**JÜLICH**
Forschungszentrum

At the Institute of Energy and Climate Research – Energy Systems Engineering (ICE-1), we develop advanced models and algorithms to understand and optimize integrated energy infrastructures.

As renewable energy continues to grow, inverter-based resources (IBRs) — such as solar PV, wind turbines, and battery inverters — are transforming how our power systems behave. Traditional grids once dominated by synchronous machines are evolving into converter-rich networks, creating exciting challenges for system stability, control, and reliability.

Our mission is to ensure that tomorrow's power systems are stable, sustainable, and ready for a renewable future. If you're passionate about combining deep technical research with meaningful societal impact, this position is for you.

**We are offering a**

# PhD position - Stability of Inverter-Based Power Systems

### Your Job:

In this PhD project, you will explore the stability and dynamic behaviour of inverter-based power systems, using state-of-the-art supercomputing infrastructure.

You'll work at the cutting edge of energy systems and computational engineering, developing scalable methods to simulate and secure IBR-dominated grids.

Your key responsibilities include:

- Conducting large-scale simulations to study grid stability, fault propagation, and recovery dynamics.
- Analyzing control and protection strategies using high-resolution time-domain models.
- Developing dynamic models for grid-forming and grid-following inverters.
- Implementing and optimizing scalable algorithms for transient and stability analyses

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

on HPC architectures (CPU, GPU, hybrid).
- Enhancing the numerical robustness and efficiency of existing simulation frameworks.
- Publishing and presenting your results at international conferences and in peer-reviewed journals.
- Mentoring students and contributing to collaborative, interdisciplinary research projects.
- Disseminate your findings through scientific publications, conferences, and collaborations
- Supervise Bachelor's and Master's students

## Your Profile:
- Excellent Master's degree in electrical engineering
- Very strong mathematical and algorithmic background
- Programming experience (Python, C++, etc.)
- Familiarity with parallel programming frameworks (e.g. MPI, CUDA)
- Fluent in written and spoken English
- Strong analytical and independent working style
- Excellent teamwork and communication skills

You are independent, motivated, and passionate about shaping the energy transition—if this describes you, we encourage you to apply!

## Our Offer:
Join a diverse and supportive research group at one of Europe's leading research centers, where you will work on cutting-edge energy system models developing solutions for Europe energy system decarbonization. You will have access world-class infrastructure (including the Jülich Supercomputing Centre), and develop skills to advance your future career in academia or industry.

We offer ideal conditions for you to complete your doctoral degree:
- Pursue a PhD at RWTH Aachen University under the supervision of Prof. Benigni
- Access cutting-edge infrastructure, including the Jülich Supercomputing Centre
- Participate in projects, meetings, and international conferences
- 30 days of annual leave and flexible working arrangements, including partial remote work
- Strong support and mentoring for building a career in academia or industry
- Professional development through JuDocS, including training courses, networking, and structured continuing education ( 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 6 months serve as orientation and probation period. Pay is in line with 13 (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"). The monthly salaries in euro can be found on the BMI website: https://go.fzj.de/bmi.tvoed.entgelt  Further information on doctoral degrees at Forschungszentrum Jülich (including its various branch offices) is available at https://www.fz-juelich.de/en/careers/phd

In addition to exciting tasks and the collaborative working atmosphere at Forschungszentrum Jülich, we have a lot more to offer ( https://www.fz-juelich.de/en/careers/julich-as-an-employer/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.

The following links provide further information on diversity and equal opportunities: https://go.fzj.de/equality and and on the targeted promotion of women: https://go.fzj.de/womens-job-journey