Dr.rer.nat. Bastian Schlich

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Personal

I worked at the Embedded Software Laboratory from April 2004 until February 2010, first as a PhD student and then as a postdoc. As a postodc, I was leading the Formal Verifiation group. My main research interest was in formal verification of software for embedded systems. The group applies different formal verification techniques such as static analysis, abstract interpretation, and model checking to embedded software.

The group develops a tool for the analysis of assemby code for microcontrollers and instruction list programs for PLCs. The tool is called [mc]square. In the tool, different formal methods such as model checking, abstract interpretation, and static analysis are applied and adapted to the specifics of embedded systems software. The main focus is the application of theoretical results to real problems. The tool should be user-friendly and easy to handle and should not require changes of the program to be analyzed.

In a second project, a static analyzer for C code is developed, which aims at supporting the development of embedded software accoring to the upcoming ISO 26262. It will be implemented as a plugin for the Ecplise development platform. Later, it will be implemented as a plugin for the Microsoft Visual Studio development platform.

I received my Doctoral degree in June 2008 from the RWTH Aachen University. The title of my Dissertation thesis is "Model Checking of Software for Microcontollers". I wrote my Diploma thesis at the chair of Software-Technology, University of Dortmund. The topic of the thesis is "Konzeption und Realisierung eines Werkzeugs zur Unterstützung des Test-Driven-Developments".

Publications

[BSK+15]

PDFBIB

Biallas, S., Simon, H., Kowalewski, S., Hauck-Stattelmann, S., and Schlich, B., "Automatische Testfallgenerierung für SPS-Programme mittels Zeilenüberdeckung", in *Proc. Automation 2015 : 16. Branchentreff der Mess- und Automatisierungstechnik, 11. und 12. Juni 2015, Baden-Baden / VDI/VDE-Gesellschaft Mess- und Automatisierungstechnik*, Düsseldorf, 2015 in VDI-Berichte, VDI-Verl., pp. 95-106.

Automatische Testfallgenerierung für SPS-Programme mittels Zeilenüberdeckung

Bibtex entry :

```
@inproceedings {  BSK+15,
    author = { Biallas, Sebastian and Simon, Hendrik and Kowalewski,
Stefan
        and Hauck-Stattelmann, Stefan and Schlich, Bastian },
    title = { Automatische Testfallgenerierung f{\"u}r SPS-Programme
        mittels Zeilen{\"u}berdeckung },
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[HBS+15]
PDFBIB

Hauck-Stattelmann, S., Biallas, S., Schlich, B., Kowalewski, S., and Jetley, R., "Analyzing the Restart Behavior of Industrial Control Applications", in *Proc. FM 2015: formal methods : 20th international symposium, Oslo, Norway, June 24 - 26, 2015 ; proceedings / Nikolaj Bjørner; Frank de Boer (eds.)*, Springer International Publishing, 2015 in Lecture Notes in Computer Science, Cham, pp. 585-588.

Analyzing the Restart Behavior of Industrial Control Applications

Bibtex entry :

```
@inproceedings {  HBS+15,
```

```
    author = { Hauck-Stattelmann, Stefan and Biallas, Sebastian and
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(Norway),
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}
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[SFB+15]
[PDF](#)BIB

Simon, H., Friedrich, N., Biallas, S., Hauck-Stattelmann, S., Schlich, B., and Kowalewski, S., "Automatic test case generation for PLC programs using coverage metrics", in *Proc. 2015 IEEE 20th Conference on Emerging Technologies Factory Automation (ETFA) : 8 - 11 Sept. 2015, City of Luxembourg, Luxembourg / co-sponsored by IEEE ...*, Piscataway, NJ, 2015, IEEE, p. 4.

Automatic test case generation for PLC programs using coverage metrics

Bibtex entry :

```
@inproceedings {  SFB+15,
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```

[BKS+14]

[PDF]BIB

Biallas, S., Kowalewski, S., Stattelmann, S., and Schlich, B., "Efficient Handling of States in Abstract Interpretation of Industrial Programmable Logic Controller Code", in *Proc. Discrete Event Systems : [Proc. Proceedings of the 12th International Workshop on Discrete Event Systems, Cachan, France, 2014] / Conference Editor: Lesage, Jean-Jacques, Faure, Jean-Marc, Cury, Jose E. R., Lennartson, Bengt*, Cachan, France, 2014, IFAC, pp. 400-405.

Efficient Handling of States in Abstract Interpretation of Industrial Programmable Logic Controller Code

Bibtex entry :

```
@inproceedings {  BKS+14,
    author = { Biallas, Sebastian and Kowalewski, Stefan and
Stattelmann,
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of
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12th
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        Faure, Jean-Marc, Cury, Jose E. R., Lennartson, Bengt },
    publisher = { IFAC },
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    year = { 2014 },
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Workshop on
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    doi = { 10.3182/20140514-3-FR-4046.00065 },
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[SBS+14]
PDFBIB

Stattelmann, S., Biallas, S., Schlich, B., and Kowalewski, S., "Applying Static Code Analysis on Industrial Controller Code", in *Proc. 2014 IEEE [International Conference on] Emerging Technologies and Factory Automation (ETFA 2014) : Barcelona, Spain, 16 - 19 September 2014 / [co-sponsored by Universitat Politècnica de Catalunya - Barcelona Tech (UPC); IEEE Industrial Electronics Society]*, Piscataway, NJ, 2014, IEEE, p. 4.

Applying Static Code Analysis on Industrial Controller Code

Bibtex entry :

```
@inproceedings {  SBS+14,
    author = { Stattelmann, Stefan and Biallas, Sebastian and Schlich,
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        Industrial Electronics Society] },
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}
```

[BKK+13]
PDFBIB

Biallas, S., Kamin, V., Kowalewski, S., Schlich, B., Sehestedt, S., and Stattelmann, S., "Verifikation von sicherheitsgerichteten SPS-Programmen mit Hilfe von Safety-Automaten", in *Proc. Automation 2013 : 14. Branchentreff der Mess- und Automatisierungstechnik ; Kongresshaus Baden-Baden, 25. und 26. Juni 2013 / VDI/VDE-Gesellschaft Mess- und Automatisierungstechnik*, Düsseldorf, 2013 in VDI-Berichte, VDI-Verl., pp. 75-79.

Verifikation von sicherheitsgerichteten SPS-Programmen mit Hilfe von Safety-Automaten

Bibtex entry :

```
@inproceedings {  BKK+13,
    author = { Biallas, Sebastian and Kamin, Volker and Kowalewski,
Stefan
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mit
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```

[BKS12]
PDFBIB
Biallas, S., Kowalewski, S., and Schlich, B., "Automatische Wertebereichsanalyse von SPS-Programmen", in *Proc. Automation 2012 : der 13. Branchentreff der Mess- und Automatisierungstechnik / VDI/VDE-Gesellschaft Mess- und Automatisierungstechnik ; Kongress 'Automation 2012' ; 13 (Baden-Baden) ; 2011.06.13-14Branchentreff der Mess- und Automatisierungstechnik*, Düsseldorf, 2012 in VDI-Berichte, VDI-Verl., pp. 79-83.

Automatische Wertebereichsanalyse von SPS-Programmen

Bibtex entry :

```
@inproceedings {  BKS12,
    author = { Biallas, Sebastian and Kowalewski, Stefan and Schlich,
        Bastian },
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```

[BKS12a]
[PDF](#)BIB

> Biallas, S., Kowalewski, S., and Schlich, B., "Automatische Wertebereichsanalyse -- Formale Verifikation für SPS-Programme", *Automatisierungstechnische Praxis : atp*, vol. 54, iss. 7/8, pp. 68-74, 2012

Automatische Wertebereichsanalyse -- Formale Verifikation für SPS-Programme

Bibtex entry :

```
@article {  BKS12a,
    author = { Biallas, Sebastian and Kowalewski, Stefan and Schlich,
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}
```

[BKS12b]
[PDF](#)BIB

> Biallas, S., Kowalewski, S., and Schlich, B., "Range and Value-Set Analysis for Programmable Logic Controllers", in *Proc. Proceedings of the 11th International Workshop on Discrete Event Systems*, Guadalajara, Mexico, 2012, IFAC, pp. 378-383.

Range and Value-Set Analysis for Programmable Logic Controllers

Bibtex entry :

```
@inproceedings {  BKS12b,
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        Bastian },
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}
```

[BSK12]
[PDF]BIB

Brauer, J., Schlich, B., and Kowalewski, S., "Parallel and distributed invariant checking of microcontroller software", *Electronic notes in theoretical computer science : ENTCS*, vol. 287, pp. 45-63, 2012

Parallel and distributed invariant checking of microcontroller software

Bibtex entry :

```
@article {  BSK12,
    author = { Brauer, J{\"o}rg and Schlich, Bastian and Kowalewski,
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    title = { Parallel and distributed invariant checking of
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    journal = { Electronic notes in theoretical computer science :
ENTCS },
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```

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        Domains (France), 10-09-2010 },
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    cin = { 122810 / 120000 },
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```

[BBK+11]
[PDF]BIB

> Biallas, S., Brauer, J., Kowalewski, S., and Schlich, B., "Automatically Deriving Symbolic Invariants for PLC Programs Written in IL", in *Proc. Formal methods for automation and safety in railway and automotive systems : FORMS/FORMAT 2010 ; [8th symposium ; proceedings] / Eckehard Schnieder; Géza Tarnai, eds.*, Heidelberg [u.a.], 2011, Springer, pp. 237-245.

Automatically Deriving Symbolic Invariants for PLC Programs Written in IL

Bibtex entry :

```
@inproceedings {  BBK+11,
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Programs
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        proceedings] / Eckehard Schnieder; Géza Tarnai, eds. },
    publisher = { Springer },
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    year = { 2011 },
    address = { Heidelberg [u.a.] },
    organization = { Formal methods for automation and safety in
railway and
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    doi = { 10.1007/978-3-642-14261-1 },
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[BKS11]
[PDF]BIB

> Biallas, S., Kowalewski, S., and Schlich, B., "Leistungsfähige Verifikation von industriellen SPS-Programmen mittels Model-Checking und statischer Analyse", in *Proc. 'Zukunft verantwortungsvoll gestalten' : Automation 2011 ; der 12. Branchentreff der Mess- und Automatisierungstechnik ; Kongress Baden-Baden, 28. und 29. Juni 2011 / VDI/VDE-Gesellschaft*

Mess- und Automatisierungstechnik. [Kongressleiter: Peter Adolphs ...], Düsseldorf, 2011 in VDI-Berichte, VDI-Verl., pp. 67-72.

Leistungsfähige Verifikation von industriellen SPS-Programmen mittels Model-Checking und statischer Analyse

Bibtex entry :

```
@inproceedings {  BKS11,
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2011 ;
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        ; Kongress Baden-Baden, 28. und 29. Juni 2011 /
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```

[RHS+11]
PDFBIB
Reinbacher, T., Horauer, M., Schlich, B., Brauer, J., and Scheuer, F., "Model checking embedded software of an industrial knitting machine", *International journal of information technology, communications and convergence*, vol. 1, iss. 2, pp. 186-205, 2011

Model checking embedded software of an industrial knitting machine

Bibtex entry :

```
@article {  RHS+11,
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[SBK11]
[PDF](#)BIB

> Schlich, B., Brauer, J., and Kowalewski, S., "Application of Static Analyses for State-Space Reduction to the Microcontroller Binary Code", *Science of computer programming*, vol. 76, iss. 2, pp. 100-118, 2011

Application of Static Analyses for State-Space Reduction to the Microcontroller Binary Code

Bibtex entry :

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@article {  SBK11,
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[SNB+11]

PDFBIB

Schlich, B., Noll, T., Brauer, J., and Brutschy, L., "Reduction of Interrupt Handler Executions for Model Checking Embedded Software", in *Proc. Hardware and software: verification and testing : 5th International Haifa Verification Conference, HCV 2009, Haifa, Israel, October 19-22, 2009 : revised selected papers / Kedar Namjoshi ... (eds.)*, Heidelberg [u.a.], 2011 in Lecture Notes in Computer Science, Springer.

Reduction of Interrupt Handler Executions for Model Checking Embedded Software

Bibtex entry :

```
@inproceedings {  SNB+11,
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    series = { Lecture Notes in Computer Science },
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HCV 2009,
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[BFK+10]

PDFBIB

Biallas, S., Frey, G., Kowalewski, S., Schlich, B., and Soliman, D., "Formale Verifikation von Sicherheits-Funktionsbausteinen der PLCopen auf Modell- und Code-Ebene", in *Proc. Entwurf komplexer Automatisierungssysteme : EKA 2010 ; Beschreibungsmittel, Methoden, Werkzeuge und Anwendungen ; 11. Fachtagung mit Tutorium, 25. bis 27. Mai 2010 in Magdeburg, Denkfabrik im Wissenschaftshafen / ifak, Institut für Automation und Kommunikation e.V., Magdeburg; Otto-von-Guericke-Universität Magdeburg, Institut für Automatisierungstechnik. [Hrsg.: Ulrich Jumar, Eckehard Schnieder, Christian Diedrich]*, Magdeburg, 2010, ifak, pp. 49-57.

Formale Verifikation von Sicherheits-Funktionsbausteinen der PLCopen auf Modell- und Code-Ebene

Bibtex entry :

```
@inproceedings {  BFK+10,
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        Magdeburg, Denkfabrik im Wissenschaftshafen / ifak, Institut
        f{\"u}r Automation und Kommunikation e.V., Magdeburg;
        Otto-von-Guericke-Universit{\"a}t Magdeburg, Institut
        f{\"u}r Automatisierungstechnik. [Hrsg.: Ulrich Jumar,
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    organization = { Entwurf komplexer Automatisierungssysteme :
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[BNS10]
[PDF]BIB

> Brauer, J., Noll, T., and Schlich, B., "Interval Analysis of Microcontroller Code using Abstract Interpretation of Hardware and Software", in *Proc. SCOPES '10 Proceedings of the 13th International Workshop on Software & Compilers for Embedded Systems : St. Goar, Germany - June 29-30, 2010*, New York, NY, 2010 in ACM Digital Library, ACM.

Interval Analysis of Microcontroller Code using Abstract Interpretation of Hardware and Software

Bibtex entry :

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[GSB+10]
[PDF](PDF)BIB

Gückel, D., Schlich, B., Brauer, J., and Kowalewski, S., "Synthesizing Simulators for Model Checking Microcontroller Binary", in *Proc. Proceedings of the 13th IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems : April 14–16, 2010, Vienna, Austria / Sponsored by IEEE Computer Society, Test Technology Techn. Council, In coop. with Dept. of Computer Engineering, Fac. of Informatics, Vienna Univ. of Techn.*, Piscataway, NJ, 2010, IEEE, pp. 313-316.

Synthesizing Simulators for Model Checking Microcontroller Binary

Bibtex entry :

```
@inproceedings {  GSB+10,
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[Sch10]
[PDF]BIB

Schlich, B., "Model Checking of Software for Microcontrollers", *ACM transactions on embedded computing systems : TECS*, vol. 9, iss. 4, p. 27, 2010

Model Checking of Software for Microcontrollers

Bibtex entry :

```
@article {  Sch10,
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},
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```

[BHS09]
[PDF]BIB

Brauer, J., Huuck, R., and Schlich, B., "Interprocedural pointer analysis in Goanna", *Electronic notes in theoretical computer science : ENTCS*, vol. 254, pp. 65-83, 2009

Interprocedural pointer analysis in Goanna

Bibtex entry :

```
@article {  BHS09,
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```
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[BSR+09]
[PDF](#)BIB

> Brauer, J., Schlich, B., Reinbacher, T., and Kowalewski, S., "Stack bounds analysis of microcontroller assembly code", in *Proc. Embedded Systems Week 2009 : CODES+ISSS'09, CASES'09, EMSOFT'09 ; Proceedings of the 2009 international conference on Compilers, architecture, and synthesis for embedded systems ; 2009, Grenoble, France, October 11 - 16, 2009*, New York, NY, 2009, ACM Press.

Stack bounds analysis of microcontroller assembly code

Bibtex entry :

```
@inproceedings {  BSR+09,
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    year = { 2009 },
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[FHS+09]
PDFBIB
>   Fehnker, A., Huuck, R., Schlich, B., and Tapp, M., "Automatic bug detection in microcontroller software by static program analysis"Berlin [u.a.]: Springer, 2009, vol. 5404, pp. 267-278.

Automatic bug detection in microcontroller software by static program analysis

Bibtex entry :

```
@inbook {  FHS+09,
    author = { Fehnker, Ansgar and Huuck, Ralf and Schlich, Bastian and
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: 35th
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```

[KHS09]
PDFBIB
>   Klein, G., Huuck, R., and Schlich, B., "Operating System Verification", *Journal of automated reasoning*, vol. 42, iss. 2/4, pp. 123-124, 2009

Operating System Verification

Bibtex entry :

```
@article {  KHS09,
    author = { Klein, Gerwin and Huuck, Ralf and Schlich, Bastian },
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publisher = { Springer },
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```

[RBH+09]
[PDF]BIB

Reinbacher, T., Brauer, J., Horauer, M., and Schlich, B., "Refining assembly code static analysis for the Intel MCS-51 microcontroller", in *Proc. 2009 IEEE International Symposium on Industrial Embedded Systems (SIES 2009) : Lausanne, Switzerland, 08 - 10 July 2009 / [sponsored by: IEEE Industrial Electronics Society (IES)])*, Piscataway, NJ, 2009, IEEE, pp. 161-170.

Refining assembly code static analysis for the Intel MCS-51 microcontroller

Bibtex entry :

```
@inproceedings {  RBH+09,
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Martin
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```

```
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[RHS+09]
PDFBIB
Reinbacher, T., Horauer, M., Schlich, B., Brauer, J., and Scheuer, F., "Model checking assembly code of an industrial knitting machine", in *Proc. Proceedings of the 2009 Fourth International Conference on Embedded and Multimedia Computing : EM-Com 2009 : [December 10-12, 2009, Jeju Island, Korea]*, Piscataway, NJ, 2009, IEEE, p. 8.

Model checking assembly code of an industrial knitting machine

Bibtex entry :

```
@inproceedings {  RHS+09,
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Bastian
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[RHS09]
PDFBIB
Reinbacher, T., Horauer, M., and Schlich, B., "Using 3-valued memory representation for state space reduction in embedded assembly code model checking", in *Proc. Proceedings of the 2009 IEEE Symposium on Design and Diagnostics of Electronic Circuits and Systems : April 15-17, 2009, Liberec, Czech Republic / M. Renovell; IEEE Computer Society ...*, Piscataway, N.J.], 2009, IEEE, pp. 114-119.

Using 3-valued memory representation for state space

reduction in embedded assembly code model checking

Bibtex entry :

```
@inproceedings {  RHS09,
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    url = { http://publications.rwth-aachen.de/record/99559 },
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```

[SBW+09]
[PDF]BIB
Schlich, B., Brauer, J., Wernerus, J., and Kowalewski, S., "Direct Model Checking of PLC Programs in IL", *IFAC Proceedings Volumes*, vol. 42, iss. 5, pp. 28-33, 2009

Direct Model Checking of PLC Programs in IL

Bibtex entry :

```
@article {  SBW+09,
    author = { Schlich, Bastian and Brauer, J{\"o}rg and Wernerus,
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df },
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```

[SK09]
PDFBIB

Schlich, B. and Kowalewski, S., "Model checking C source code for embedded systems", *International journal on software tools for technology transfer : STTT*, vol. 11, iss. 3, pp. 187-202, 2009

Model checking C source code for embedded systems

Bibtex entry :

```
@article {  SK09,
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[SKW09]
PDFBIB

Schlich, B., Kowalewski, S., and Wernerus, J., "Verifikation von SPS-Programmen in AWL mit Hilfe von direktem Model-Checking", in *Proc. Automation 2009 : der Automatisierungskongress in Deutschland ; Kongress Baden-Baden, 16. und 17. Juni 2009 ; [10. Branchentreff der Mess- und Automatisierungstechnik] / VDI/VDE-Gesellschaft Mess- und Automatisierungstechnik. - 2067*, Düsseldorf, 2009 in VDI-Berichte, VDI-Verl., pp. 13-16.

Verifikation von SPS-Programmen in AWL mit Hilfe von direktem Model-Checking

Bibtex entry :

```
@inproceedings {  SKW09,
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        [10. Branchentreff der Mess- und Automatisierungstechnik] /
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[BKK+08]
PDFBIB

Beckers, J., Klünder, D., Kowalewski, S., and Schlich, B., "Direct support for model checking abstract state machines by utilizing simulation"Berlin [u.a.]: Springer, 2008, vol. 5238, pp. 112-124.

Direct support for model checking abstract state machines by utilizing simulation

Bibtex entry :

```
@inbook {  BKK+08,
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        conference, ABZ 2008, London, UK, September 16-18, 2008 ;
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```

[HSW+08]
[PDF](BIB)

Herberich, G., Schlich, B., Weise, C., and Noll, T., "Proving correctness of an efficient abstraction for interrupt handling", *Electronic notes in theoretical computer science : ENTCS*, vol. 217, pp. 133-150, 2008

Proving correctness of an efficient abstraction for interrupt handling

Bibtex entry :

```
@article {  HSW+08,
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```

[NS08]
[PDF](BIB)

Noll, T. and Schlich, B., "Delayed nondeterminism in model checking embedded systems

assembly code"Berlin [u.a.]: Springer, 2008, vol. 4899, pp. 185-201.

Delayed nondeterminism in model checking embedded systems assembly code

Bibtex entry :

```
@inbook {  NS08,
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third
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        Haifa, Israel, October 23 - 25, 2007 ; proceedings / Karen
        Yorav (ed.) },
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[RKH+08]
[PDF](#)BIB
> Reinbacher, T., Kramer, M., Horauer, M., and Schlich, B., "Motivating model checking for embedded systems software", in *Proc. 2008 IEEE/ASME International Conference on Mechatronic and Embedded Systems and Applications : MESA ; Beijing, China, 12 - 15 October 2008*, Piscataway, NJ, 2008, IEEE, pp. 546-551.

Motivating model checking for embedded systems software

Bibtex entry :

```
@inproceedings {  RKH+08,
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[RKH+08a]

[PDF](#)BIB

Reinbacher, T., Kramer, M., Horauer, M., and Schlich, B., "Challenges in embedded model checking : a simulator for the [mc]square model checker", in *Proc. 2008 International Symposium on Industrial Embedded Systems : [SIES'2008] ; La Grande Motte, France, 11 - 13 June 2008 / IEEE*, Piscataway, NJ, 2008, IEEE, pp. 245-248.

Challenges in embedded model checking : a simulator for the [mc]square model checker

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@inproceedings {  RKH+08a,
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    year = { 2008 },
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[Sch08]
[PDF](#)BIB
> Schlich, B., "Model checking of software for microcontrollers", PhD Thesis, Aachen, 2008.

Model checking of software for microcontrollers

Bibtex entry :

```
@phdthesis {  Sch08,
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    pages = { IV, 159 S. : graph. Darst. },
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[SGK08]
[PDF](#)BIB
> Schlich, B., Gückel, D., and Kowalewski, S., "Modeling the environment of microcontrollers to tackle the state-explosion problem in model checking", in *Proc. Formal methods for automation and safety in railway and automotive systems ; proceedings of Symposium FORMS/FORMAT 2008, Budapest, Hungary, October 9 - 10, 2008 / Géza Tarnai ... (ed.)*, Budapest, 2008, L Harmattan.

Modeling the environment of microcontrollers to tackle the state-explosion problem in model checking

Bibtex entry :

```
@inproceedings {  SGK08,
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[SLK08]
[PDF](#)BIB

Schlich, B., Löll, J., and Kowalewski, S., "Application of static analyses for state space reduction to microcontroller assembly code"Berlin [u.a.]: Springer, 2008, vol. 4916, pp. 21-37.

Application of static analyses for state space reduction to microcontroller assembly code

Bibtex entry :

```
@inbook {  SLK08,
    author = { Schlich, Bastian and L{\"o}ll, Jann and Kowalewski,
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    booktitle = { Formal methods for industrial critical systems : 12th
        international workshop, FMICS 2007, Berlin, Germany, July 1
        - 2, 2007 ; revised selected papers / Stefan Leue; Pedro
        Merino (eds.) },
    publisher = { Springer },
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    year = { 2008 },
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    url = { http://publications.rwth-aachen.de/record/83462 },
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```

[SK07d]

PDFBIB

Schlich, B. and Kowalewski, S., "An extendable architecture for model checking hardware-specific automotive microcontroller code", in *Proc. FORMS/FORMAT 2007 - 6th symposium : formal methods for automation and safety in railway and automotive systems ; proceedings of Symposium FORMS/FORMAT 2007, Braunschweig, Germany, 25th and 26th January, 2007 / Eckehard Schnieder; Géza Tarnai (Eds.)*, Braunschweig, 2007, GZVB, pp. 202-212.

An extendable architecture for model checking hardware-specific automotive microcontroller code

Bibtex entry :

```
@inproceedings {  SK07d,
    author = { Schlich, Bastian and Kowalewski, Stefan },
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for
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        Germany, 25th and 26th January, 2007 / Eckehard Schnieder;
        Géza Tarnai (Eds.) },
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    url = { http://publications.rwth-aachen.de/record/117067 },
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```

[SSK07]

PDFBIB

Schlich, B., Salewski, F., and Kowalewski, S., "Applying model checking to an automotive microcontroller application", in *Proc. 2007 International Symposium on Industrial Embedded Systems : Costa da Caparica, [Lisbon], Portugal, 4 - 6 July 2007 ; [SIES'2007] / IEEE / IEEE Computer Society Press*, Piscataway, NJ, 2007, IEEE, pp. 209-216.

Applying model checking to an automotive microcontroller application

Bibtex entry :

```
@inproceedings {  SSK07,
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        [SIES'2007] / IEEE / IEEE Computer Society Press },
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```

[PSK06]
[PDF](PDF)BIB

Palczynski, J., Schlich, B., and Kowalewski, S., "Eine Evaluationssuite zur schnellen Bewertung von Matlab/Simulink-Modelcheckern", in *Proc. Informatik 2006 : Informatik für Menschen ; Beiträge der 36. Jahrestagung der Gesellschaft für Informatik e.V. (GI) ; 2. bis 6. Oktober 2006 in Dresden / Christian Hochberger … (Hrsg.). - T. 1. - 1*, Bonn, 2006 in GI-Edition : Proceedings, Ges. für Informatik, pp. 751-755.

Eine Evaluationssuite zur schnellen Bewertung von Matlab/Simulink-Modelcheckern

Bibtex entry :

```
@inproceedings {  PSK06,
    author = { Palczynski, Jacob and Schlich, Bastian and Kowalewski,
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        der 36. Jahrestagung der Gesellschaft f{\"u}r Informatik
        e.V. (GI) ; 2. bis 6. Oktober 2006 in Dresden / Christian
        Hochberger ... (Hrsg.). - T. 1. - 1 },
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    pages = { 751-755 },
    series = { GI-Edition : Proceedings },
    year = { 2006 },
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        organization = { 36. Jahrestagung der Gesellschaft f{\"u}r
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    url = { http://publications.rwth-aachen.de/record/111754 },
}
```

[SK06a]
PDFBIB

Schlich, B. and Kowalewski, S., "[mc]square: A model checker for microcontroller code", in *Proc. ISoLA 2006 : Second International Symposium on Leveraging Applications of Formal Methods, Verification and Validation ; 15 - 19 November 2006, Paphos, Cyprus / IEEE Computer SocietyLeveraging Applications of Formal Methods, Verification and Validation (ISoLA 2006)*, Paphos, Cyprus, 2006, IEEE Computer Society Press, pp. 466-473.

[mc]square: A model checker for microcontroller code

Bibtex entry :

```
@inproceedings {  SK06a,
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Leveraging
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        ; 15 - 19 November 2006, Paphos, Cyprus / IEEE Computer
        SocietyLeveraging Applications of Formal Methods,
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    pages = { 466-473 },
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    address = { Paphos, Cyprus },
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Applications of
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    url = { http://publications.rwth-aachen.de/record/117076 },
}
```

[SRW+06]
PDFBIB

Schlich, B., Rohrbach, M., Weber, M., and Kowalewski, S., "Model checking software for microcontrollers", , Aachen, AIB-2006-11, 2006.

Model checking software for microcontrollers

Bibtex entry :

```
@techreport {  SRW+06,
    author = { Schlich, Bastian and Rohrbach, Michael and Weber,
Michael
        and Kowalewski, Stefan },
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    pages = { 33 Bl. : graph. Darst. },
    volume = { 2006,11 },
    number = { AIB-2006-11 },
    series = { Aachener Informatik-Berichte },
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    cin = { 122810 / 120000 },
    url = { http://webdoc.sub.gwdg.de/ebook/serien/ah/AIB/2006-11.pdf
},
}
```

[SK05b]
PDFBIB

Schlich, B. and Kowalewski, S., "Model checking C source code for embedded systems", , [S.l.], NASA/CP-2005-212788, 2005.

Model checking C source code for embedded systems

Bibtex entry :

```
@techreport {  SK05b,
    author = { Schlich, Bastian and Kowalewski, Stefan },
    title = { Model checking C source code for embedded systems },
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Formal
        Methods, Verification, and Validation : IEEE/NASA ISoLA 2005
        ; proceedings of a workshop held at the Loyola College
        Graduate Center, Columbia, Maryland, USA, 23 - 24 September
        2005 ; with a special track on the theme of formal methods
        in human and robotic space exploration / National
        Aeronautics and Space Administration, Goddard Space Flight
        Center. Ed.: Tiziana Margaria ... },
    pages = { 65-77 },
    number = { NASA/CP-2005-212788 },
    year = { 2005 },
    address = { [S.l.] },
    organization = { IEEE/NASA Workshop on Leveraging Applications of
Formal
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```

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        2005-09-23 - 2005-09-24 },
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}
```

[SK04]
PDFBIB

     Schlich, B. and Kowalewski, S., "C Model Checker: Eine Übersicht", 2004.

C Model Checker: Eine Übersicht

Bibtex entry :

```
@techreport {  SK04,
    author = { Schlich, Bastian and Kowalewski, Stefan },
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Teaching

BSc/MSc/Diploma Theses

- Counterexample-Guided Abstraction Refinement for Programmable Logic Controllers (Sebastian Biallas)
- Extending EVA to 16 and 32 Bit Systems (Michael Lambertz)
- Static Analysis for the Renesas R8C/23 Microcontroller (Jörg Toborg)
- Static Analysis of Microcontroller Programs using SAT- and Constraint-Solving (Lucas Brutschy)
- Implementation of a Simulator for a Renesas Microcontroller (Mudassir Rasool)
- Synthesizing an Instruction Set Simulator for Model Checking Embedded Systems Software (Ivica Bogosavljevic)
- Model-Checking of Instruction List Programs for Programmable Logic Controllers using [mc]square (Jörg Wernerus)
- Parallel and Distributed Construction of the State Spaces in the Model Checker [mc]square (Stefan Mau)
- Extending the Symbolic Representation of States in [mc]square (Dipl.-Inform. Volker Kamin)
- Model-Checking of Sensor Network Nodes with the Help of [mc]square (Matthias Moers)
- Extending the Model Checker [mc]square by User-Defined Environments (Dr. rer. nat. Dominique Marcel Gückel)
- Extending the Model Checker [mc]square to Handle the Infineon XC167 Microcontroller (Florian Scheuer)

- Application of Static Analysis in the Field of Model Checking Software for Embedded Systems (Jann Löll)
- Symbolic Model Checking in [mc]square (Dipl.-Inform. John F. Schommer)
- An Approach for Model Checking Embedded Systems Software (Michael Rohrbach)
- Studies on the Application Potential of Formal Verification in the Engine Management Systems Software Domain (Dr. rer. nat. Andreas Polzer)
- Requirements for a Model Checker for Matlab/Simulink (Dr. rer. nat. Jacob Palczynski)

Lectures & Seminars

- Winter semester 09/10: Formal Methods for Embedded Systems (Lecture)
- Summer semester 09: Applying Formal Verification Methods to Embedded Systems (Seminar)
- Winter semester 08/09: Static Analysis of Embedded Systems Software (Seminar)
- Summer semester 08: Formal Methods for Embedded Systems (Lecture)
- Summer semester 07: Formal Methods for Embedded Software (Lecture)
- Winter semester 06/07: Testing Embedded Systems (Seminar)
- Summer semester 06: SUN Software Award 2006
- Winter semester 05/06: Systematic Software Engineering (Lecture)
- Summer semester 05: Formal Methods for Embedded Systems (Lecture)
- Winter semester 04/05: Systems Programming (Lecture)
- Winter semester 04/05: Application of Model Checking to Embedded Systems (Seminar)
- Summer semester 04: Hybrid and Real-Time Systems (Seminar)

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