborating with transport companies. The research covers all transport modes, focusing on green transport, electric vehicles, public transport optimization, and human behavior. With expertise in mathematical modeling, machine learning, economics, psychology,

and engineering, they take an interdisciplinary approach to solving complex transport issues.

Climate and Energy Policy

Sustainability is a key focus for companies, public authorities and society as a whole. We deliver research-based methods, instruments and decision support for the green transition. The division is at the international forefront within a range of key research fields.

Best regards,

DTU Management

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Carlos Lima Azevedo

Carlos Lima Azevedo's DTU ORBIT Profile

Research interests

My main research interests are the mathematical modeling and simulation of human behaviour, smart mobility services and the design, development and assessment of new technologies for better integrated mobility solutions.

Supervision style

Supervision meetings are held every two weeks in general. A Teams group chat for occasional / urgent communication will be created for each project. Technical work progress, task planning and (later down the road) the structure and content of the final draft is discussed in these meetings.

methodologies and expected prerequisites

Behavioural modelling, Machine Learning, Transportation modelling, Smart Mobility.

Project proposals

Title: MSc Project - AI for well being

Description: This MSc thesis proposes the development of machine learning models for predicting emotional states based on mobility, activity, and physiological data. While previous research has focused on emotion detection, this study aims to enhance emotion prediction by incorporating individual characteristics, environmental context, and temporal patterns. The project will involve detailed trajectory data of individual, bio sensors data and activity diaries already collected. Analyzing such multimodal data to evaluate different model architectures and assess their effectiveness in capturing stress responses. The findings will provide insights into the challenges of emotion prediction and guide future improvements through explainability techniques, diverse datasets, and more robust predictive models.

Title: MSc Project - Simulation and scenario analysis of green parking policies via incentives for electric vehicles

Description: Transitioning to vehicle electrification is in the essence of the current urban transportation planning agenda to tackle climate change. In Denmark, a reduction by 70% (relative to 1990) of greenhouse gases (GHG) emissions is expected until 2030, allowing Denmark to be climate neutral in 2050. While the design and expected impacts of vehicle taxation reforms that benefit the adoption of electric vehicles have been widely discussed, the effects of changes in the use of the urban space with the same goal remain unclear. This project aims to combine scenario analysis and microsimulation to assess the impact of alternative parking policies that benefit electric vehicles (e.g., parking lots exclusive for electric vehicles) in regards to GHG emissions reduction and from a perspective of accessibility, welfare, equity, and efficiency.

Title: MSc Project - Reinforcement Learning for Transportation

Description: Note: This portfolio of projects is together with Prof. Filipe Rodrigues and Ravi Seshadri, and different applications can be pursued. Reinforcement Learning (RL), in particular its combination with Deep Learning, is currently one of the most exciting and promising research areas in AI. RL has recently shown outstanding results at solving complex sequential decision-making problems such as learning to play Go and videogames at super-human-level performance, autonomous driving and smart grid optimization. Through interaction with an environment (real or simulated), RL algorithms are able to learn optimal policies for taking actions at each time step t , such that the sum of expected future rewards is maximized (e.g. maximizing game score in the videogame example). The ability of RL algorithms to correlate actions with the delayed rewards that they lead to (e.g. amount of congestion reduction, or responsiveness increase) makes them excellent candidates for learning policies for complex transportation challenges, such as adaptive autonomous vehicle routing and re-balancing through dynamic pricing, traffic signal control for reducing congestion, etc.

Title: MSc Project - Combining Urban Simulation and AI

Description: Note: This portfolio of projects is together with Prof. Francisco Pereira. Simulation models are usually very complex and detailed tools that can represent cause-effect interactions in space and time based on rules of the domain (e.g. physics, human behavior, biology, climate). For that reason, they are still today an unavoidable tool for many large scale problems, such as transport and urban modeling, climate change, drug development. On the other hand, they are known to be extremely challenging tools to work with: they are often very slow to run, difficult to calibrate, require a tremendous amount of memory, and are hard to reuse. The goal of this theme is to apply Machine Learning methods towards the next generation of Simulation research, with automatic calibration, efficient exploration of the parameter space, and better generalizability. Significant advancements in this theme will have serious impact in real-world policy problems, such as climate adaptation and mitigation, green transition, energy policy.



Jesper Bláfoss Ingvardson

Jesper Bláfoss Ingvardson's DTU ORBIT Profile

Research interests

My main research focus is on behavioural modelling in transport, using statistical methods and models to explain travel behaviour and user preferences related to use of transport modes and choice of travel routes. I main interest is on public transport systems; both in terms of how they are perceived from the passengers' point of view with the goal to improve them – as well as from the societal perspective in terms of ensuring more users and thus helping to improve the efficiency of urban transport systems and the environment.

Supervision style

You can expect to have supervision meetings every 1-2 weeks during the project period. If possible, please try to send a short agenda with what you would like to discuss one day before each meeting: e.g. a few questions, some results, or similar. During the meeting we discuss the specific questions/results, the plan for the next 1-2 weeks, and sometimes zooming out to ensure that the overall project plan is followed. I will mainly help and supervise on the methods, algorithms, cases used, etc. but since I'm no coding expert I will assume you can handle this by yourself (but of course help you find the relevant algorithms etc.).

Methodologies

Statistical modelling, econometrics, machine learning, travel demand modelling

Project proposals

Title: BSc/MSc Project – Exploring travellers’ experience during the door-to-door public transport journey

Description: Public transport journeys are highly complex and fragmented, consisting of multiple trip legs (e.g. access, egress, waiting, transferring, in-vehicle), transport modes (e.g. walking, cycling, PT), and environments (e.g. streets, stations, vehicles). During these journeys, travellers may face various barriers (e.g. lack of bicycle parking, poorly lit stations) that can reduce perceived safety or satisfaction with public transport. This study will investigate predictors of safe and attractive public transport journeys, with a particular focus on stations and their urban surroundings.

Students will be provided with a large-scale online survey of public transport users conducted in Denmark. The survey covers overall travel behaviour, detailed assessments of respondents’ most recent train trip (including station features, urban surroundings, access conditions, perceived safety, and satisfaction), and basic socio-demographic characteristics.

Students are expected to prepare and analyse the survey data using statistical models. They may also employ image recognition methods using Google Street View imagery to describe station surroundings, in addition to the survey data. Such large-scale data is also available. The final research question will be agreed upon during the initial meetings and can be adjusted according to the interests and prerequisites of the student.

Expected methods applied in the thesis work are: **Statistical modelling and interpretation, coding skills (R, Python, etc.), machine learning (required if student wants to employ image recognition), GIS (recommended but not required)**



Claire Bergaentzlé

Claire Bergaentzlé ORBIT profile

Research interests

Energy policy, integrated energy systems, demand flexibility, electricity grid tariffs, data centres consumption and industrial waste heat.

Supervision style

I wish to supervise motivated students willing to make a difference. Students will receive tailored supervision throughout the project, from the definition of a research question that addresses high-priority topics for the green transition, to defense preparation. At the end of the project, students will have delivered a high-level report meeting the best university standards and that can be professionally valorized, methodologically, analytically and in terms of writing format.

Methodologies

Good command of simulation tools, energy systems or equipment integration optimization, long-term investment/feasibility models. Advanced knowledge in clustering techniques and statistics will be a plus. Students will be expected to use modeling to test and compare various load pattern scenarios and or energy technologies integration and to elaborate on policy or regulatory framework conditions supporting more efficient, cheaper and decarbonised energy use.

Project proposals

Title: MSc Project – Impact of electricity grid tariffs in Denmark using data science

Description: The project aims to develop evidence-based knowledge on how Danish consumers (households and businesses mainly) consume electricity. Thesis works should leverage access to individual demand data (hourly smart meter data) and socio-economic data from Denmark Statistics (e.g. age, zip code, dwelling type, education level, income etc.) to obtain granular, specific understanding of what consumer type uses what DER equipment (heat pump, EV, PV), how they consume, and how they adjust consumption to price variations. In this work, students should pay special attention to consumption behavior facing variable electricity prices and grid tariffs. Therefore, the thesis will imply working with either/or wholesale price data and power grid tariffs. This analysis will examine such electricity price and / or tariff impacts on load patterns and regional variations across Denmark. Within this overall data-science framework, students will be free to suggest their line of analysis. Possible interesting topics include:

- Develop advanced clustering methods to group Danish consumers into relevant groups and to use these representative groups to derive future demand scenarios.
- Use electricity demand patterns and develop methodologies to infer the presence of an EV or HP or PV.
- Test how new grid tariffs redistribute grid costs across grid users, diving into real-locative impacts of tariff design (e.g. affecting rich vs. poor households; EV owners vs. HP owners; rural vs. urban etc.).
- Test how the interaction of spot prices and/or grid tariff structures trigger demand elasticity, by whom, to what extent and where.
- Assess how consumers and which consumers respond to price shocks (e.g. flood, gas price crisis in 2022 affecting el prices). Which consumers do not, what bill impact for them, and what barriers?
- Many more ideas to be developed! You are welcome to be creative

This thesis builds on previous work available . Group thesis works are encouraged.



Julien Daubanes

Julien Daubanes orbit profile

Research interests

I am mainly interested in the effectiveness and optimal design of climate/energy policy. My research focuses on environmental economics, studying how energy markets respond to governments' climate policy, as well as corporate voluntary actions, including investors' green-finance commitments. I am currently also interested in the design of effective oil sanctions.

Supervision style

I am used to meeting students relatively regularly before their thesis starts, as well as during the first part of the thesis period, in order to ensure that their project combines a solid motivation with a clear research question, and that students have a good command of the methods their project calls for.

Methodologies

I expect that students have taken one or more courses in economics or finance and that they have a solid quantitative background in mathematics, data analysis, or statistics.

Project proposals

Title: MSc Project – Analysis of firms’ disclosure of their decarbonization strategies

Description: A growing number of corporations are taking voluntary measures to reduce their CO₂ emissions. The Carbon Disclosure Project maintains the world’s most comprehensive repository of environmental data, covering corporate climate transition plans, emissions, and environmental risks. This data includes textual information in which firms report and explain the measures they implement. The thesis would use text analysis techniques to assess the variety of internal decarbonization policies firms implement, their motivations, their practices, and their potential benefits.

Title: MSc Project – Oil companies’ exposure to the oil price risk

Description: The energy transition is expected to ultimately make oil production less profitable, potentially leading to stranded assets. Uncertainty about how the transition will unfold generates so-called transition risk, which affects the cost of capital that financial markets impose on oil companies. Oil companies’ exposure to this risk is firm-specific, as it depends on each company’s portfolio of oil assets and other investments. The thesis would update existing financial assessments of oil companies’ exposure to transition risk and extend this analysis to study variations in firms’ exposure and the relationship between these variations and oil companies’ investment decisions.

Title: MSc Project – The effect of oil sanctions against Russia

Description: To reduce Russia’s revenues for its invasion of Ukraine, Western governments have imposed and progressively tightened a range of oil sanctions over the past few years, including a price cap on Russian exports, sanctions against major Russian oil companies, and measures targeting Russia’s shadow fleet. The thesis would review these sanctions, their announcements and subsequent revisions, and examine their effects—using event-study techniques or descriptive statistics—on global oil prices and on the price of Urals crude, which serves as a proxy for the revenue Russia earns per barrel exported through its shadow fleet.



Martin Drews

Martin Drews orbit profile

Research interests

My research integrates climate science, regional climate change, disaster risk management and climate change adaptation with physics-based geoscientific modelling, advanced statistics and data science. Essentially, my current research clusters in four areas: 1) identification, localization and modelling of compound and cascading climate extremes 2) advancing dynamical adaptation pathways planning 3) quantitative methods for modelling the impacts of climate change onto impact chains 4) the use of ML/AI to enhance climate modelling.

Supervision style

I am in general very flexible, though this depends on the number of students I supervise at the same time. Meeting every two weeks is common. In general, I try to bring in a co-supervisor in terms of one of our research assistants, PhD candidates or post.docs. Likewise, if possible, I like to link projects to ongoing research activities, making you part of these activities – this is more fun for everyone.

Methodologies

This depends on the project but generally a reasonable command of programming, analysis tools, statistical / mathematical / data science methods (e.g. ML, AI) – and preferably a strong “domain” interest. Alternatively, if you have an interest in climate change adaptation or cascading impact studies, experience with supply chain analysis, operations research, or transdisciplinary methods are an asset.

Project proposals

Title: MSc Project – Transboundary climate risks

Description: It is increasingly evident that many countries and sector are affected by growing climate risks whose effects extend beyond national borders. These so called “transboundary climate risks” (TCRs) have recently received increased attention from researchers and decision makers, as heatwaves, droughts, storms, and floods have increasingly demonstrated their potential to cause serious disruptions in global supply chains—with major consequences for food security, public health, industry, and the global economy more broadly. The purpose of this project is to investigate how TCRs affect one or more selected sectors or supply chains, with a focus, for example, on Denmark and the Nordic region. These could include agriculture and food, critical minerals, medicine and pharmaceuticals, machinery, transport, or the economy. There is relatively little knowledge and data in this area comes from different sources, so a part of the project will probably involve identifying relevant data—for example from Eurostat, Statistics Denmark, and the World Bank—and designing a qualitative or modelling approach to combine these data with knowledge about the potential impacts of climate change on supply chains.

Title: MSc Project – The impact of wildfires under climate change scenarios

Description: Wildfires can be caused by natural or anthropogenic factors and pose as one of the most significant weather-related risks. Natural factors account for spontaneous combustion of dry matter under high temperatures and biophysical conditions, while anthropogenic factors can rise by accidental and intentional actions (deliberate setting of fires). In Europe, wildfire events are mainly related to human factors, which are the cause of around 90% of wildfire ignitions.

In the course of the EU projects TREEADS and ACCREU, our section has developed a methodology for assessing the local risk of wildfires in a fully probabilistic sense, which is based on 1) a machine learning-based wildfire ignition model for applications under present and future climates, 2) downscaled climate projections, 3) a fire spread model (Forefire) for modelling the spread of wildfires under different land covers. Moreover, we have done preliminary studies with the model, assessing the economic and biophysical impacts of wildfires and role of new management strategies/adaptation in selected case studies. This project will work on some of the current shortcomings of the methodology, develop new or improved components, and/or apply the modelling framework on a case study. For example, currently the model does not include the intensity, which is a dominant factor when estimating impacts on biodiversity; after a fire, burnt natural areas grow back, perhaps survival analysis can be used to model these effects, which are important for climate projections.

Title: MSc Project – Climate change impacts on infrastructure and supply

Description: Most people have probably experienced how weather can affect traffic, for example in the form of (i) disruptions to metro and train operations, (ii) longer travel times, (iii) congestion in public transport, and (iv) damage to roads, railways, and bridges. Storms and floods can also cause supply failures such as blackouts or brownouts, as well as damage to other types of infrastructure, which in turn can affect critical societal functions such as the healthcare system. This project aims to model using relevant numerical methods the potential risks, damage, and other impacts from extreme weather and/or gradual climate change on infrastructure systems using open data. OpenStreetMap and Open Infrastructure Map contain open data on (critical) infrastructure and utilities, including healthcare and electricity. Other relevant data can be obtained from the utility companies, we work with, Copernicus Climate Data Store or from the Danish Meteorological Institute (DMI). A simple blue spot mapping for all of Denmark is available via DTU's OS/2 SkadesØkonomi tool, and additional relevant data can be found on the Danish Environmental Portal and the Water Portal (Vandportalen). You will choose to focus on selected infrastructure and/or utility systems and on the relevant climate and weather impacts. You will then develop a numeric model (e.g. a Bayesian network) or risk analysis that combines knowledge of impacts, exposure, vulnerability, and potential consequences. For example, this could involve developing a model to investigate: i) The risk of soil erosion along roads and railways in Denmark ii) Limitations in access to healthcare infrastructure during flooding from the sea and heavy rainfall; iii) Flooding of roads in Denmark under different scenarios; iv) The vulnerability of Danish electricity infrastructure to flooding.

Title: MSc Project – Dynamic adaptation pathways planning

Description: Within the last decade, principles of dynamic climate change adaptation planning have increasingly been adopted in Denmark and internationally. This includes the concept of Dynamic Adaptive Policy Pathways (DAPP) and its associated planning process, which was originally introduced with the Delta Plan in the Netherlands. While DAPP offers a flexible framework, which – at least in principle – is both extendable, scalable and suitable for coping with adaptation challenges at a systemic level and under deep uncertainty, it still has significant limitations. This project seeks to investigate, advance and mainstream DAPP practices, including using digital technologies like reinforcement learning. For example, the project could address the current absence of planned monitoring to guide adaptation decisions over time, which is key for realizing the potential of an adaptive plan. Or the project could demonstrate implementations of dynamic adaptation pathways in Denmark or other countries, including cases in the Global South, from the perspective of systemic transformations, considering infrastructure and land use performance together and from a multi-risk perspective.

Title: MSc Project – Artificial Intelligence and Machine Learning for Enhanced Representation of Processes and Extremes in Earth System Models

Description: This project is closely linked to the EU project AI4PEX, which finishes in 2028. In the project, we explore new methods based on machine learning techniques to solve problems in climate modelling. The project is probably linked to research on improving climate projections of extreme precipitation or key land-atmosphere interactions. For example, most climate scenarios only include changes in the atmosphere due to greenhouse gas emissions. They do not explicitly include future changes in land cover, such as afforestation. Because of this, insights for planning and adaptation gained from climate simulations can be highly misleading, e.g. areas could show high warming instead of cooling. In this light, this project could test whether machine learning or AI can be used to identify and extract patterns in relevant data and then use those patterns to adjust the vast collection of existing (and computationally expensive) climate simulations, so they better reflect how changing land cover might modulate future climate trends.



Toke Reinholt Fosgaard

Toke Reinholt Fosgaard orbit profile

Research interests

Behavioral and experimental economics.

Supervision style

The supervisor regularly follow the progress of the thesis and ensure that the master's thesis falls within the academic focus area of the MSc programme. Typically having meetings every 4 week.

Methodologies

Some training in economics, and in particular behavioral economics. Empirical method used is experimental economics.

Project proposals

Title: Studying behavioral economics patterns of sustainable food choices.

Description: Design and conduct an experiment to study ways to increase sustainable food consumption.

Title: Bike commuting

Description: Description: Design and conduct an experiment to study how to increase daily bike commuting.



Dogan Keles

Dogan Keles orbit profile

Research interests

I research the design of energy markets and how the integration of renewable energy affects market dynamics and prices. My work focuses on the drivers of electricity prices, the cross-border effects of energy policy and the impact of these policies on both energy suppliers and consumers. In addition, I study the profitability of energy storage and other flexible technologies, as well as capacity markets, electricity spot markets, and related topics.

Supervision style

My supervision is aimed at enabling students to conduct independent research grounded in rigorous methodological and scientific standards. I support students in developing clear research structures, critical thinking, and robust analytical approaches. Each master's thesis is expected to deliver high-quality output with relevance to the energy industry, policymaking, and/or academic research. We meet regularly in bi-weekly sessions to ensure steady progress, complemented by flexible, on-demand meetings when needed.

Methodologies

Good knowledge of analytical methods from Operations Research, Econometrics or Machine Learning. General understanding of the energy system or markets.

Project proposals

Title: Analysis of resource adequacy in the European energy system with diminishing dispatchable conventional capacities.

Description: This master's thesis analyzes resource adequacy in the European energy system under declining dispatchable conventional capacity. It develops a quantitative framework that captures the stochastic nature of renewable generation and electricity demand, assessing implications for system reliability. The project models the zonal European electricity market, incorporating cross-border trade and price formation. It further accounts for demand growth driven by electrification across sectors such as transport, heating, and industry. By combining probabilistic modeling with market analysis, the thesis aims to evaluate adequacy risks and identify strategies to ensure secure, efficient, and resilient power system operation in a decarbonizing Europe.

Title: Data centers in future power market models

Description: Electricity demand from data centers are generally included as inflexible loads in the power market models. However, recent years have shifted the fundamental economics behind the datacenters in terms of compute costs, bring-your-own-connection (BYOC), spatial and temporal load sequencing, etc. The impact of these recent developments in AI space on the price formation in European power markets is unclear and hence needs to be elaborated upon quantitatively. The project will be divided into two phases: updating the assumptions, and analysis. In the first part, the student is expected to review the latest literature and trends around data center economics with the goal of improving the assumptions in market models. Later in the second stage, the existing power market models will be run for different scenarios to analyze the impacts from these updates.

Title: Battery marginal costs in long term power market models

Description: Traditional power market models use a fixed marginal cost for the operation of battery energy storage within the power market models. However, in reality, these assets bid into the market at their opportunity cost, which is time-varying. Therefore, this project will aim to improve the modelling of the marginal costs for the batteries by using optimization on several markets, and then analyze the impacts on the power prices in Denmark/Germany in the 2030's. The findings from this thesis will help obtain a more realistic assessment of power prices and the role of energy storage in shaping future electricity prices.

Title: Grid-scale battery storage as a merchant asset: optimal bidding strategies across Electricity markets

Description: Recent regulatory developments have opened the possibility for batteries for grid expansion, e.g. virtual transmission. Large scale battery storage is being deployed to provide grid services and for congestion relief. However, battery assets deployed for these services might not be operated to full use, as they might stay in stand-by mode for most of the time. However, alternative regulation could mean that the battery, when not required for grid services, can earn merchant revenues on electricity markets. Due to its flexibility, batteries can participate in multiple markets, including day-ahead, intraday, and balancing markets. Here, we encounter a well-known revenue stacking problem: optimally allocating battery capacity across these co-existing markets while respecting physical and regulatory constraints, which remains computationally and strategically complex. This project will enhance current research on the profitability of the on the merchant revenue optimization problem for a grid-scale battery asset under national and European market rules. The student will survey the existing literature on battery revenue stacking and characterize the current regulatory framework to get a thorough understanding of the optimization problem. Subsequently, the student will develop and implement a stochastic optimization model that co-optimizes state-of-charge scheduling across market products while incorporating grid service constraints. Thus, the student can assess the maximum achievable revenue frontier and the optimal capacity allocation across market and grid operation across seasonal regimes.



Jacob Ladenburg

Jacob Ladenburg profile

Research interests

My research interests are focused on the willingness to pay for energy and environmental goods, acceptance of energy technologies and the impact of information, external shocks and spatial context

Supervision style

Meetings after need. Typically intensive at the beginning of a project to ensure that the student becomes acquainted with data. Students are expected to take charge of the meetings, including being responsible for the agenda for each meeting, sending out relevant data in due time, etc.

Methodologies

Econometrics, discrete choice models (logit, probit, if relevant conditional logit/mixedlogit), ordinary least squares models.

Project proposals

Title: MSc Project – The effect of local climate events on the acceptance of renewable energy technologies – a panel analysis

Description: Data from energy technology acceptance surveys conducted in 2022, 2023, and 2026 are combined with local weather data. Statistical models (difference-in-difference) are used to estimate the causal effects of extreme local weather events (rain, flood, drought) on technology acceptance.

Title: MSc Project – The effect of local climate events on the willingness to pay for carbon capture and storage – a panel analysis

Description: Data from carbon capture and storage willingness-to-pay surveys conducted in 2022, 2023, and 2026 are combined with local weather data. Statistical models (difference-in-difference) are used to estimate the causal effects of extreme local weather events (rain, flood, drought) on the willingness to pay. Knowledge of discrete choice modelling, like in the course Quantitative modelling of behaviour - Efteruddannelse og kurser fra DTU Learn for Life or similar, is a requirement

Title: MSc Project – Preference stability in WTA for power outages

Description: Preference stability is analysed based on data from Willingness to Accept power outages surveys conducted in 2022 and 2023. Mean and cross socio-economic groups preference stability is analysed using mixlogit/mixlogitWTP models. Knowledge of discrete choice modelling, like in the course Quantitative modelling of behaviour - Efteruddannelse og kurser fra DTU Learn for Life or similar, is an advantage.

Title: MSc Project – Preference stability in WTA for power outages

Description: Preference stability is analysed based on data from Willingness to Accept power outages surveys conducted in 2022 and 2023. Mean and cross socio-economic groups preference stability is analysed using mixlogit/mixlogitWTP models. Knowledge of discrete choice modelling, like in the course Quantitative modelling of behaviour - Efteruddannelse og kurser fra DTU Learn for Life or similar, is an advantage.



Xiufeng Liu

Xiufeng Liu orbit profile

Research interests

I am mainly interested in data-driven energy systems, smart grids, and digital solutions for climate and sustainability transitions. My research focuses on machine learning and AI methods for energy forecasting, anomaly detection, and decision support in district heating, power systems, and positive energy districts. I am currently also interested in federated learning and LLM-assisted analytics for energy applications, including privacy-preserving multi-site modeling and interactive data navigation.

Supervision style

I usually meet students regularly before their thesis starts and throughout the first part of the thesis period to ensure that their project has a clear motivation, a precise research question, and a feasible methodological plan. During the project, we will meet as requested, while I emphasize milestone-based progress, reproducible analysis, and clear communication of both technical methods and practical implications.

Methodologies

I expect that students have taken one or more courses in machine learning, statistics, optimization, data science, or energy systems, and that they have a solid quantitative background in mathematics, data analysis, or programming (preferably Python). Prior experience with time series analysis, econometrics, or deep learning is an advantage.

Project proposals

Title: MSc Project – Explainable forecasting for district heating and electricity demand

Description: Energy systems are increasingly data-rich but still require transparent and robust forecasting models for planning and operation. This project will develop and compare explainable ML/deep learning models for district heating or power demand forecasting under weather, price, and behavior uncertainty. The thesis can include feature attribution, uncertainty quantification, and robustness tests across seasons and demand regimes.

Title: MSc Project – Federated learning for cross-site smart energy analytics

Description: Utilities and building operators often face data-sharing constraints due to privacy and governance requirements. This project will design a federated learning framework for multi-site energy prediction or anomaly detection without centralizing raw data. The thesis can assess performance under data heterogeneity and limited communication, and benchmark federated approaches against centralized baselines.

Title: MSc Project – Digital twin and what-if analysis for positive energy districts

Description: Urban energy transition requires tools that support planning decisions under technical and economic uncertainty. This project will build a digital twin-based what-if analysis framework for positive energy districts, evaluating scenarios such as flexible demand, local renewables, storage, and EV charging strategies. The thesis can combine simulation and data-driven modeling to compare policy or investment alternatives and quantify system-level impacts.



Florentina Paraschiv

Florentina Paraschiv orbit profile

Research interests

Sustainable Finance (ESG research; renewables); Credit Risk Modeling; Climate Banking;

Supervision style

Bi-monthly meetings to track progress, one on-site and one Teams. I prefer intermediate presentations for improved feedback. Intermediate feedback per email is possible.

Methodologies

Data analysis (sorting, processing); Python would be preferred software; Machine learning general and some knowledge about LLMs; Statistics and Time series econometrics; Basic knowledge of finance.

Project proposals

Title: MSc Project-From Words to Scores: Overview of ESG Reporting

Description: The goal of the project is to have a flexible framework to analyse automatically a company's Sustainability report (ESG focused).

This project develops a large language model (LLM) pipeline to systemically analyse corporate ESG reports and map reporting characteristics to standardized ESG categories. since different ESG rating agencies use self-developed methodologies including unique sets of indicators, the first step constructs a unified feature space by aligning overlapping indicators across multiple raters into common categories (e.g., social programs, water, emissions). A domain-specific dictionary is then built for each category to ensure robust semantic matching between report language and these categories, allowing the model to correctly classify varied expressions (e.g., mapping "well-regulated discharge systems" to water-related metrics). This enables scalable, consistent extraction of ESG-relevant content from large volumes of corporate disclosures.

Title: MSc Project-Statistical modelling of ESG divergence

Description: The goal of the project is to shed light on the degree of homogeneity of ESG reporting across raters in the light of reported variables.

Beyond classification, the project focuses on extracting higher-level reporting characteristics from text, including sentiment, repetitiveness, and linguistic signals of obfuscation such as vagueness or of unnecessary verbosity. These features are used to quantify how firms communicate ESG information, rather than just what they report. In a final step, the extracted characteristics serve as input variables in statistical models to analyse their relationship with ESG rating divergence across agencies. the goal is to identify whether specific reporting styles contribute to diverging ESG scores across raters, providing insights into the role of corporate disclosure practices in shaping external evaluations.



Ramazan Sari

Ramazan Sari orbit profile

Research interests

My research interests include, energy consumption, energy policy, social acceptance, energy justice, energy poverty, oil markets, commodity markets, economic growth, well-being, and forecasting. I am particularly interested in how energy and financial systems evolve over time, how they interact with broader economic and social outcomes, and how policy can support transitions that are efficient, equitable, and socially accepted. My work focuses on understanding these interconnections to contribute to more sustainable and inclusive development pathways.

Supervision style

My supervision style involves face-to-face or online meetings every two weeks to discuss progress and provide feedback. I support students in developing a strong literature review and in ensuring that the thesis motivation, research focus, and overall contribution are clear, rigorous, and well grounded.

Methodologies

My methodological approach includes both quantitative and qualitative analyses. On the quantitative side, I work with statistics, econometrics, time series econometrics, and optimization methods. On the qualitative side, I use approaches such as semi-structured interviews, sand-pit exercises, and storytelling to explore complex social and policy dimensions.

Project proposals

Title: MSc Project – Forecasting in Energy Markets

Description: This thesis explores the forecasting of financial and energy markets by examining the dynamic relationships between variables such as oil prices, natural gas prices, electricity prices, stock market indices, exchange rates, interest rates, and volatility indicators. It aims to assess whether interactions between these markets improve forecasting accuracy and provide better insight into market behavior under stable and turbulent conditions. The study may apply both traditional econometric and modern data-driven methods. Possible methods include ARIMA and VAR/VECM models for time-series dynamics, Granger causality tests to identify predictive linkages, and GARCH-type models to capture volatility. Machine learning approaches such as Random Forest, Support Vector Regression, XGBoost, and LSTM networks may also be used to compare forecasting performance. The thesis can evaluate models using out-of-sample forecast measures such as RMSE, MAE, and MAPE, contributing to a better understanding of how financial and energy markets influence one another and how these linkages can be forecasted effectively.

Title: MSc Project - Social Acceptance of Renewable Technologies

Description: Research on the social acceptance of renewable technologies is essential for advancing sustainable energy transitions. Understanding public attitudes, cultural values, and community responses toward renewables, such as wind, solar, and bioenergy, helps identify barriers and drivers that influence the adoption of these technologies. Social acceptance research informs policymakers, industry leaders, and stakeholders about how to design and implement energy projects that align with community needs and values, reduce resistance, and enhance public support. By examining factors like trust, perceived benefits, environmental impact, and local involvement, such research enables the creation of inclusive strategies that can foster smoother transitions to clean energy systems. Possible methods and data for this topic: Structured interviews, semi-structured interviews, structural equation modeling, econometric analyses, survey data.

Title: MSc Project - The role of energy justice in efficient energy policy development

Description: Energy justice is a growing research field that advances understandings of how energy systems and energy transitions impact society. At its core lie three tenets: 1) Distributional justice, i.e. distribution of energy services and how benefits/burdens are shared (this tenet has had the most attention in Economics to date); 2) Recognition justice, i.e. ignored/misrepresented parts of society, perhaps due to social, cultural or gender differences; 3) Procedural justice, i.e. fairness of decision-making processes and stakeholder involvement [4]. There is substantial scope to apply these tenets to a country or a region to shed light on emerging issues of energy injustice. The research will draw upon 20-25 semi-structured interviews, conducted with two sets of key actors: households and policymakers. Household interviews will explore the lived experiences of the energy practices and politics, while policymaker interviews will explore the perceived social impacts of energy policy. All interviews will integrate questions around procedural, distributive, and recognition justice issues.

Title: MSc Project - Exploring experienced and perceived issues of gender inequality in transition to renewable energy

Description: The research that focuses on the importance of integrating issues of gender inequality into energy justice is a growing literature. Energy justice seeks to embed principles of justice, fairness and social equity into energy systems and energy system transitions. Given the rise in social inequality within many states because of multiple converging structural, financial and economic crises, EU energy policy needs to focus more heavily on its social impacts. Gender issues has become one of the dominant issues in the states' policy agendas. The research will draw upon surveys and/or interviews. Household interviews will explore the lived experiences of the energy practices and politics, while policymaker interviews will explore the perceived social impacts of energy policy. Statistical and econometric methods will be used for the analyses. Expected results: The findings will feed into the recommendations for country's policymakers. Indeed, the policy recommendations will be focused on addressing some of the emerging injustices of country's renewable energy transition. In this case, the research will lead explorations into the gendered injustices associated with renewable energy transition.



Katrin Schmelz

Katrin Schmelz orbit profile

Research interests

I study the coevolution of individual preferences and societal institutions, particularly how these shape the design of public policy for climate change and public health, as well as the long-term sustainability of liberal-democratic institutions. Drawing on my training in both economics and psychology, I use quantitative social-science methods from behavioral economics (experiments and surveys) and computational text analysis.

Supervision style

I view MSc students as producers of knowledge rather than consumers. I support their progress through biweekly meetings based on short written progress reports submitted in advance, which help focus discussion and maintain momentum towards project completion.

Methodologies

Students should bring enthusiasm for the topic, a willingness to take intellectual risks, and strong technical skills, particularly in coding and quantitative behavioral-science methods. They should also have the discipline to acquire any skills they may still lack, together with intellectual curiosity, independence, and persistence. Familiarity with social-science methods, especially quantitative text analysis, as well as an interest in substantive questions in psychology, politics, and public policy, are essential.

Project proposals

Title: MSc Project – The Emergence and Political Impact of Green Values: Evidence from U.S. Congressional Speeches, 1873–Present

Description: This thesis applies novel Natural Language Processing methods, in particular Contextualized Construct Representation (CCR), to trace the long-term emergence of “green” values in U.S. Congressional speech since the late 19th century, and examine how these values relate to political events and public policy over time.

Title: MSc Project- The underworld of liberal democracy: Authoritarian and intolerant values in U.S Congressional Speeches, 1873-Present

Description: This thesis applies novel Natural Language Processing methods, in particular Contextualized Construct Representation (CCR), to examine the persistence and evolution of illiberal and anti-democratic values in U.S. Congressional speech since the late 19th century, and to assess their relationship to political developments, public policy, and judicial reasoning over time.



Per Sieverts Nielsen

Per Sieverts Nielsen orbit profile

Research interests

District heating, Low temperature district heating, Positive Energy District, Energy Communities

Supervision style

I prefer to let the student select her/his own focus. Supervision once every 2 weeks.

Methodologies

Interview studies, Case studies, Comparison studies

Project proposals

Title: MSc Project – District heating, low-temperature district heating in Positive Energy Districts and Energy Communities

Description: The heating demand is taking up more than 1/3 of energy consumption in a buildings. District heating networks are multi fuel resilient systems to cover the heat demand. Low temperature systems make it possible to include waste heating industries. In the context of creating Positive Energy Districts district heating is an important component together with many other interesting components.



Ugur Soytaş

Ugur Soytaş ORBIT profile

Research interests

My research interests can be summarized in two main areas. First, quantifying social issues of green transition such as individual and societal well-being impacts of climate change and resource use. Second, interconnectedness between markets such as energy commodities, emission trading systems, and financial assets.

Supervision style

I prefer to hold meetings every two weeks but can be flexible. I am OK with both Teams and in person meetings. I can give brief feedback on written parts of your thesis throughout the process.

Methodologies

Time series and panel data econometrics.

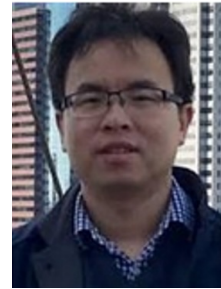
Project proposals

Title: MSc Project – Relationship between societal well-being and resource use

Description: The thesis explores the dynamics of well-being over time and across countries in response to use of energy/water/material footprint using panel data analysis. The analysis extends to heterogeneity analysis such as development level, climate exposure, and culture.

Title: MSc Project- Risk and return connectedness between energy, carbon, and financial markets

Description: The thesis uses time series or panel data econometrics to explore the return and volatility spillovers across selected markets. These could be electricity, energy commodities, carbon emission, and asset markets. The choice of financial assets is discussed with the student. The connectedness is explored under different regimes of macro level variables.



Xiaobing Zhang

your orbit profile

Research interests

My research interest lies at the intersection of energy economics, industrial organization, and behavioral responses to climate and energy policies. I use both theory method (e.g., game theory) and empirical method (e.g., econometrics) to investigate and evaluate the policies for green technology adoption such as heat pump and EVs.

Supervision style

Supervision meetings will be held every two weeks as a general rule, with instant emails to facilitate ongoing communication and address urgent matters when needed. Technical progress, task planning, and—at a later stage—the structure and content of the final draft will be discussed during these meetings.

Methodologies

Game theory; Econometrics; Machine learning causal inference; Dynamic optimization models

Project proposals

Title: MSc Project 1 – Impact of Electric Vehicle Charging on the Danish Power Grid

Description: The rapid adoption of electric vehicles (EVs) is expected to significantly increase electricity demand and reshape load patterns in power systems. In Denmark, where ambitious climate targets and high renewable energy penetration coexist, understanding the impact of EV charging on the power grid is essential for ensuring system reliability and efficiency. This project will investigate how different EV charging behaviors and infrastructure deployment scenarios affect the Danish electricity grid. The analysis may include modeling temporal and spatial charging demand, assessing peak load impacts, and evaluating potential stress on distribution networks. Special attention can be given to smart charging strategies, demand response, and the integration of renewable energy sources. The project may combine data analysis, simulation, and scenario modeling to explore how policy design, pricing mechanisms, and user behavior influence charging patterns. The findings will provide insights into grid stability, infrastructure planning, and policy measures, contributing to the development of efficient and sustainable EV integration strategies in Denmark.

Title: MSc Project 2 – Mean Field Game Modelling of Electric Vehicle Adoption with Behavioral and Peer Effects

Description: The transition to electric vehicles (EVs) depends not only on economic incentives and infrastructure availability, but also on social interactions and behavioral factors. Peer effects, social influence, and bounded rationality can play a crucial role in shaping adoption dynamics, yet these aspects are often underrepresented in traditional models. This project aims to develop a mean field game (MFG) framework to analyze EV adoption decisions in a large population of heterogeneous agents. The model will capture how individual choices are influenced by the aggregate adoption level, allowing for the incorporation of peer effects, social norms, and behavioral biases such as present bias or imperfect information. The student will formulate and solve a dynamic model in which agents decide whether and when to adopt EVs, balancing costs, expectations about future infrastructure and policy, and the behavior of others. Extensions may include policy interventions (e.g., subsidies, taxes), network effects, or information diffusion. The project may involve analytical modelling as well as numerical simulations to characterize equilibrium adoption paths under different assumptions. The findings will contribute to a deeper understanding of the role of behavioral and social dynamics in the diffusion of clean technologies and provide insights for the design of more effective policy instruments.

Title: MSc Project 3 – Who Transitions to Electric Vehicles? Heterogeneity in the Green Transition Using Danish Register Data

Description: The transition to electric vehicles (EVs) is progressing rapidly, yet adoption remains uneven across households and regions. Understanding who adopts EVs and who does not is crucial for designing effective and equitable climate policies. Differences in income, location, demographics, and access to infrastructure may all shape the pace and distribution of adoption. This project aims to investigate the heterogeneity in EV adoption using detailed micro-level data from Statistics Denmark. The analysis will explore how socioeconomic characteristics, geographic factors, and household attributes influence the likelihood and timing of EV adoption. Particular attention may be given to distributional aspects, such as whether current policies disproportionately benefit certain groups, and whether barriers exist for lower-income or rural households. The student will work with register-based data to construct an empirical framework for analyzing adoption behavior. Possible approaches include discrete choice models, duration analysis, or causal inference methods to evaluate the impact of policy measures (e.g., subsidies, tax incentives). The project may also explore interactions between income, infrastructure availability, and vehicle usage patterns. The findings will provide insights into the equity and efficiency of the green transition in transport, helping to identify which groups are leading or lagging in EV adoption and informing the design of more targeted and inclusive policy interventions.



Michael Barfod

Michael Barfod's DTU ORBIT Profile

Research interests

My main research focus is on quantitative and qualitative decision support making use of a range of impact assessment methodologies, such as multi-criteria decision analysis, cost-benefit analysis and risk analysis to build comprehensive decision support systems. My main interest lies in the green transition of the maritime industry, including green shipping corridors and port's role as energy transition hubs.

Supervision style

With me as supervisor, you can expect to have supervision meetings every second week. I am happy to discuss the thesis, its structure and content, but I do not read chapters before the thesis is handed-in. Although we will meet every two weeks, I am flexible if the need arises for additional supervision.

Methodologies and expected prerequisites

Multi-criteria decision analysis, cost-benefit analysis, risk analysis, and decision support systems.

Project proposals

Title: BSc/MSc Project - Green Shipping Corridors

Description: Green maritime corridors is a concept that addresses the uncertainties associated with substantial investments in ships, fuels, and fuel infrastructure required to kick-start the green transition in the sector through testing and demonstrating new solutions on a scale. Cargo owners, vessel operators, port operators, marine fuel producers, bunkering service providers are only a few of the stakeholders involved in turning a green maritime corridor into reality.

The projects will be concerned with different approaches to assess the feasibility and sustainability of green maritime corridors and perform sensitivity modeling.

Title: BSc/MSc Project - Complying with maritime regulations

Description: The maritime industry is undergoing a significant transformation as international and regional regulations push for rapid decarbonization. Shipowners and operators are increasingly challenged by overlapping compliance requirements, including IMO's technical measures, market-based instruments, and EU-led initiatives like the EU ETS and FuelEU Maritime. The potential introduction of the IMO Net-Zero Framework (NZF) adds further complexity, combining fuel intensity limits with global emissions pricing.

Projects will be concerned with different approaches to meet the regulations such as: a) Examine the carbon emission reduction potential of various technical and operational energy efficiency measures for specific types of ships, b) Examine the carbon emission reduction potential of alternative fuels as both short- and long-term measures, and c) Design decision support systems to assist the maritime industry in meeting the reduction targets in the most cost-effective way.

Title: MSc Project - Decision Support using MCDA

Description: Current research deals with the difficult task of identifying the most suitable tools for decision support. Several MCDA techniques are available, but many become inappropriate when dealing with a large number of alternatives and criteria.

Outranking techniques, such as ELECTRE and PROMETHEE are examples of methods that can handle many alternatives and criteria simultaneously. The project aims to examine the outranking methods available by performing a thorough literature review of the pros and cons. A suitable case study can be used for testing and the results can be compared with the outcome of a conventional analysis. The outcome will be recommendations for the techniques' applicability in decision-making.



Claudia Manca

Claudia Manca's DTU ORBIT Profile

Research interests

My research examines how work and workplaces are changing in contemporary organizations, with a particular focus on hybrid work and digitalization. Main interests are in adopting new technologies, examining how this process unfolds in practice and how managers, teams and employees experience it. This includes ongoing sociotechnical change, how collaboration and work practices are transformed, and how relationships are reconfigured.

Supervision style

We will typically meet every second week. At the same time, I remain available for additional meetings when needed, and the frequency of interaction can be adjusted depending on your progress and specific needs. Our meetings are meant as a safe space to discuss your ongoing project and results, refine your use of theories and concepts, and think together about how your work can contribute to existing research and practice.

Methodologies and expected prerequisites

I do not impose strict methodological prerequisites, and I am open to supervising different research designs. My main expertise, however, lies in qualitative research, including interviews, ethnographies, diary studies and case-based approaches. At the same time, I am open to projects that combine qualitative and quantitative methods, including survey-based studies to explore the impact of new technologies on teams' and individuals' outcomes.

Project proposals

Title: BSc/MSc Project - Generative AI and the future of work

Description: Generative artificial intelligence is transforming how people work and collaborate. While these technologies promise efficiency gains, they may also generate unintended consequences that are not fully understood.

A thesis in this area could explore how implementing generative AI in the workplace reshapes work practices, roles, and decision-making processes, and how organizations can adopt it responsibly and sustainably.

Title: BSc/MSc Project - Diversity, equity and inclusion in the new world of work

Description: Digitalization holds the potential to support more inclusive and equitable work environments, for example, by affording greater flexibility and opportunities for participation. At the same time, they may also reinforce existing inequalities or create new forms of exclusion. A project in this area could examine how technologies are used in practice and how they shape dynamics of inclusion, exclusion and perceptions of fairness. The aim would be to generate insights into how organizations can leverage new technology while safeguarding equity, inclusivity and accessibility in the workplace and beyond.

Title: MSc Project - Managing ongoing sociotechnical change

Description: In contemporary organizations, change is no longer episodic but an ongoing condition. Sociotechnical transformations continuously reshape structures, processes and practices, raising important questions about how stability can be achieved amid constant change.

A thesis on this topic could explore how organizations and managers navigate this tension between stability and change, focusing on how sociotechnical transformations are managed, sustained and stabilized over time, and how actors make sense of and respond to them.

Title: MSc Project - Time pressure and leadership in digital work

Description: Digital technologies and new ways of working are intensifying the pace of organizational life. Managers often find themselves under increasing time pressure, with limited space for reflection and leadership development.

Projects in this area could investigate how technological developments reshape temporal perceptions and structures within organizations and how these changes affect leadership practices. It may explore how managers prioritize, cope with fragmentation and make time for leadership in increasingly demanding environments.



Anneke Claypool

Anneke Claypool's DTU Orbit Profile

Research interests

My main research focus is health policy modeling and healthcare operations. In health policy modeling, I use simulation models of disease for insights into health policy through projections of long-term health outcomes and cost-effectiveness analysis. In healthcare operations, by using health system data, patient flow analysis, and optimization, operations can be improved through scheduling, supply chain, or operational planning.

Supervision style

Over the course of the project, I will meet with groups every two weeks, with flexibility depending on the needs of the project. During these meetings we can discuss methods, progress, and roadblocks. I will not review chapters of the thesis before submission or debug code, but am always happy to discuss preliminary findings, next steps, and give feedback on illustrations.

Methodologies

Infectious disease population cohort models, microsimulation, Markov models, cost-effectiveness analysis, healthcare operations management, decision analysis

Project proposals

Title: Modeling Disease and Cost-Effectiveness Analysis

Description: During the course of the project, students will create a population-wide model of disease, using optimization to calibrate the model to real-world data. Students will conduct a literature review of disease characteristics and effectiveness of interventions (in diagnostics, prevention, or treatment) to incorporate into the model. When the model is calibrated, students will use it to conduct a cost-effectiveness analysis, comparing combinations of interventions to reduce disease burden.

Students will need prior experience in coding.

Title: Healthcare Operations Management

Description: Students will collaborate with healthcare providers and use hospital data to inform capacity planning in a hospital setting to improve operations. Examples could include optimization of procedure scheduling to reduce patient wait times and analyzing patient flow through a hospital to identify bottlenecks.

Students will need prior experience in coding.



Jasmine Lam

Jasmine Lam's DTU ORBIT Profile

Research interests

Jasmine Lam is a full professor in the Operations and Supply Chain Management area. Jasmine is the Maritime Chair with interest in maritime, port, logistics, innovation, resilience, and sustainability. She focuses on data analytics, decision analysis, intelligent systems, policy recommendations, and interdisciplinary approaches.

Supervision style

With me as supervisor, you can expect to have supervision meetings once in every two or three weeks. The frequency can be adjusted according to the project's progress and our mutual agreement.

Methodologies and expected prerequisites

Multi-criteria decision analysis, operations research, simulation, risk analysis, machine learning, Decision support systems.

Project proposals

Title: MSc Project - Ship-shore communication in the presence of autonomous ships

Description: Supervisors Jasmine Lam and Seyed Parsa Parvasi

Maritime transportation is undergoing a transformative shift with the introduction of Maritime Autonomous Surface Ships (MASS). MASS, as a disruptive technology, has the potential to revolutionize global shipping, emphasizing the need to analyze changes to ship-shore systems for sustainability. However, MASS faces challenges in accurately predicting obstacles' movements and intentions, necessitating advanced navigation technologies and better communication strategies, including MASS-to-MASS and MASS-to-SCC (shore control centers). Safe and efficient communication can be capable by using the advent of Industry 4.0, Internet of Things (IoT), and smart logistics. The overall goal of the project is to develop a safe, secure and smart autonomous ship-shore communication approach to address complexity in ship-shore interfaces. The focus is simulation/ operations research.

This thesis topic will be scoped after discussions with the students to match the methodological background and interest of the student(s). The focus is simulation/ operations research in autonomous ship-shore communication. Prerequisites At least two, preferably more, MSc courses relevant to communication technology, operations management or logistics or transport and methodologies, e.g.: 42417 Simulation in Operations Management, 42380 Supply Chain Analytics.

Title: MSc Project - Optimization of green-fuelled autonomous ships

Description: Supervisors Jasmine Lam and Seyed Parsa Parvasi

Maritime transportation is undergoing a transformative shift with the introduction of Maritime Autonomous Surface Ships (MASS). MASS, as a disruptive technology, has the potential to revolutionize global shipping, emphasizing the need to analyze changes to establish a safe, secure and smart autonomous shipping environment. At the same time, shipping is undergoing green transition to reduce carbon emissions. New developments include adopting green and sustainable alternative marine fuels. The project aims to model for optimization of green-fuelled autonomous ships. The focus is developing an operations research model and solutions.

This thesis topic will be scoped after discussions with the student(s) to match the methodological background and interest of the student(s). The focus is developing an operations research model and solutions for green-fuelled autonomous ships. PREREQUISITES At least two, preferably more, MSc courses in operations research methodologies.



Allan Larsen

Allan Larsen's DTU ORBIT Profile

Research interests

My research falls within applying operations research methodologies such as mathematical programming (meta)-heuristics, and simulation modelling to solve and analyse complex planning problems within supply chain management, logistics and healthcare operations management. Specific research interests: Freight transport and logistics, urban freight transport, and operations within healthcare.

Most of my thesis projects are carried out in collaboration with a company and usually take departure in the student's connection to potential case companies. However, I strongly recommend reaching out to discuss the potential before deciding the topic of the thesis solely with the company.

Supervision style

I offer biweekly supervision meetings. Before the thesis project starts, I will host a kick-off workshop for all students I supervise that semester, offering advice on formalities, structure, and content of the thesis.

I do not review entire chapters prior to submission, but I am happy to discuss parts of the thesis during our meetings. If needed and time permits, I can provide additional supervision outside of our regular meetings. I expect you to work in thesis groups of at least two students.

Methodologies and expected prerequisites

For **MSc thesis students**, I expect that you have taken multiple courses within O&SCM and/or operations research. Specifically, I expect that you have taken at least two of the following courses; 42402 Sustainable Operations and Supply Chain Management, 42417 Simulation in Operations Management, 42380 Supply Chain Analytics and 42403 Advanced Operations Management for Production and Service Systems.

For **BSc thesis students**, I expect that you have taken 42587 Introduction to Operations and Supply Chain Management (or a similar course) and also have interest (or experience) in programming in, e.g. Julia, Python, or similar, enabling you to implement an optimization or a simulation model.

Project proposals

Title: Optimisation and/or simulation within supply chains and logistics (BSc/MSc)

Description: Efficient and sustainable supply chain management is critical for companies and institutions, especially amid disruptions like pandemics, geopolitical instability, and climate change. Simulation and/or optimisation modelling allow companies to assess potential impacts of changes in e.g. demand and supply and allow more efficient use of resources, implying more sustainable operations regarding economic, climate, and environmental effects.

Theses in this topic typically involve solving real-life problems with company collaboration, using simulation modeling and/or optimization methods. These projects require modeling and implementation, so familiarity with tools like AnyLogic, AnyLogistix, and/or programming languages such as Julia, Python, or Java is essential.

Title: Optimisation and/or simulation of self-driving/autonomous vehicle hub (MSc)

Description: Self-driving vehicles are gaining traction across Europe, with public transport actors investing heavily in their development and deployment. This is largely driven by the potential to introduce shared, on-demand transport services, which promise lower operational costs and more efficient transport systems.

However, scaling these technologies is crucial to realise the benefits of such transport services. Assessing the required operational impact of a maintenance and preparation hub for vehicles, is essential to understand the level of investment public transport companies need to make to build a viable business case for these services.

This project aims to create a simulation model of the operations around a preparation hub for autonomous vehicles, including maintenance, charging, cleaning, and other preparation activities across different phases and scaling scenarios. The project is carried out in collaboration with the Danish operations and implementation partner Holo (see: <https://www.letsholo.com/>), and secondarily with their customer Ruter, the public transport authority for the Oslo region.

The project requires experience in modelling and implementation, and therefore familiarity with tools such as AnyLogic, or programming languages like Julia, Python, or Java is essential. Familiarity with simulation modelling, including validation and verification, is also required.

Title: Analysis and operating room scheduling at the Main Orthopaedic Center at Rigshospitalet (MSc)

Description: Analysis and operating room scheduling at the Main Orthopaedic Center at Rigshospitalet Efficient and robust execution of operating room schedules is essential to avoid cancellations and ensure sufficient capacity so that patients can be treated within required waiting time targets. The operating theatre complex at the Main Orthopaedic Center at Rigshospitalet has recently experienced challenges in this regard. Consequently, a comprehensive analysis of operations carried out was initiated in mid-2025, which, among other initiatives, resulted in the recruitment of additional operating room nurses and the expansion of operating room capacity.

With staffing levels and operating room capacity largely in place, the next step is to explore how the available resources can be utilized more effectively across the operating theatre complex.

This project invites analytical investigation of operating theatre activities and operating capacity utilization. Potential focus areas include identifying inefficiencies or improvement potentials related to operating room utilization, staffing, physical resource use, or planning processes. The project may involve developing analytical, simulation, or optimization-based approaches to support better planning and resource allocation within the operating theatre complex.

Title: Last-mile in urban freight transport (BSc/MSc)

Description: Urban freight transport is increasingly challenging due to growing cities (higher demand), citizens' expectations for low response times (higher intensity), and rising traffic congestion (lower travel speed).

This thesis will focus on last-mile logistics, the final steps in the transport chain to the destination, such as a city center or suburban mall. It involves modeling, implementing, and experimenting with vehicle routing problems under city logistics constraints. Examples include multi-echelon distribution planning, considering the design of distribution hubs, satellites, and alternative-fueled vehicles.



Jesper Larsen

Jesper Larsen's DTU ORBIT Profile

Research interests

My main focus is on mathematical optimisation using MIP and LP as well as heuristic methods like metaheuristics or matheuristics. I have covered a wealth of application areas but most of my research is within transportation research.

Supervision style

In general, I aim at a meeting every second week, but along the way we can adapt the set up to the project. In the beginning my focus is to get you started as fast as possible maybe on a simpler model than the full problem, and i parallel develop the project plan which it an important document.

Methodologies

Mathematical modelling (IP, MIP), Metaheuristics, Matheuristics, algorithm design, Transport Optimisation, Production scheduling.

Project proposals

Title: Patient Admission Scheduling

Description: Newly admitted patients need a free bed that satisfies both the personal preferences (single, twin room, or a ward) as well as the medical needs of the patient located in the department that is specialized in treating the clinical picture. The assignment of patients to beds is often carried out by a central admission office that individually contacts every appropriate department a few days before the effective admission of the patient. This project should devise and implement a solution approach based on mathematical programming. It is foreseen that the initial parts of the project will consist in developing mathematical models and the second part of implementing and testing the most promising model.

Title: Solar Farm Cable Layout Problem

Description: Solar energy is a renewable and sustainable energy, which gets more and more important in times where humanity aims to reduce the usage of fossil fuels. Photovoltaic modules are used to convert sun light into electricity. Often this is done in large solar farms. We model a solar farm as layered graph, where the power generated by the strings (several connected photovoltaic modules) needs to be conducted through the layers of the graph. For the connection of two vertices there are different types of cables with different capacities and costs. The problem is now to find a cable layout with minimal costs, which does not violate cable or vertex capacities. This project has a focus on developing new mathematical or new optimal methods based on alternative decomposition techniques.

Title: Pharmaceutical Manufacturing

Description: The production of a pharmaceutical product can be a complicated process. Typically, it is synthesized in batches from quantities of raw material in such a way that the greatest quantity of the final product, having a pre-specified potency, can be manufactured. Complicating issues include the deterioration of the quality of the raw material over time, target batch sizes for the final product, and mixing restrictions on the input raw material. The aim is to devise a mathematical programming model, along with a solution method, to optimize the manufacturing process of a pharmaceutical product. Typically, the objective of the problem is to maximize the quantity of the final product produced; however, here consideration will also be given to the sensitivity of the solution to changes in input parameters. For the solution method, exact and/or heuristic methods may be developed



Fabricio Oliveira

Fabricio Oliveira's DTU ORBIT Profile

Research interests

My research interests are related to developing models and methods that account for uncertainty in the data when mathematical optimisation is used as an analytical tool for decision support. Topics include stochastic and robust optimisation modelling and decomposition methods. More recently, my research has focused on integrating statistical machine learning methods into decision-support solutions that have optimisation at their core.

Most of my research is related to the design and planning of production and distribution systems, most predominantly energy, healthcare and humanitarian relief systems.

Supervision style

I expect to have meetings every other week to discuss the project progress and the tasks for the upcoming weeks. In these, we will discuss topics such as thesis structure and content, technical writing, models, code, and experimental results. Although I do not revise individual chapters before submission or debug your code, I am happy to provide guidance and support on these matters during our meetings, as well as adjust the meeting frequency and duration as needed.

Methodologies and expected prerequisites

You should expect to work with a combination of the following topics: mathematical programming modelling; stochastic and robust optimisation; statistical machine learning (clustering, decision trees, SVMs, and neural networks); forecasting methods (time series); and decomposition methods.

I expect MSc students to have taken multiple courses within Operational Research (e.g., 42114 Integer Programming, 42112 Mathematical Programming Modelling, 42136 Large-Scale Optimization using Decomposition). Moreover, I expect you to understand the basics of machine learning (data preparation, model training, and evaluation). Being comfortable with coding is a necessary condition. I prefer that students work with Julia.

Project proposals

Title: Data-driven blood inventory control

Description: Managing inventories in the blood supply chain is a challenging task, mainly due to the uncertain nature of the demand for blood units, the perishable nature of the blood, and a strong subjective bias towards criteria other than cost minimisation.

Theses in this topic will consider methods that can optimise periodic review policies for red blood cells inventory management that focus on minimising operational costs, as well as blood shortage and wastage due to outdating, taking into account perishability and demand uncertainty. The methods are designed to use past data and relevant covariates to optimise against predictions made by statistical machine learning methods.

Title: Machine-learning-based robust optimisation

Description: A central notion in robust optimisation is that of an uncertainty set: the set that encompasses all possible realisations of the uncertainty for which a solution is guaranteed to remain feasible once the uncertainty resolves.

Theses in this topic will investigate how loss values and other fitness metrics can be used to immunise optimisation models that rely on machine-learning models for receiving data (for example, in the form of predictions) from errors and prediction uncertainty. The applications can be in any setting where prices and/or demands are forecasted using ML models.

Title: Application-driven learning for sequential decision-making under uncertainty

Description: A classical approach to decision-making under uncertainty separates prediction from optimisation: a machine learning model forecasts the uncertain parameters, and an optimisation model uses those forecasts to make decisions. This separation is convenient but misaligned, for a predictor that is accurate in a statistical sense need not produce decisions that are good in a cost sense. Application-driven learning (ADL) addresses this by closing the loop: instead of training the predictor to minimise forecast error, it is trained to minimise the actual cost incurred when its predictions drive decisions.

Theses in this topic will investigate how ADL can be applied to recurring decision problems in which a predict-plan-execute cycle repeats over time—for example, inventory replenishment under uncertain demand or energy scheduling under uncertain prices. Applications are open, but ongoing projects focus on blood inventory management and hydrogen electrolyser scheduling.



Richard Lusby

Richard Lusby's DTU ORBIT Profile

Research interests

My research focuses on the design and implementation of effective algorithms for solving large-scale optimization problems found in practice. Decomposition algorithms are a core theme in my research, and I have a growing interest in the use of machine learning methods to enhance conventional Operations Research methods. Application areas include public transportation, logistics, energy, and manpower planning.

Supervision style

A meeting every second week. However, this can be modified depending on how the project is progressing.

Methodologies

Mathematical modelling (IP, MIP), Decomposition algorithms, Metaheuristics, Matheuristics
Multi-objective optimization

MSc Project - Project proposals

Title: A heuristic for the sector coupled unit commitment problem

Description: The unit commitment problem is a crucial optimization problem in the analysis of energy systems, determining the optimal schedule of the generation units to meet the demand at a minimal cost. As the energy sector transitions to renewable sources such as wind and solar, the unit commitment problem becomes increasingly complex due to the variability and uncertainty of renewable energy. The *sector-coupled* unit commitment problem considers multiple energy types, e.g., power, district heating, natural gas, hydrogen, etc. A vital part of the green transition is to couple sectors such as PtX which converts power to hydrogen, using surplus heat from, e.g. data centers to heat households as district heating, and large heat pumps to convert power to district heating. Is it possible to construct a (meta-) heuristic for the sector coupled unit commitment problem, which is both fast and finds good solutions? Although the (single sector) unit commitment problem is well studied, not much research considers the sector coupled version. Inspiration can be taken in the numerous heuristics for the (single sector) unit commitment problem, e.g. <https://link.springer.com/article/10.1007/s10479-018-3003-z> and <https://www.mdpi.com/1996-1073/15/4/1296>.

Title: MSc Project - Estimating optimal unit commitment values

Description: The unit commitment problem is a crucial optimization problem in the analysis of energy systems, determining the optimal schedule of the generation units to meet the demand at a minimal cost. As the energy sector transitions to renewable sources such as wind and solar, the unit commitment problem becomes increasingly complex due to the variability and uncertainty of renewable energy. Is it possible to use regression or (simple?) machine learning for predicting the unit commitment solution value? Inspiration can be taken from <https://www.sciencedirect.com/science/article/pii/S0305054824001862?via%3Dihub>

Title: MSc Project - Integrated Locomotive and Maintenance Planning in Rail Freight

Description: Rail freight operators face complex short-term planning problems when assigning locomotives to train services. In this project, you will study how to optimally schedule a fleet of locomotives over a 1–2 week horizon, covering all required trips while respecting traction needs, deadheading options, and operational costs. The project extends an existing planning tool by incorporating maintenance requirements and station capacity and layout constraints, which significantly increase planning complexity. The project will explore optimization and heuristic methods using e.g., column generation, or iterative repair approaches, with a focus on balancing solution quality and computational performance. The work is closely connected to real-world railway operations and offers opportunities for both methodological research and practical impact.

Title: MSc Project - Removing redundant columns in column generation

Description: One known downside of using column generation to solve mixed integer programs is that often (many) columns that are not necessary to define any integer solution are generated. Detecting such redundant columns and preventing their generation can have a positive impact on the convergence of column generation, particularly for *time dependent decompositions*. Known approaches add classical Benders cuts in the sub-problems to ensure that redundant columns are not generated. The focus of this thesis is on implementing, and investigating the performance of, such an approach on the capacitated lot-sizing problem with setup times and the temporal knapsack problem.



Dario Pacino

Dario Pacino's DTU ORBIT Profile

Research interests

My main reserach focus is on the developement of mathematical models and heuristic algorithms for large scale optimization problems. I am also interested in how AI methods such as Reinforcement Learning can be applied to optimization problems. My main application area is maritime optimization, but I have worked also in health-care and generally on transport applications.

Supervision style

With me as supervisor, you can expect to have supervision meetings every second week. I am happy to discuss the thesis, its stucture and content, but I do not read chapters before the thesis is handed-in. I am happy to help you with your code during the meeting hour, but I do not debug or revise code outside of the meetings. Though we will meet every two weeks, I am flexible and can give you extra supervision when (and if) needed.

methodogies and expected prerequisites

Mathematical modelling (IP, MIP), Metaheuristics, Matheuristics, Reinforcement learning, and generally programming experience.

Project proposals

Title: BSc/MSc Project - Optimization stowage planning

Description: When a vessel arrives a port, cargo needs to be loaded. This loading process is called stowage planning. A stowage plan describes the precise position that each piece of cargo should have on the vessel. Stowage plans need to follow a strict set of rules to ensure the vessel is stable, and their position on the vessel has a large impact on the time the vessel stays at port and the emission it will generate.

Several different thesis projects can be derived from this topics, which will depend on the vessel type (RORO or container), on the level of details to include, and on the methodology to use (**Metaheuristics, Branch & Price, Mathematical modelling, Reinforcement Learning**, etc.)

Title: BSc/MSc Project - Maritime terminal optimization

Description: Terminals are the service provides for cargo handling in ports. A terminal is a candy store of optimization problems, that can fit any methodological interests that you might have. A thesis within this topic can focus on operational problems such as planning the cargo loading operations, or on tactical problems such as planning the berthing schedule of a number of collaborating terminals.

In particular I find very interesting the use of **metaheuristics** or **reinforcement learning** for the planning or cargo loads where arrival times are uncertain.

Title: MSc Project - Generic heuristic solve for binary models

Description: Heuristics and metaheuristics are notoriously hard to implement and maintain, and as a consequence most optimization experts revert to mathematical programming. Unfortunately, mathematical programming is not able to solve all problems. Research on **metaheuristics** is often limited to either specific application areas or classical problems, and little knowledge is available on model-based approaches.

In this project we aim at taking the first steps into the implementation of a general purpose heuristic solver for 0/1 Integer Programming (IP) models. Your task will be to implement and test one or more heuristic procedures for the general class of binary 0/1 integer programs.



David Pisinger

David Pisinger's DTU ORBIT Profile

Research interests

My research is focused on designing applicable solution methods for large scale optimization problems. The problems can be based on real-life applications, or simple problems that make it possible to develop new theory and solution methods. I work on problems in transportation problems, maritime optimization, decision making under uncertainty, energy systems, wind farm design, and knapsack problems

Supervision style

You can expect to have supervision meetings every second week. Before the meeting send me 3-5 pages you have written on your thesis since last meeting, and/or a list of questions. During the meeting we discuss the project, and make a plan for the coming two weeks. I love to discuss algorithms, but I assume that you can do the coding yourself.

methodologies and expected prerequisites

Algorithms, Graphs/Networks, Metaheuristics, MIP-models, Good programming skills.

Project proposals

Title: MSc Project - Energy production planning

Description: The Unit Commitment problem (UC) is to select which units to produce energy over the coming time horizon in order to minimize operational costs. The problem is important both on a daily scheduling basis, but also when planning future investments in new power plants, wind farms, or solar plants. In Denmark, Energinet is the main infrastructure owner, responsible for ensuring that sufficient energy is available for the industry and households. To improve efficiency, and hence meet our targets for more sustainable energy, the energy systems are becoming more coupled. This means for instance, that electricity can be used in the direct form, or transformed to heat through heat pumps. Furthermore, we may have heat storage, that save energy to future time slots. The Unit Commitment problem is difficult to solve (it is an NP-hard problem) and in order to support strategic decisions we often need to solve the problem for 10-20 years on an hourly basis. Therefore, it would be very interesting to implement fast heuristics that provide near-optimal solutions in very short time.

Title: MSc Project - Optimizing baggage handling

Description: Copenhagen airport is one of the largest airports in Scandinavia, handling more than 20 millions of passengers per year. An important part of the airport operation is to handle checked-in baggage, such that it effortlessly (for the passenger) arrives at the end destination. The baggage handling consists of several phases: Baggage drop-off, security scanning, early baggage storage, sorting, loading, unloading, baggage reclaim. Each of the phases demand some resources that can be optimized. The goal of the project is to use the existing resources in the best possible way such that more passengers can be handled without investment in new infrastructure.

Past projects have included: Check-in counter assignment, algorithms for early baggage storage, assignment of boxes in the sorting facility, optimization of belts in baggage reclaim area. The concrete project will be discussed and scoped with Copenhagen Airport.

Title: MSc Project - Offshore wind farm layout

Description: Wind farms provide renewable energy at low marginal cost, complementing and supplementing other renewable energy sources like solar energy and biogas. The offshore wind farm design problem consists of several sub-tasks: Selecting the correct wind turbine, locating turbines and sub- station(s) within the available area to maximize energy production, cable selection, and finally cable routing. Heuristics and/or mathematical models can significantly reduce the cost of energy, making the green transition easier.



Stefan Røpke

Stefan Røpke's DTU ORBIT Profile

Research interests

Core: Vehicle routing, integer programming, decomposition methods, meta-heuristics, transport. Other: Collaborative game theory, stochastic programming, AI/machine learning, financial optimization, sustainability, public transport.

Supervision style

In general, I aim to meet every second week, but along the way, we can adapt the setup to the project.

Methodologies

Mathematical modelling (IP, MIP), Metaheuristics, Matheuristics, AI/Machine learning, Branch and Price, Forecasting

Project proposals

Title: Solving real life vehicle routing problems

Description: Real-life vehicle routing problems typically contain more complicated constraints or objective functions compared to the standard problems studied in the literature. In this project, we will work with a company that specializes in vehicle routing software, and the exact project topic will depend on what the company is currently working on and the student group's interests.

Title: BSc/MSc Project - Portfolio optimization

Description: Portfolio optimization is a quantitative investment strategy that aims to construct an investment portfolio with the highest possible expected return for a given level of risk or the lowest possible risk for a given level of expected return. It's a crucial concept in finance and asset management, helping investors make informed decisions about how to allocate their assets to achieve their financial goals. A book about the subject is <https://link.springer.com/content/pdf/10.1007/978-3-319-18482-1.pdf> (you can download it when at DTU or use DTU's VPN connection).

The project should be based on an Operations Research model, but the project can include elements from finance, forecasting, or machine learning as desired.

Title: MSc Project - Automatic Dantzig-Wolfe decomposition

Description: At DTU we have done research on how to automate Dantzig-Wolfe decomposition. A goal of the research has been to develop methods for solving mixed-integer programming problems using Dantzig-Wolfe decomposition and column generation without user involvement. In the long run, such methods could be embedded into solvers such as CPLEX or Gurobi, thereby improving their performance on certain problem classes. The master's thesis can look into a specific question related to automatic Dantzig-Wolfe decomposition, such as:

- Detect a structure that allows us to split the mathematical model into master and sub-problems.
- Devise heuristics to solve subproblems to speed up the algorithm's convergence.
- Binary decision diagrams (see https://www.andrew.cmu.edu/user/vanhoeve/papers/DD_Tutorial.pdf) have shown promise for solving certain pricing problems. A master's thesis could look into whether it is possible to detect such sub-problems automatically and solve them using binary decision diagrams.

Title: BSc/MSc Project - Operations research, renewable energy sources, power-to-X, hybrid power plants, alternative fuels

Description: With this project, we invite students to propose their own thesis topic within operations research, focusing on areas such as renewable energy sources, power-to-X, hybrid power plants, and alternative fuels. Your research could contribute to planning solar farm design, usage of renewable fuels in transport, scheduling fuel production, or something completely different. MSc projects could involve collaboration with Total Energies, Blue Power Partners, or a company the student is in touch with.

Title: MSc Project - Navi Merchants

Description: Navi Merchants specializes in dry bulk freight, with a primary focus on bulk agricultural products and biomass trades across the Baltic, Continent, Mediterranean, USA, and Southeast Asia. The company is interested in using optimization and data science to make better decisions, especially in relation to trading. Examples of potential projects can be found here: <https://copmer.com/career/for-students/>, and specific projects can be discussed with the company.

Title: MSc Project - ALNS for Departure Allocation with Machine Learning Extensions

Description: In a baggage hall, departing flights must be assigned to baggage boxes over time. Each departure has requirements such as handler, load type, number of boxes, and time windows. The problem includes constraints on compatibility, timing, buffer times, and adjacency of assigned boxes. The main task is exploring how Adaptive Large Neighbourhood Search (ALNS) can be extended using machine learning. The goal is to investigate whether machine learning can improve the performance of the heuristic. Possible directions could be

- Using machine learning for operator / neighbourhood selection
- Using machine learning for acceptance decisions in ALNS
- Using machine learning as a destroy or repair operator

The project will be in collaboration with the company Qampo. Depending on the focus of the project the student can develop their own design of ALNS or Qampo can provide pseudo-code for the existing ALNS algorithm. Qampo will provide real-life data and solutions from the existing ALNS algorithm, which can be used to benchmark the developed algorithm.

Title: BSc/MSc Project - using LLMs to evolve and discover algorithms

Description: Recently, there has been growing interest in using LLMs to discover or evolve algorithms or parts of algorithms. Examples are evolving LLM models themselves: <https://github.com/karpathy/autoresearch>, discovery of components of a vehicle routing heuristic <https://arxiv.org/pdf/2510.07073> or discovery of diversification-intensification mechanisms <https://galgos.inf.puc-rio.br/cvrplib/uploads/teams/OptVerse-CityU-20260109-203156.pdf> in heuristics. In this project, you will test the idea of evolving algorithms using LLMs on a case that you decide (we can discuss potential cases).



Lara Schilling

Lara Schilling's Google Scholar Profile

Research interests

My research focuses on sustainable supply chain management, particularly emphasizing the intersection of digital technologies and their implementation in emerging markets. I examine how digital transformation can improve supply chain practices, fostering both sustainability and resilience. To explore these complex dynamics, I employ a mix of qualitative and quantitative empirical methods, including case studies, ethnography, discourse analysis, and surveys.

Supervision style

I offer supervision meetings every two weeks to discuss your thesis's structure and content. While I do not review individual chapters before final submission, I am happy to provide guidance during our meetings as needed. This process serves as a standard framework, but my mentoring style is flexible so that we can tailor the approach to meet the needs of your project best. I encourage students to work in working groups of at least two members.

Methodologies and expected prerequisites

I recommend to have completed course 42402 Sustainable Operations and Supply Chain Management.

Project proposals

Title: A case study on craft and its role in supply chain management (MSc)

Description: In the face of accelerating ecological degradation, climate breakdown, and mounting socio-economic inequality, scholars have called for a radical rethinking of supply chain management. The aim of this study is to examine how the organising of craft can inform alternative approaches to supply chain management that foreground material engagement, sustainability, and relational sourcing. Grounded in a new materialism perspective, which recognizes the vitality and agency of materials in organizing, this study examines how artisanal producers engage with materials—or matter. Through a case study at Danish artisanal production sites, the study investigates how supply relationships are organised, how materials are perceived and selected, and how the supply management of craft may inform more sustainable and materially attuned approaches to supply chain management.

Title: A critical discourse analysis of circular supply chains (MSc)

Description: This research project explores the social implications of value retention options within the circular economy, moving beyond its commonly emphasized environmental benefits. It examines how value retention practices in the Global South intersect with initial value creation in the Global North, shedding light on potential inequalities and power dynamics. Focusing on the textile industry, the study employs a critical discourse analysis of circular economy narratives to uncover underlying assumptions and socio-economic consequences. The research involves conducting interviews, collecting secondary data, and applying qualitative content analysis to assess how these dynamics shape labor conditions, livelihoods, and local economies.



Thomas Stidsen

Thomas Stidsen's DTU ORBIT Profile

Research interests

Research in optimization approaches, both mathematical model formulation and specialized optimization algorithms for the models. Primary application areas are: Educational timetabling, man-power planning and multi-objective optimization.

Supervision style

With me as supervisor, you can expect to have supervision meetings every second week. I am happy to discuss the thesis, its structure and content, but I do not read chapters before the thesis is handed-in. I am happy to help you with your code during the meeting hour, but I do not debug or revise code outside of the meetings. Though we will meet every two weeks, I am flexible and can give you extra supervision when (and if) needed.

Methodologies

Mathematical modelling (LP, IP, MIP), Metaheuristics, Matheuristics, Multi-Objective methods, Benders Decomposition, Column Generation/Branch & Price

Project proposals

Title: BSc/MSc Project - Energy grid planning with Siemens

Description: Energinet, the Danish grid administrator, is currently expanding the electrical network in these years. In this expansion, Siemens is one of the main contractors, delivering e.g. sub-stations. The project is about planning which substations to build when, minimizing costs, minimizing the risk of delays, taking into account sub-contractor availability, resource constraints.

Expected methods applied in the thesis work are: **Mathematical modelling, Mathheuristics and Multi-objective optimization.**

Title: MSc Project - Integrated train driver at DSB

Description: DSB has two types of drivers. There are the classic train drivers who drive the commercial departures on the main tracks and there are the station drivers who only drive within the station on local tracks. The train drivers are allowed to drive on some tracks within a station but not necessarily all and the station drivers are not allowed to drive on any main tracks outside a station. The station drivers are normally attached to a specific station whereas the train drivers vary w.r.t. what part of the rail network they are allowed to drive. The duties of any driver are composed by task derived from the rolling stock schedule.

Expected methods applied in the thesis work are: **Mathematical modelling, Mathheuristics and Column Generation/Branch & Price**

Title: BSc Project - Exam room allocation at DTU

Description: Every semester DTU plans the written exams in a large number of rooms. Help the DTU planners to do it optimally: Given a set of written exams, a set of students, select the rooms and timeslots for the exams. Notice, the dates for the exams are given, but the time of day and room needs to be decided. Expected methods applied in the thesis work are: **Mathematical modelling and Mathheuristics**