

## Formal Verification of Microcontroller Binary Code

**Location: Hörsaal EI 8, Gußhausstraße 27-29, 1040 Wien**

**Date: Wed. 13.01.2010, 16:00 - 17:00**

**Location: Hörsaal HS1.04a, Höchstädtplatz 5, 1200 Wien**

**Date: Thu. 14.01.2010, 18:00 - 19:00**

**Content:** The importance of software for embedded systems is increasing. More and more of the overall functionality of embedded systems is achieved by software. Errors in the software, however, can lead to severe or even fatal events. Detecting all errors in the software by testing is in general not possible. One way to tackle this problem is to apply formal verification techniques.

This talk will cover two formal verification techniques for microcontroller assembly code, namely static analysis and model checking. Both techniques are implemented in a tool called [mc]square, which is a model checking and static analysis framework for microcontroller assembly code.

After a general introduction to [mc]square, the talk will detail static analysis and model checking of microcontroller assembly code. It will focus on the challenges that arise when verifying microcontroller assembly code. One of the major problems in model checking is the so-called state explosion. A way to tackle this problem is the application of abstraction techniques. The talk will describe several abstraction techniques, which are specifically tailored for microcontroller assembly code. To show the applicability of formal verification techniques to microcontroller assembly code, it will present some case studies.

**Presenter:** Dr. Bastian Schlich is working as a Postdoc at the Embedded Software Laboratory at the RWTH Aachen University. He is working on formal verification techniques for embedded software, specifically for microcontrollers and programmable logic controllers. Currently, he is leading the development of the [mc]square model checking tool.

In 2008, he got his PhD (with distinction) in computer science. The PhD was awarded with the Borchers Plakette. Furthermore, he was a visiting researcher at the National ICT Australia in Sydney from September 2007 until February 2008.

<http://embedded.rwth-aachen.de>