



PhD Position (m/f/d) for system- and circuit-level development of neuromorphic mixed signal ASICs

Job-ID: 5021/21 | Dept.: Circuit Design | Salary: according TV-L | For the limited period of the project, until 31.12.2024 | Entry Date: as soon as possible

The Collaborative Research Center 1461 (SFB 1461) at Christian-Albrechts-Universität zu Kiel, recently approved by the German Research Foundation (DFG), is entitled: "Neurotronics: Bio-inspired Information Pathways". The interdisciplinary Collaborative Research Center aims to analyze fundamental mechanisms of biological information processing in nervous systems and to implement them in electronic circuits. Thematically, SFB 1461 covers the research areas: Neurobiology, Behavioral Science, Systems and Network Theory, Physics of Nonlinear Systems, Electronic Circuitry including memristive and memsensory devices, and Materials Science. The research focus of the SFB 1461 is at the Christian-Albrechts-Universität zu Kiel, which is substantially and purposefully extended by external partner institutions. The external institutions include research groups or chairs of Ruhr-Universität Bochum, Technische Universität Ilmenau, Universität Hamburg-Eppendorf, Universität Cottbus-Senftenberg) and Technische Hochschule Lübeck as well as the Leibniz Institutes IHP – Innovations for High Performance Microelectronics and IPN - for Education in the Sciences (IPN).

A PhD degree will be strongly encouraged. The integrated research training group of the SFB 1461 offers its doctoral students a structured doctoral program, which promotes the further development of professional, linguistic and communicative competencies. Participation is mandatory for PhD students of the SFB 1461. Further information can be found on the website: www.CRC1461-Neurotronics.de

IHP is an institute of the Leibniz Association and conducts research and development of silicon-based systems and ultra high-frequency circuits and technologies including new materials. It develops innovative solutions for application areas such as wireless and broadband communication, security, medical technology, industry 4.0, automotive industry, and aerospace. IHP employs approximately 330 people. It operates a pilot line for technological developments and the preparation of high-speed circuits with 0.13/0.25 μm BiCMOS technologies, located in a class 1 cleanroom.

The main goal of this project is the development of comprehensive and accurate analog memristive device models which represent the behavior of CMOS integrated HfO₂ based RRAM devices. In particular, device issues such as cyclic variations, retention and endurance will be addressed. The completion of models is a long-term challenge since the memristive technology itself is evolving. This process of memristive device evolution requires the advancement of the respective models to represent the physical behavior of optimized technologies. The project also targets functional circuit-level development, fabrication and characterization of designed systems and verification of the applied mixed-signal approaches and memristive device models.

The Position:

- System and concept work on neuromorphic ASICs
- Analog-level and mixed-signal development of neuromorphic ASICs
- Contributions to design methodologies and device models for neuromorphic ASICs and systems from the circuit design point of view
- Characterization and re-engineering of neuromorphic ASICs developed within this project
- Close cooperation with external and internal research groups

Your Qualifications:

- Master degree in electrical engineering or physics
- Strong background in mixed-signal-simulation tools
- Experience in mixed-signal circuit design
- Ability to work in multidisciplinary project teams
- Very good oral and written skills in English
- Basic German language skills are welcome. Deepening language skills is expected and encouraged, for example in in-house or intensive courses.

Our Offer:

Do research in a challenging, multinational environment giving you excellent career opportunities. You will have the chance to establish international reputation at the edge of top-notch technologies. It is important to us to support the individual career developments (e.g. conferences, advanced trainings) as well as the personal needs of our employees by offering flexible working hours and the possibility to work off-site. The compatibility of work and family is highly valued. More information about our scientific excellence and the working environment at IHP can be found on our website.

IHP is TOTAL E-QUALITY-certified for equal opportunities for women and men at work and actively pursues the equality of all gender and all groups of people. We promote the professional development of women and strongly encourage them to apply. Disabled applicants, qualified according to the above criteria, will be given preference over other candidates with equivalent relevant qualifications.

Your application:

Have we sparked your interest? Then we look forward to receiving your application [via our online application form](#).

For further information regarding the position please contact Prof. Dr. Gerhard Kahmen: career@ihp-microelectronics.com.

