



Student Positions available for Multi/Many-core Embedded System Modelling and Programming

We are now accepting applications for student positions in the area of embedded system design at the non-profit research institute fortiss GmbH.

fortiss offers the unique opportunity to be directly involved in interesting research projects. In cooperation with the researchers at fortiss, you will develop new concepts and implement interesting demonstrators.

Applicants should be enrolled in a Computer Science or Electrical Engineering program (or equivalent). The candidates should have experience in one or more of the following areas: (i) software engineering, (ii) embedded system design, (iii) communication protocols, (iv) micro-controller programming, (v) basic concept of parallel programming, and (vi) modelling tools. Knowledge of Linux is a plus. Possible programming languages are C, C++ or Java.

fortiss GmbH is a recently founded non-profit research organization funded by the Bavarian Ministry for Economics. fortiss has tight links to Technische Universität München and the Department of Informatics. The group Cyber-Physical Systems focuses on model-driven development in the domains automation and automotive.

fortiss is situated directly at the subway station Nordfriedhof (line U6) 10 minutes from Marienplatz and 20 minutes to the TUM in Garching. We offer a nice surrounding, free drinks, and a very good infrastructure.

Interested applicants should submit a short curriculum vitae and academic transcripts.



For any enquiries or further information, send an E-mail to: Dr. Christian Buckl (buckl@fortiss.org) or visit our web site at <http://www.fortiss.org>.

Open Positions

The Single-Chip Cloud Computer (SCC) experimental chip is a 48-core concept vehicle recently released by Intel Labs as a platform for many-core software research. There are only 100 such chips available in this planet, one of which is accessible by us! In our group, we are interested in researches that can conduct pioneer work to exploit the massive computing power of SCC. We have the following research opportunities open:

1. *Efficiently Executing Kahn Process Network on Intel SCC (Single Chip Cloud Computing)*

In this project, we plan to establish an efficient runtime environment [5] for the Intel SCC. The runtime environment should be specifically designed for running the class of applications modeled by the Kahn model of computation. A major focus of this project is to investigate the different possibilities of the SCC platform and exploit the maximal communication potential of the platform.

Duration: 3 months for a semester project, which can be extended to a master project

Useful skills: C/C++ Programming, MPI, Linux, GCC, Socket Programming

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2. Area: Modeling

Running SystemC Transaction-Level Modeling Simulation on Intel SCC

One topic is to use SCC as the runtime platform for the SystemC [1,2], which are the most popular modeling and simulation tool for embedded system design. In this project, the focus is on the transaction-level modeling (TLM) which is recently released by the SystemC community. We plan to parallelize the newly released TLM SystemC [3,4] for the Intel SCC. The proposal can be detailed into a few sub-tasks: (a) Design the best parallelization scheme for TLM SystemC, which can make use of the massive concurrency offered by the Intel SCC. (b) Prototype a runtime environment such that a TLM SystemC simulation can run on top of the Intel SCC.

Duration: 6 months

Useful skills: Model of Computation, Parallel Computing, C/C++ Programming,

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Literature

[1] Kai Huang, Iuliana Bacivarov, Fabian Hugelshofer, Lothar Thiele. Scalably distributed SystemC simulation for embedded applications. In International Symposium on Industrial Embedded Systems (SIES 08), pages 271 - 274, La Grande Motte, France, June 11-13, 2008.

[2] Kai Huang, Iuliana Bacivarov, Jun Liu, and Wolfgang Haid. A Modular Fast Simulation Framework for Stream-Oriented MPSoC. In International Symposium on Industrial Embedded Systems (SIES 09), page 74-81, Ecole Polytechnique Fédérale de Lausanne, Switzerland, July 8-10, 2009.

[3] Nanjundappa, M. Patel, H.D. Jose, B.A. Shukla, S.K. SCGPSim: A fast SystemC simulator on GPUs. 15th Asia and South Pacific Design Automation Conference (ASP-DAC), 2010.

[4] Christoph Schumacher, Rainer Leupers, Dietmar Petras, Andreas Hoffmann. parSC: Synchronous Parallel SystemC Simulation on Multi-Core Host Architectures. CODES+ISSS, 2010

[5] Kai Huang. Towards Many-Core Real-Time Embedded Systems: Software Design of Streaming Systems at System Level. Ph.D. dissertation book. 2011 (ISBN: 978-3-8440-0013-9)