JÜLICH
Forschungszentrum

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 7,400 employees in one of Europe's biggest research centres and help us to shape change!

At the Institute of Climate and Energy Research - Energy Systems Engineering (ICE-1) we focus on the development of models and algorithms for simulation and optimization of decentralized, integrated energy systems. Such systems are characterized by high spatial and temporal variability of energy supply and demand as well as by a high degree of interdependence of material and energy flows. Research at ICE-1 aims to provide scalable and faster than real-time capable methods and tools which enable the energy-optimal, cost-efficient and safe design and operation of future energy systems.

We are offering a

PhD position - Modelling of Gas Grids for High Performance Computing Simulation

Your Job:
The increasing share of fluctuating renewable energies in electricity generation leads to increased volatility as well as a strongly changed distribution of the power fed into the grid. This increases the requirements on the flexibility of the system and the operation of power grids. Additional electricity demand to decarbonize various energy sectors, such as transport and heating, as well as intersectoral flexibility options such as power-to-X lead to increasing sectoral interdependencies. Your task is to support our institute in the development of gas grid models that are able to analyze this interaction of energy networks (electricity, gas, heat) and markets at high resolution.

Your tasks will include among others:

- Development of realistic European gas and hydrogen grid models
- Further develop the inhouse open source gas flow simulation tool GasNetSim
- Analysis of the steady-state and dynamic behavior of gas flows, taking into account different gas compositions and operating strategies resulting, for example, from the power grid - restricted operation of electrolyzers

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

- Development of the interfaces to other grid models such as power and heating grid models
- Contribution the development of a multi-physical high performance computing simulation tool that makes use of the parallel infrastructures of supercomputers
- Supervision of Master and Bachelor students
- Representation in national and international networks
- Presentation of your research results at (international) meetings and conferences, as well as in the form of publications in relevant journals

Your Profile:

- Excellent Masters degree in Mechanical Engineering or comparable
- Very good Programming skills in Python and C++
- Fluent written and spoken English, good German skills are an advantage
- Excellent ability to work as part of a team and in a cooperative manner
- Independent and analytical style of working

With your application documents (CV, motivation letter, relevant certificates like Bachelors and Masters degree, any other relevant certificates), please also upload one document where you briefly explain your specific experience with:

- Python
- C++
- Modelling / simulation of gas grids
- Parallel computing architectures
- Handling of large data sets

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 offer ideal conditions for you to complete your doctoral degree:

- Possibility of pursuing a PhD at RWTH Aachen University supervised by Prof. Benigni
- A highly motivated research group in one of the biggest research centers in Europe
- An excellent scientific and technical infrastructure: both necessary conditions for a successful PhD thesis at RWTH Aachen within three and a half years
- Participation in project meetings and conferences
- Flexible arrangement with the option to work partly from home
- Strong support and mentoring for setting up a future career in science and/or the industry
- 30 days of annual leave and provision for days off between public holidays and weekends (e.g. between Christmas and New Year)
- A large research campus with green spaces, offering the best possible means for networking with colleagues and pursuing sports alongside work
- Further development of your personal strengths, e.g. through an extensive range of training courses; a structured program of continuing education and networking opportunities specifically for doctoral researchers via JuDocS, the Jülich Center for Doctoral Researchers and Supervisors: https://www.fz-juelich.de/en/judocs
- Targeted services for international employees, e.g. through our International Advisory Service

The position is for a fixed term of 3,5 years, where the first half year serves as orientation and probation period. Pay in line with 75% of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund) and additionally 60 % of a monthly salary as special payment („Christmas bonus“). All information about the Collective Agreement for the

Public Service (TVöD-Bund) can be found on the BMI website: https://go.fzj.de/bmi.tvoed . The monthly salaries in euros can be found on page 66 of the PDF download.

Further information on doctoral degrees at Forschungszentrum Jülich including our other locations is available at: www.fz-juelich.de/gp/Careers_Docs

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.