Faculty of Computer Science

At the **Institute of Computer Engineering** the **Chair of Processor Design** offers, subject to the availability of resources, a position as

Research Associate

(subject to personal qualification employees are remunerated according to salary group E 13 TV-L)

starting **March 1, 2021.**

Research area: **Mixed criticality multi-core computer architecture**

Terms: 75% of the full-time weekly hours, the position is limited to December 31, 2022 (with the option to be extended).
The period of employment is governed by §2 (2) Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG).

Position

At the Chair of Processor Design we have the long-term vision of shaping the way future electronic systems are to be designed.

A wide range of embedded multi-core systems found in the automotive and avionics industries are evolving into Mixed-Criticality (MC) systems to meet cost, space, timing, and power consumption requirements. Escalating power densities have led to thermal issues, thereby leading to safety and reliability concerns for these systems. In this project, the timing and power requirements of the MC systems at both design- and run-time will be analyzed to ensure no thermal emergencies occur in the system. In addition, the thermal management of multi-core mixed-criticality systems will be studied, while the safety and reliability of the systems are guaranteed under any circumstances. Some aspects of the proposed approach are system monitoring from the perspective of temperature, reliability, and real-timeliness at runtime, investigation of hardware aspects of the systems, and issues related to modeling and tool support. In this project, the system-level methods on multi-core processors will be used to enable energy-efficient techniques through system design and also, analysis and optimization of real-time capabilities, power, temperature, safety and reliability with regard to application demands in any situation. The proposed approach can be customized for different safety applications and target platforms. The proposed project will focus on requirements derived from the automotive, aerospace, and telecommunications and evaluate the effectiveness of the approach in these domains.

Tasks:

- Studying the architecture requirements for the target domains to drive and use one of the suitable actual automotive grade platforms. It involves using the low-power techniques, knowing about what affects the cores' temperature and how to run the applications on the target platform.
- Deriving a list of mixed-criticality applications that is relevant for the automotive industry and profiling them. The models of these applications will be specified in detail on real platform.

- Designing, developing and implementing the process analysis system and methods by using the necessary hardware and software run-time control. The proposed method must be customized for different safety applications and target platforms.

Requirements:

- a university degree in computer science or electrical engineering;
- strong architecture background with general purpose multi-core platforms;
- proficiency in C/C++ and Python;
- good knowledge of Computer Architecture and algorithm design;
- good publication record and good communication skills;
- fluency in English - written and oral.

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, Tel +49 (351) 463 39274; Email: akash.kumar@tu-dresden.de
Applications from women are particularly welcome. The same applies to people with disabilities.

Application Procedure

Please submit your comprehensive application **(in English only)** including the following: motivation letter, CV, copy of degree certificate, 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 **PhD21-01-PD** in the subject header to **recruiting.cfaed@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 **January 15, 2021** (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 cluster 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.