

Technische Universität Dresden (TUD), as a University of Excellence, is one of the leading and most dynamic research institutions in the country. Founded in 1828, today it is a globally oriented, regionally anchored top university as it focuses on the grand challenges of the 21st century. It develops innovative solutions for the world's most pressing issues. In research and academic programs, the university unites the natural and engineering sciences with the humanities, social sciences and medicine. This wide range of disciplines is a special feature, facilitating interdisciplinarity and transfer of science to society. As a modern employer, it offers attractive working conditions to all employees in teaching, research, technology and administration. The goal is to promote and develop their individual abilities while empowering everyone to reach their full potential. TUD embodies a university culture that is characterized by cosmopolitanism, mutual appreciation, thriving innovation and active participation. For TUD diversity is an essential feature and a quality criterion of an excellent university. Accordingly, we welcome all applicants who would like to commit themselves, their achievements and productivity to the success of the whole institution.

At the **Faculty of Computer Science, Institute of Computer Engineering**, the **Chair of Processor Design** offers one fixed term position as

Research Associate (m/f/x)

(subject to grant approval, qualified employees are remunerated according to salary group E 13 TV-L)

starting on **April 1, 2023**.

Research area: **Energy-Efficient Distributed and In-Network Computing through Approximate Computing**

Terms: The position is initially limited until December 31, 2024 with 75% of a full time position subject to extension upon positive evaluation and offers the possibility to obtain further academic qualification.

The period of employment is governed by the Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG).

Position

In the era of 5G/6G, diverse domains of applications, from personalized healthcare to image/video processing, and AI-based tasks shall be executed on millions of IoT edge devices. The ever-increasing complexity and real-time concerns in such energy-hungry applications not only has necessitated the need for distributed computing, but on-the-fly, via network elements (a.k.a in-network computing). To further alleviate such challenges for the power-constrained IoT devices, we aim to design configurable accelerators through the use of approximate computing techniques while satisfying the accuracy-requirements of such applications.

Tasks

- Modify the structure of 5G/6G applications to be suited for progressive/iterative computation for in-network computation approach,
- Identify mechanisms for task-partitioning (e.g., distributed inference) on edge devices,

- Identify and harness the error-resiliency of 5G/6G applications and apply a proper chain of approximations to improve energy-efficiency of computational algorithms,
- Develop accelerators using FPGAs for low-power and high-throughput design,
- Demonstrate the efficacy of the methodology and designs using real-life application, and
- Publish the works in international conferences and/or journals.

Requirements

We aim at attracting the best talent in the respective research fields and expect the following:

- outstanding university degree (Master or equivalent) in computer science or electrical-engineering;
- good understanding of 5G applications and 5G network structure and simulators;
- good programming skills (especially on scripting and C languages) as well as good hardware-design skills (especially using VHDL/Verilog and component-based design);
- Experience with high-level synthesis (Vivado HLS) and machine learning simulators (especially neural networks);
- Experience in using FPGAs for design will provide an added advantage;
- very good interpersonal and communication skills; in particular, the ability to effectively work in collaborative research efforts;
- Fluency in English – written and oral;
- Knowledge of German would be an advantage.

What we offer

You will join a team of enthusiastic researchers who pursue creatively their individual research agenda. Other ongoing projects at the Chair of Processor Design can be found at <https://www.cfaed.tu-dresden.de/pd-about>. The chair is a part of the “Center for Advancing Electronics Dresden”, which offers plenty of resources and structures for career development.

Informal enquiries can be submitted to Prof. Dr. Akash Kumar, Email: akash.kumar@tu-dresden.de

TUD strives to employ more women in academia and research. We therefore expressly encourage women to apply. The University is a certified family-friendly university and offers a Dual Career Service. We welcome applications from candidates with disabilities. If multiple candidates prove to be equally qualified, those with disabilities or with equivalent status pursuant to the German Social Code IX (SGB IX) will receive priority for employment.

Application Procedure

Please submit your comprehensive application (**in English only**) including the following: motivation letter, CV, copy of degree certificates, transcript of grades (i.e. the official list of coursework including your grades) and proof of English language skills preferably via the TU Dresden SecureMail Portal <https://securemail.tu-dresden.de> by sending it as a single pdf document quoting the reference number **PhD22-12-PD** in the subject header to akash.kumar@tu-dresden.de or by post to: **TU Dresden, Fakultät Informatik, Institut für Technische Informatik, Professur für Prozessorentwurf, Prof. Akash Kumar, Helmholtzstr. 10, 01069 Dresden, Germany**. The closing date for applications is **February 28, 2023** (stamped arrival date of the university central mail service applies). Please submit copies only, as your application will not be returned to you. Expenses incurred in attending interviews cannot be reimbursed.

Reference to data protection: Your data protection rights, the purpose for which your data will be processed, as well as further information about data protection is available to you on the website: <https://tu-dresden.de/karriere/datenschutzhinweis>

About cfaed

The cfaed is a Central Academic Unit which brings together 200 researchers from TU Dresden and ten other research institutions in the areas of Electrical and Computer Engineering, Computer Science, Materials Science, Physics, Chemistry, Biology, and Mathematics. The cfaed addresses the advancement of electronic information processing systems through exploring new technologies which overcome the limits of today's predominant CMOS technology. www.tu-dresden.de/cfaed



About TU Dresden

The TU Dresden is among the top universities in Germany and Europe and one of the eleven German universities that were identified as an 'elite university' since 2012. As a modern full-status university with 17 faculties it offers a wide academic range making it one of a very few in Germany.