For the Institute of Computer Engineering (ITEC – Institut für Technische Informatik), Chair for Embedded Systems (CES), we are currently seeking to recruit, limited to four years with the possibility to obtain a Ph.D., a

**Research associate / PhD candidate (f/m/d) in the Transreg. Collaborative Research Center (TCRC) 89 «Invasive Computing» on the topic »Secure Runtime-reconfigurable Embedded Real-time Systems«**

Since many years, the Chair for Embedded Systems works internationally successful in the areas of computer engineering, such as multi-/many-core systems. Many interesting and open problems in these areas need to be addressed to successfully deploy such systems in modern application domains. As example, the most urgent questions about secure runtime-reconfigurable embedded real-time systems are highlighted in the following.

Runtime-reconfigurable systems use FPGAs to provide application-specific accelerators on demand. This allows accomplishing high flexibility and energy efficiency along with low development costs. Due to the high performance of the hardware accelerators, such systems are very well suited for applications with real-time requirements, as it is possible to guarantee an upper bound for the worst-case execution time (WCET) of hardware accelerators, whereas this is not possible for complex out-of-order CPUs. The analysis of the WCET of hardware accelerators that execute in parallel with a CPU, potentially serving multiple applications, is a recent research challenge that shall be investigated in the scope of this research project. Additionally, security aspects of reconfigurable systems shall be analyzed and improved. Reconfigurable architectures that are highly optimized for performance or power efficiency might suffer from security threats, e.g. information leakage. Instead, architectures that are designed with security in mind might provide a much better compromise between performance and security aspects. On the one hand, using runtime reconfigurable accelerators increases the attack surface while on the other hand, the inherent flexibility of runtime reconfiguration also provides means for advanced counter measures.

**You must have** a very good Master’s degree (or equivalent) in CS or EE with background or specialization in the above-mentioned topics. The ideal candidate (f/m/d) shows a strong interest and motivation to deepen in these topics to a level required for a doctorate. Programming skills in C/C++, VHDL, and scripting languages will be required, and fluency in written and spoken English is a prerequisite. We are looking for a highly motivated candidate (f/m/d) with a strong commitment to research ethics and teamwork. Good communicative skills are mandatory due to the interdisciplinary structure of the project and the team.

**We offer** an attractive and modern workplace with access to excellent facilities of KIT, diverse and responsible tasks, and a wide scope of advanced training options. We also offer interdisciplinary collaboration in scope of the TCRC 89 “Invasive Computing” that covers all aspects of research and development of multi-/many-core systems ([www.invasic.de](http://www.invasic.de)).

We prefer to balance the number of employees (f/m/d). Therefore, we kindly ask female applicants to apply for this job.

If equally qualified, severely disabled persons will be preferred.

Please apply online ([http://www.pse.kit.edu/karriere/joboffer.php?id=3307&language=en](http://www.pse.kit.edu/karriere/joboffer.php?id=3307&language=en)) until Sept. 27th, 2019 using the vacancy number 1042/2019 and reference number 8. Personnel support is provided by Ms. Brückner, Personalservice, Karlsruhe Institute of Technology (KIT), Campus Süd, Kaiserstraße 12, 76131 Karlsruhe. For technical information, please contact Prof. Henkel ([henkel@kit.edu](mailto:henkel@kit.edu)) topic: Application CES_B1).

Further details can be found on our website: [www.kit.edu](http://www.kit.edu).

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