

# Dr. rer. nat. Dominique Marcel Gückel



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## About me

I am a research assistant at the Embedded Software Laboratory of RWTH Aachen since January 2011. Before that, I used to be a scholarship holder in the DFG Research Training Group (Graduiertenkolleg) [AlgoSyn](#) since January 2008. I conduct my research at the Embedded Software Laboratory of RWTH Aachen (Chair of Computer Science 11). The intention of my research is to extend the model checking tool [mc]square by synthesis functions.

## Languages

- German (first language)
- English (fluent)
- French (fluent)
- Latin (degree: Latinum)
- Spanish (basic knowledge)

## Activities

- Leader (lead editor) of the proceedings group for the Proceedings of the Joint Workshop of the German Research Training Groups in Computer Science, Dagstuhl 2010. Printed version available (ISBN 386-130-146-6). Online version of the volume available as [PDF](#).

## Publications

- Dominique Gückel: Erweiterung des Model-Checkers [mc]square um benutzerdefinierte Umgebungen. Diplomarbeit, RWTH Aachen, 2007.
- Bastian Schlich, Dominique Gückel, and Stefan Kowalewski. Modeling the Environment of Microcontrollers to Tackle the State-Explosion Problem in Model Checking. In *Proceedings of Symposium Formal Methods for Automation and Safety in Railway and Automotive Systems*

(FORMS/FORMAT 2008), ISBN 978 963 236 138 3. PDF

- Dominique Gückel. Retargeting a Hardware-Dependent Model Checker by Using Architecture Description Languages. In *Doctoral Symposium on Systems Software Verification (DS SSV 2009)*, 4th International Workshop on Systems Software Verification (SSV 09), ISSN 0935-3232. PDF
- Wolfgang Thomas, Kai Bollue, Dominique Gückel, Gustavo Quiros, Michaela Slaats and Michael Ummels. DFG Research Training Group “Algorithmic Synthesis of Reactive and Discrete-Continuous Systems (AlgoSyn)”. In *it - Information Technology, Volume 4 /2009*, Oldenbourg, pp. 222-230.
- Dominique Gückel, Bastian Schlich, Jörg Brauer, and Stefan Kowalewski. Synthesizing Simulators For Model Checking Microcontroller Binary Code. In *Proceedings of 13th IEEE International Symposium on Design & Diagnostics of Electronic Circuits and Systems (DDECS 2010)*, ISBN 978-1-4244-6611-5, pp. 313-316.
- Dominique Gückel. Synthesis of Hardware Simulators for Use in Model Checking. In *Dagstuhl 2010. Proceedings of the Joint Workshop of the German Research Training Groups in Computer Science*, ISBN 386-130-146-6, p. 76. PDF
- Dominique Gückel, Jörg Brauer, and Stefan Kowalewski. A System for Synthesizing Abstraction-Enabled Simulators for Binary Code Verification. In *Proceedings of 5th IEEE Symposium on Industrial Embedded Systems (SIES 2010)*, ISBN 978-1-4244-5840-0, pp. 118-127.
- Sebastian Biallas, Jörg Brauer, Dominique Gückel, and Stefan Kowalewski. On-The-Fly Path Reduction. 4th International Workshop on Harnessing Theories for Tool Support in Software (TTSS'10), to appear.
- Thomas Reinbacher, Dominique Gückel, Martin Horauer, and Stefan Kowalewski. Testing Microcontroller Software Simulators. In *Proceedings of the Workshop on SLE for CPS at INFORMATIK 2011 (WS4C11)*, to appear.
- Dominique Gückel and Stefan Kowalewski. Automatic Derivation of Abstract Semantics From Instruction Set Descriptions. In *Proceedings of the 6th International Workshop on Systems Software Verification (SSV 2011)*, to appear.

## Bachelor / Diploma / Master Theses

### Ongoing

- Florian Caron: State Partitioning for Model Checking Binary Code (Bachelor thesis)

### Finished

- Ivica Bogosavljevic: Synthesizing an Instruction Set Simulator for Model Checking Embedded Systems Software (Master thesis)
- Sebastian Wehlmann: Tool-based implementation of a simulator for Renesas R8C/Tiny microcontrollers for extending the model checker [mc]square (Diploma thesis)

### Open

- Tool-based implementation of a microcontroller simulator
- Realization of abstraction techniques for supporting nondeterminism in synthetic simulators
- Extending a simulator synthesis framework by static analyses

More topics are available on request.

## Teaching

- SS08: Exercises for the lecture [Formal Methods for Embedded Systems](#)
- SS09: Proseminar [Embedded Systems](#)
- WS09/10: Seminar [Verification and Program Analysis](#)
- WS10/11: Exercises for the lecture [Formal Methods for Embedded Systems](#)

Besides, I regularly supervise examinations in the lab course *Hardwarenahe Programmierung* (for undergraduate students in the bachelor programme). In the past, I also supervised exams in the lab course *Elektronische Grundlagen für Informatiker* (*foundations of electronics for computer scientists*).

## Links

- [\[mc\]square](#)
- [DFG Research Training Group 1298 AlgoSyn](#)

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