Faculty of Computer Science

The **Institute of Computer Engineering, Chair of Processor Design** offers in a collaborative project for novel design methodologies and heterogeneous manycore architectures for future 5G communication standards and beyond of **1st February 2020** a position as

Research Associate / PhD Student / Postdoc

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

Research area: **Reconfigurable hardware design for 5G applications**

Terms: The position is limited to 31 Jan 2022 (with the option to be extended). The period of employment is governed by the Fixed Term Research Contracts Act (Wissenschaftszeitvertragsgesetz – WissZeitVG).

The project is a collaboration with National Instruments, the Chair of Compiler Construction headed by Prof. Jeronimo Castrillon and the Vodafone Chair of Mobile Communications headed by Prof. Gerhard Fettweis.

Position and Requirements

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

This project involves realising the applications designed within the National Instruments LabView environment onto a partially reconfigurable FPGA-based platform. The dynamism of the applications (with regards to the dynamic Quality of Service and number of users at runtime) and the dependencies between the tasks within the applications will be analysed. The obtained information will then be used to dynamically schedule and map the tasks at runtime on the underlying FPGA-based platform. This is to make sure that the changes made for some particular applications at runtime will not interfere with other applications within the system. The whole process is expected to be automated with as little manual work from the designer as possible.

The person is expected to take role in:

- communicating with both Application and Compiler groups to gain insights into the application behaviors and requirements (in terms of hardware resources, performance, etc.);
- analysing the FPGA system currently generated by LabView NXG to design a compatible partially reconfigurable FPGA-based system which can work seamlessly with NI devices;
- designing a system template which can be easily generated with different parameters (such as number of processing elements, communication throughput, etc.);
- working with the Application group to agree on the standard hardware-based implementation of the tasks to be compatible with the partial reconfiguration design flow and with the intended system template;
- designing the design automation tools to automate the implementation process: extracting necessary modules generated from LabView NXG, packaging them into IPs that can be imported into Vivado for partial reconfiguration design flow, generating the bitstreams and partial bitstreams;
- publishing the works in international conferences and/or journals.

The successful candidate must have:

- an university degree in computer science or electrical engineering, and if applicable a PhD;

- strong FPGA design/architecture background with either Xilinx (preferred) or Intel FPGA;
- strong background in HDL either Verilog or VHDL;
- proficiency in C/C++;
- good knowledge of Computer Architecture and algorithm design;
- good publication record (for Postdoc position) and good communication skills.

The following skills will provide an added advantage:

- good knowledge of System-on-Chip architecture and design with related concepts such as multi-core, mutli-processor, network-on-chip, communication interfaces (AXI, AXI-Stream, etc), DMAs, etc.;
- familiarity with LabView NXG and TCL script.

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 **Cluster of Excellence "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

Your application **(in English only)** should include: 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. Complete applications should be submitted preferably via the TU Dresden Secure-Mail Portal https://securemail.tu-dresden.de by sending it as a single pdf document quoting the reference number **PhD19012-PD** in the subject header to **akash.kumar@tu-dresden.de** or by mail to: **TU Dresden, Fakultät Informatik, Institut für Technische Informatik, Professur für Prozessorentwurf (Processor Design), Herrn Prof. Akash Kumar, Helmholtzstr. 10, 01069 Dresden, Germany**. (Please note: We are currently not able to receive electronically signed and encrypted data). The closing date for applications is **20.12.2019** (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

cfaed is a cluster of excellence within the German Excellence Initiative. It 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. 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' in June 2012. As a modern full-status university with 18 departments it offers a wide academic range making it one of a very few in Germany.