As a member of the Helmholtz Association, Forschungszentrum Jülich makes an effective contribution to solving major challenges facing society in the fields of information, energy, and bioeconomy. It focuses on varied tasks in the area of research management and utilizes large, often unique, scientific infrastructure. Come and work with around 6,400 colleagues across a range of topics and disciplines at one of Europe’s largest research centres.

The Jülich Supercomputing Centre (JSC) at Forschungszentrum Jülich operates one of the most powerful HPC infrastructures in Europe, enabling scientists and engineers to solve highly complex and socially relevant problems by simulations. The department of Federated Systems and Data at JSC develops software for data analysis, data management and workflow management on distributed data and computer systems. The research group Earth System Data Exploration applies these tools to develop new analysis methods for Earth System data with a focus on Deep Machine Learning.

Specifically, as the lead partner in the interdisciplinary research project KISTE (KI STRategie für Erdsystemdaten, AI strategies for earth system data), we develop new AI applications and concepts to address relevant aspects in environmental sciences with a focus on air quality and weather information. These will be linked to the group’s activities to facilitate access to environmental data through large-scale web service architectures and high performance data processing. KISTE furthermore places a strong focus on the development of innovative e-learning modules about AI applications in environmental sciences.

We are offering a

**PhD Position – Application of Unsupervised Learning on Air Quality Data with focus on Biogenic Emissions**

**Your Job:**
A major research objective in the work in the KISTE project is to improve current methods for interpolation and prediction of air pollution data through unsupervised big data and deep learning approaches. Specifically, your work shall target the use of AI for modeling the relationships between air pollutant emissions and secondary air pollutant concentrations. You will analyze spatio-temporal cause-effect relationships between plant conditions (e.g. drought, sickness, season etc.) and air quality. For this, you will advance the state-of-the-art of machine learning in the environmental sciences by
focusing on unsupervised deep learning techniques.

Your tasks:

- Develop unsupervised learning tools for plant emission prediction
- Analyze statistically the connection between plant emission and air quality in different seasons and for different plant stress conditions
- Present and discuss the developed learning tools in a series of earth and data scientists’ colloquia
- Write articles about your technical developments and insights on the interaction of plant emissions and air quality
- Be part of the creation of a massive open online course to make your developed methods usable to a broad audience

Your Profile:

- University degree in either environmental sciences, physics, applied mathematics, or another discipline with relevance to air pollution research
- Expertise in HPC systems and numerical modelling workflows
- Experiences with Python and SQL databases
- Experience with handling large data files and large datasets
- Strong interest in AI, machine learning and statistical data analysis
- Very good communication and organizational skills
- Very good command of the English language

Our Offer:

- An exceptional research and high-performance scientific computing infrastructure at JSC - ideal conditions for successfully completing a doctoral degree
- A highly motivated group as well as an international and interdisciplinary working environment at one of Europe’s largest research establishments
- Possibility for further scientific and technical training through international experts
- Chance of participating in (international) conferences and project meetings
- Continuous scientific mentoring by your scientific advisor
- Further development of your personal strengths, e.g. via a comprehensive further training programme
- Pay in line with 75% of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund)
- Information on employment as a PhD student at Forschungszentrum Jülich can be found here http://www.fz-juelich.de/gp/Careers_Docs

Forschungszentrum Jülich promotes equal opportunities and diversity in its employment relations. We also welcome applications from disabled persons.