

# Dr. rer. nat. Marcus Völker

## Kontakt

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## Offene Abschlussarbeiten

*Zur Zeit sind keine Abschlussarbeiten offen*

## Offene Hiwistellen

*Zur Zeit sind keine Hiwistellen offen*

## Lehre

| Semester             | Titel  | Art |
|----------------------|--|-----|
| Wintersemester 15/16 | <a href="#">Formale Methoden für Steuerungssoftware</a>                              | V   |
|                      | <a href="#">Formale Methoden für Steuerungssoftware</a>                              | V   |
| Wintersemester 16/17 | <a href="#">Formale und semiformale Methoden für eingebettete Software (1 Thema)</a> | S   |
|                      | <a href="#">Entwicklung NXT gesteuerter LEGO-Fahrzeuge mit Java</a>                  | P   |
| Sommersemester 17    | <a href="#">Formale und semiformale Methoden für eingebettete Software (1 Thema)</a> | S   |
|                      | <a href="#">Formale Methoden für Steuerungssoftware</a>                              | V   |
| Wintersemester 17/18 | <a href="#">Formale und semiformale Methoden für eingebettete Software (1 Thema)</a> | S   |
| Sommersemester 18    | <a href="#">Formale und semiformale Methoden für eingebettete Software (1 Thema)</a> | S   |

|                      |  |    |
|----------------------|--|----|
| Wintersemester 18/19 | Formale Methoden für Steuerungssoftware                                  | V  |
|                      | Formale und semiformale Methoden für eingebettete Software<br>(2 Themen) | S  |
|                      | Proseminar: Grundlagen eingebetteter Systeme<br>(1 Thema)                | PS |
| Sommersemester 19    | Seminar: Ausgesuchte Themen zur Eingebetteten Software<br>(1 Thema)      | S  |
|                      | Proseminar: Grundlagen eingebetteter Systeme<br>(2 Themen)               | PS |
| Wintersemester 19/20 | Formale Methoden für Steuerungssoftware                                  | V  |
|                      | Seminar: Ausgesuchte Themen zur Eingebetteten Software<br>(2 Themen)     | S  |
|                      | Proseminar: Grundlagen eingebetteter Systeme<br>(3 Themen)               | PS |
| Wintersemester 20/21 | Formale Methoden für Steuerungssoftware                                  | V  |
| Wintersemester 21/22 | Formale Methoden für Steuerungssoftware                                  | V  |
| Wintersemester 22/23 | Formale Methoden für Steuerungssoftware                                  | V  |

## Publikationen

[BBZ+23]

[PDFBIB](#)

Behery, M. A. A., Brauner, P., Zhou, H. A., Uysal, M. S., Samsonov, V., Bellgardt, M., Brillowski, F. S., Brockhoff, T., Farhang Ghahfarokhi, A., Gleim, L. C., Gorißen, L. M., Grochowski, M., Henn, T., Iacomini, E., Kaster, T., Koren, I., Liebenberg, M. R., Reinsch, L. N., Tirpitz, L., Trinh, M., Posada Moreno, A. F., Liehner, G. L. V., Schemmer, T., Vervier, L. S., Völker, M., Walderich, P., Zhang, S., Brecher, C., Schmitt, R. H., Decker, S. J., Gries, T., Häfner, C. L., Herty, M., Jarke, M., Kowalewski, S., Kuhlen, T., Schleifenbaum, J. H., Trimpe, J. S., van der Aalst, W. M. P., Ziefle, M., and Lakemeyer, G., "Actionable Artificial Intelligence for the Future of Production" Cham: Springer International Publishing, 2023, pp. 1-46.

## Actionable Artificial Intelligence for the Future of Production

### Bibtex entry :

```
@inbook { BBZ+23,
  author = { Behery, Mohamed Anwar Abdellatif and Brauner, Philipp
and
  Zhou, Hans Aoyang and Uysal, Merih Seran and Samsonov,
Vladimir and Bellgardt, Martin and Brillowski, Florian
Sascha and Brockhoff, Tobias and Farhang Ghahfarokhi,
Anahita and Gleim, Lars Christoph and Gori{\ss}en, Leon
Michel and Grochowski, Marco and Henn, Thomas and Iacomini,
Elisa and Kaster, Thomas and Koren, István and Liebenberg,
Martin Roland and Reinsch, Leon Niwes and Tirpitz, Liam and
Trinh, Minh and Posada Moreno, Andres Felipe and Liehner,
Gian Luca Valentin and Schemmer, Thomas and Vervier, Luisa
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Sophie and V{"o}lker, Marcus and Walderich, Philipp and
Zhang, Song and Brecher, Christian and Schmitt, Robert H.
and Decker, Stefan Josef and Gries, Thomas and H{"a}fner,
Constantin Leon and Herty, Michael and Jarke, Matthias and
Kowalewski, Stefan and Kuhlen, Torsten and Schleifenbaum,
Johannes Henrich and Trimpe, Johann Sebastian and van der
Aalst, Wil M. P. and Ziefle, Martina and Lakemeyer, Gerhard },
title = { Actionable Artificial Intelligence for the Future of
Production },
booktitle = { Internet of production : fundamentals, applications
and
proceedings / editors: Christian Brecher, G{"u}nther Schuh,
Wil van der Aalst, Matthias Jarke, Frank T. Piller, Melanie
Padberg },
publisher = { Springer International Publishing },
pages = { 1-46 },
series = { Interdisciplinary Excellence Accelerator Series : IDEAS
},
year = { 2023 },
address = { Cham },
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418710 / 418020 / 122510 / 418910 / 417200 / 124620 / 110000
/ 120000 / 022000 / 111400 / 114620 / 121920 / 124510 /
417310 / 417510 },
url = {
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[SMV+23]

[PDFBIB](#)

Schnakenbeck, A., Mroß, R., Völker, M., Kowalewski, S., and Fay, A., "Transformation von GRAFCET in GAL auf Basis eines ausführlichen Metamodells zur Verifikation von Entwurfsfehlern", *Automatisierungstechnik : AT*, vol. 71, iss. 1, pp. 56-68, 2023

## Transformation von GRAFCET in GAL auf Basis eines ausführlichen Metamodells zur Verifikation von Entwurfsfehlern

**Bibtex entry :**

```

@article { SMV+23,
author = { Schnakenbeck, Aron and Mro{"ss}, Robin and V{"o}lker,
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title = { Transformation von GRAFCET in GAL auf Basis eines

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    publisher = { De Gruyter },
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http://publications.rwth-aachen.de/record/862808/files/862808.pdf },
}
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[Vol23]

[PDFBIB](#)

Völker, M., "Policy iteration for value set analysis of PLC programs", PhD Thesis, Aachen, 2023.

## Policy iteration for value set analysis of PLC programs

### Bibtex entry :

```
@phdthesis { Vol23,
    author = { V{"o}lker, Marcus },
    othercontributors = { Kowalewski, Stefan and Beckert, Bernhard },
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},
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    school = { RWTH Aachen University },
    pages = { 1 Online-Ressource : Illustrationen, Diagramme },
    series = { Aachener Informatik-Berichte (AIB) },
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http://publications.rwth-aachen.de/record/956653/files/956653.pdf },
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[GVK22]

[PDFBIB](#)

Grochowski, M., Völker, M., and Kowalewski, S., "Test Suite Augmentation for Reconfigurable PLC Software in the Internet of Production", in *Proc. Formal Methods for Industrial Critical Systems : 27th International Conference, FMICS 2022, Warsaw, Poland, September 14-15, 2022, Proceedings / edited by Jan Friso Groote, Marieke Huisman*, Cham, 2022 in Lecture notes in

computer science, Springer, pp. 137-154.

## Test Suite Augmentation for Reconfigurable PLC Software in the Internet of Production

### Bibtex entry :

```
@inproceedings { GVK22,  
  author = { Grochowski, Marco and V{"o}lker, Marcus and Kowalewski,  
            Stefan },  
  title = { Test Suite Augmentation for Reconfigurable PLC Software  
in  
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  booktitle = { Formal Methods for Industrial Critical Systems : 27th  
International Conference, FMICS 2022, Warsaw, Poland,  
September 14–15, 2022, Proceedings / edited by Jan Friso  
Groote, Marieke Huisman },  
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[GVK22a]

[PDFBIB](#)

Grochowski, M., Völker, M., and Kowalewski, S., "Automatic Test Suite Generation for PLC Software in the Internet of Production", in *Proc. 2022 27th IEEE International Conference on Emerging Technologies and Factory Automation (ETFA) : 6-9 Sept. 2022 / [IEEE Industrial Electronics Society, IEEE]*, Piscataway, NJ, 2022, IEEE, p. 8.

## Automatic Test Suite Generation for PLC Software in the Internet of Production

### Bibtex entry :

```
@inproceedings { GVK22a,  
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/ [IEEE Industrial Electronics Society, IEEE] },
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```

[HVK+22]

[PDFBIB](#)

Henn, T., Völker, M., Kowalewski, S., Trinh, M., Petrovic, O., and Brecher, C., "Verification of Behavior Trees using Linear Constrained Horn Clauses", in *Proc. Formal Methods for Industrial Critical Systems (fmics 2022)*, 2022, pp. 211-225.

## Verification of Behavior Trees using Linear Constrained Horn Clauses

### Bibtex entry :

```
@inproceedings { HVK+22,
author = { Henn, Thomas and V{"o}lker, Marcus and Kowalewski,
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title = { Verification of Behavior Trees using Linear Constrained
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booktitle = { Formal Methods for Industrial Critical Systems (fmics
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[MSV+22]

PDFBIB

Mroß, R., Schnakenbeck, A., Völker, M., Fay, A., and Kowalewski, S., "Transformation of GRAFCET Into GAL for Verification Purposes Based on a Detailed Meta-Model", *IEEE access*, vol. 10, pp. 125652-125665, 2022

## Transformation of GRAFCET Into GAL for Verification Purposes Based on a Detailed Meta-Model

### Bibtex entry :

```
@article { MSV+22,
  author = { Mro{\ss}, Robin and Schnakenbeck, Aron and V{"o}lker,
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}
```

[SMV+22]

PDFBIB

Schnakenbeck, A., Mroß, R., Völker, M., Kowalewski, S., and Fay, A., "Transformation von GRAFCET in GAL auf Basis eines ausführlichen Metamodells zur Verifikation von Entwurfsfehlern", in *Proc. Entwurf komplexer Automatisierungssysteme : Beschreibungsmittel, Methoden, Werkzeuge und Anwendungen / Ulrich Jumar, Christian Diedrich (Hrsg.)*, Magdeburg, 2022, Otto-von-Guericke-Universität Magdeburg, p. 18.

## Transformation von GRAFCET in GAL auf Basis eines ausführlichen Metamodells zur Verifikation von Entwurfsfehlern

## Bibtex entry :

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@inproceedings { SMV+22,
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    Entwurfsfehlern },
  booktitle = { Entwurf komplexer Automatisierungssysteme :
    Beschreibungsmittel, Methoden, Werkzeuge und Anwendungen /
    Ulrich Jumar, Christian Diedrich (Hrsg.) },
  publisher = { Otto-von-Guericke-Universit{"a}t Magdeburg },
  pages = { 18 Seiten },
  year = { 2022 },
  address = { Magdeburg },
  organization = { 17. Fachtagung Entwurf komplexer
    Automatisierungssysteme,
    Magdeburg (Germany), 2022-06-23 - 2022-06-24 },
  typ = { PUB:(DE-HGF)24 },
  reportid = { RWTH-2023-00551 },
  cin = { 122810 / 120000 },
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[VK19]

[PDFBIB](#)

Völker, M. and Kowalewski, S., "A Change-Based Heuristic for Static Analysis with Policy Iteration", in *Proc. Static analysis : 26th international symposium, SAS 2019, Porto, Portugal, October 8-11, 2019 : proceedings / Bor-Yuh Evan Chang (ed.)*, Cham, Switzerland, 2019 in *Lecture notes in computer science*, Springer, pp. 73-95.

## A Change-Based Heuristic for Static Analysis with Policy Iteration

### Bibtex entry :

```
@inproceedings { VK19,
  author = { V{"o}lker, Marcus and Kowalewski, Stefan },
  title = { A Change-Based Heuristic for Static Analysis with Policy
    Iteration },
  booktitle = { Static analysis : 26th international symposium, SAS
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    Porto, Portugal, October 8-11, 2019 : proceedings / Bor-Yuh
    Evan Chang (ed.) },
  publisher = { Springer },
  pages = { 73-95 },
  series = { Lecture notes in computer science },
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doi = { 10.1007/978-3-030-32304-2_5 },
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http://publications.rwth-aachen.de/record/768806/files/768806.pdf },
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[VKR+19]

[PDFBIB](#)

Völker, M., Kloock, M. M., Rabanus, L., Alrifaae, B., and Kowalewski, S., "Verification of Cooperative Vehicle Behavior using Temporal Logic", *IFAC-PapersOnLine*, vol. 52, iss. 8, pp. 99-104, 2019

## Verification of Cooperative Vehicle Behavior using Temporal Logic

### Bibtex entry :

```
@article { VKR+19,
  author = { V{"o}lker, Marcus and Kloock, Maximilian Martin and
    Rabanus, Leon and Alrifaae, Bassam and Kowalewski, Stefan },
  title = { Verification of Cooperative Vehicle Behavior using
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  journal = { IFAC-PapersOnLine },
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  pages = { 99-104 },
  volume = { 52 },
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  organization = { 10. IFAC Symposium on Intelligent Autonomous
    Vehicles,
    Gdansk (Poland), 2019-07-03 - 2019-07-05 },
  doi = { 10.1016/j.ifacol.2019.08.055 },
  typ = { PUB:(DE-HGF)16 },
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```

[ICLP-2015-Volker]

[PDFBIB](#)

Völker, M. and Inoue, K., "Logic Programming for Cellular Automata", in *Proc. ICLP (Technical Communications)*, 2015, vol. 1433 in CEUR Workshop Proceedings, CEUR-WS.org.

# { Logic Programming for Cellular Automata }

## Bibtex entry :

```
@inproceedings { ICLP-2015-VolkerI,  
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