



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 Peter Grünberg Institute – Neuromorphic Compute Nodes (PGI-14), we currently have an opening for doctoral research in bio-inspired computing systems, focusing on algorithm and circuit design and their co-integration for energy-efficient machine learning and signal processing applications. This neuromorphic approach leverages recent neuroscience insights in multi-timescale memory functions using complex compartment neuron models to enhance information processing capabilities and energy efficiency. Engineering electronic circuits for dendritic computing can have diverse applications that can surpass traditional machine learning (such as Transformers) running on CPUs and GPUs. This project will also investigate the use of memristive devices in circuits, enabling analog tunable time-scale encodings for short- and long-term retention. The project goal is to advance the performance (energy efficiency, latency, area) of current neuromorphic computing systems. More information about us: <https://www.fz-juelich.de/en/pgi/pgi-14>

We are offering a

PhD Position – Dendritic Computing Circuits and Algorithms

Your Job:

Explore bio-inspired algorithms through simulation—both numerical and circuit-based—and experiment with existing hardware, including CMOS and memristor circuits. Additionally, will need to co-design algorithms and circuits to develop efficient neuromorphic hardware, tailored to target tasks. In detail, you will:

- develop circuit-plausible training/inference algorithms and analyze in simulation studies (LTspice and Cadence Spectre)
- perform algorithm-circuit co-design, quantifying performance and benchmarking with competing approaches
- support printed circuit board design and tape-out of integrated circuits (Altium Designer / Cadence Virtuoso)
- set up experimental systems for memristive circuit measurements and experimental data analysis

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

- work in a cross-disciplinary team within the DFG grant collaboration (neuroscientists and device physicists)

Your Profile:

- Master's degree in electrical/electronic engineering, physics or related fields
- Strong skills in mixed-signal circuit designs (TIA, ADC, ...) and simulation (SPICE, Cadence Spectre) is a must.
- Proficiency using tools such as Altium Designer (printed circuit board) and Cadence Virtuoso (integrated circuits)
- Skills in electrical measurements and analysis
- Excellent communication skills and the ability to work in a team are essential
- Strong English skills will be required for the international working environment

Our Offer:

We work on cutting-edge research topics with a high potential to positively impact society. We offer ideal conditions for you to complete your doctoral degree:

- A world-leading, international research environment with state-of-the-art equipment
- Opportunity to work in the highly interdisciplinary and exciting field of neuromorphic and brain-inspired computing, collaborating with physicists, neuroscientists, materials scientists, and engineers
- Flexible work (location) arrangements, e.g. remote work in coordination with the supervisor
- 30 days of annual leave as well as an arrangement for bridging days (e.g. between Christmas and New Year's Day)
- Opportunity to develop your strengths, e.g. through a comprehensive training programme; a structured programme including continuing professional development and networking opportunities specifically designed for Jülich's doctoral researchers by the Jülich Center for Doctoral Researchers and Supervisors (JuDocS): <https://go.fzj.de/JuDocs>
- Targeted services for international employees, e.g. through our International Advisory Service

More information about us and our goals you find here:

<https://www.fz-juelich.de/en/pgi/pgi-14>

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

Place of employment: Aachen

The position is for a fixed term of 3 years, where the first half year serves as orientation and probation period. The salary is in line with pay group 13 (75 %) of the Collective Agreement for the Public Service (TVöD-Bund). In addition, an annual special payment is granted ("Christmas payment"), which amounts to 60 % of the monthly salary. Further information on doctoral degrees at Forschungszentrum Jülich (including its various branch offices) is available at <https://www.fz-juelich.de/en/careers/phd>. All information about the Collective Agreement for the Public Service (TVöD-Bund) can be found on the BMI website: <https://go.fzj.de/bmi.tvloed> The monthly salaries in euros can be found on page 66 of the PDF download.

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.