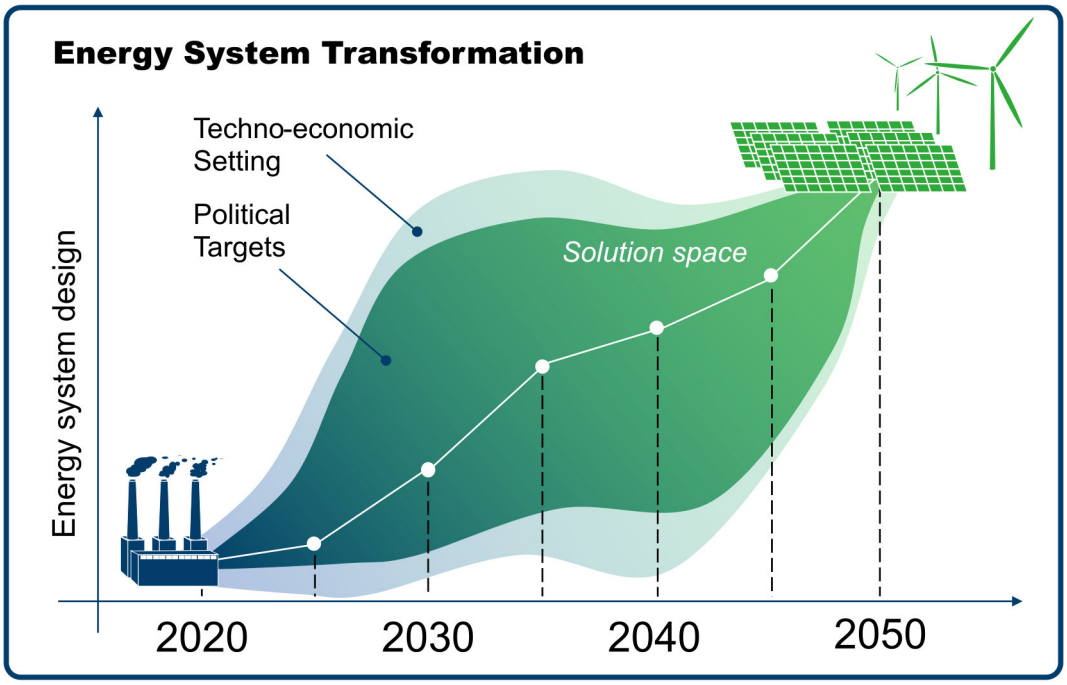

Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,500 employees in one of Europe's biggest research centres and help us to shape change!

The transformation of the entire economic system towards greenhouse gas neutrality is one of the major challenges of the 21st century. At the Institute of Energy and Climate Research – Jülich Systems Analysis (ICE-2), we use integrated simulation and optimization models to assess how possible cost-effective transformation strategies should be designed. As part of a large collaborative research project, the technology of CO2 capture from ambient air and storage (Direct Air Capture and Storage - DACS) is being upgraded for large-scale deployment to generate negative emissions (https://www.dacstore-project.com/). Become part of our international research team and contribute your ideas and creativity to develop solutions for this major challenge.

We are offering an exciting

Master Thesis - The future of Direct Air Capture and Storage: Patent Analysis with Large Language Models

Your Job:
To achieve the goal of greenhouse gas neutrality, so-called negative emission paths must be followed to compensate for remaining residual emissions, in addition to the strict defossilization of the economic system. CO2 capture from ambient air and its storage represents an important technical solution in this context. In your master thesis you will develop approaches based on Natural Language Processing (NLP) to evaluate the increasing number of patents and scientific publications. The goal is to identify both disruptive and incremental innovations for the much-needed DAC technology. The basis of the work is a classification of DAC technologies as well as their functional descriptions, which was developed in cooperation with technology experts. Based on this, a methodology will be developed and prototypically implemented to identify innovations in the field of these technologies in a large patent dataset in addition to evaluating them with respect to their relevance. In the last step, it will be discussed to what extent the developed methods can be transferred to the evaluation of scientific

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application via our **Online-Recruitment-System!**

Questions about the vacancy?
Get in touch with us by using **our contact form.**
Please note that for technical reasons we cannot accept applications via email.
www.fz-juelich.de

articles.

- Familiarization yourself with the topic (NLP, Large Language Models, Patents, Direct Air Capture)
- Development of the methodology in close cooperation with the supervisors
- Creation of data sets (partly automatically by heuristics, partly manually)
- Prototypical development of the individual modules
- Identification of textual descriptions of technical solutions in patents
- Identification of the advantages and disadvantages of a technical solution with respect to the prior art
- Integration of the modules into a pipeline for identification and evaluation of technical solutions

Your Profile:

- Technical master studies with high affinity to Natural Language Processing (mechanical engineering, electrical engineering, construction engineering) or information technology study background with high interest in technical applications (computer science, computational linguistics)
- Good knowledge of Python
- Experience in NLP and in dealing with language models advantageous
- Interest in technical design issues
- Independent and analytical way of working
- Fluent written and spoken English

Our Offer:

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! We support you in your work with:

- A large research campus with green spaces, offering the best possible means for networking with colleagues and pursuing sports alongside work
- A highly motivated and international working group in one of the largest research institutions in Europe
- Excellent scientific and technical infrastructure
- An interesting and socially relevant topic for your thesis with a future-oriented theme
- Intensive supervision by scientific colleagues
- Very good technical equipment for successful work in the home office
- Appropriate remuneration for your work

The position is initially for a fixed term of 6 months.

In addition to exciting tasks and a collaborative working atmosphere at Jülich, we have a lot more to offer: https://go.fzj.de/benefits

We welcome applications from people with diverse backgrounds, e.g. in terms of age, gender, disability, sexual orientation / identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.