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## Biography

Ansgar Fehnker is an Associate Professor (Teaching and Leadership) in the School of Computing at Macquarie University. He was previously an Associate Professor at the University of Twente, a professor in CS/IS at the University of the South Pacific, and a researcher at National ICT Australia in Sydney. His research interest is the use of automated system and software verification tools, in particular model checking and static analysis, and their application in the design and development of software systems. His work includes verification for cyber-physical systems, static analysis for C/C++, modelling and verification of wireless routing protocols, analysis of block-chain technology and more recently, developing and applying software analysis tools and methods for an educational context.

## Employment

### Associate Professor (Teaching and Leadership)

Associate Professor  
School of Computing  
Macquarie University  
15 Nov 2021 → present

### Associate Professor

University of Twente  
NB Enschede, Netherlands  
1 Feb 2016 → 14 Nov 2021

### Professor

University of the South Pacific  
Fiji  
1 Feb 2012 → 31 Jan 2016

### Researcher

National ICT Australia Limited (NICTA)  
Eveleigh, Australia  
1 Nov 2004 → 31 Dec 2012

## Research outputs

### What's in school? – topic maps for secondary school computer science

Fehnker, A., 2022, *A journey from process algebra via timed automata to model learning : essays dedicated to Frits Vaandrager on the occasion of his 60th birthday*. Jansen, N., Stoelinga, M. & van den Bos, P. (eds.). Cham: Springer, Springer Nature, p. 151-163 13 p. (Lecture Notes in Computer Science; vol. 13560).

### Atelier Hands-On Training

Blaas, R., Fehnker, A. & Mader, A. H., 1 Jun 2021

### Atelier – tutor moderated comments in programming education

Fehnker, A., Mader, A. H. & Rump, A., 2021, *Technology-Enhanced Learning for a Free, Safe, and Sustainable World: 16th European Conference on Technology Enhanced Learning, EC-TEL 2021 Bolzano, Italy, September 20–24, 2021 Proceedings*. De Laet, T., Klemke, R., Alario-Hoyos, C., Hilliger, I. & Ortega-Arranz, A. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 379-383 5 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 12884 LNCS).

Automated assessment of learning objectives in programming assignments

Rump, A., Fehnker, A. & Mader, A., 2021, *Intelligent Tutoring Systems: 17th International Conference, ITS 2021 Virtual Event, June 7–11, 2021 Proceedings*. Cristea, A. I. & Troussas, C. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 299-309 11 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 12677 LNCS).

Be lazy and don't care: faster CTL model checking for recursive state machines

Dubslaff, C., Wienhöft, P. & Fehnker, A., 2021, *Software Engineering and Formal Methods: 19th International Conference, SEFM 2021 Virtual Event, December 6–10, 2021 Proceedings*. Calinescu, R. & Păsăreanu, C. S. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 332-350 19 p. (Lecture Notes in Computer Science; vol. 13085).

Out for coffee: with Rob

Fehnker, A., Oct 2020, In: *Acta Informatica*. 57, 3-5, p. 323-327 5 p.

A distributed blockchain model of selfish mining

Eijkel, D. & Fehnker, A., 2020, *Formal Methods - FM 2019 International Workshops: Porto, Portugal, October 7–11, 2019 Revised Selected Papers, Part I*. Sekerinski, E., Moreira, N. & Oliveira, J. N. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 350-361 12 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 12232).

A sports day for programming

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Atelier - an online platform for programming tutorials

Fehnker, A., Mader, A., Rump, A., Rutgers, M., Steenmeijer, L. & Witteveen, C., 2020, *Proceedings of the 9th Computer Science Education Research Conference, CSERC '20*. Stikkorum, D. & Rahimi, E. (eds.). New York, NY: Association for Computing Machinery (ACM), p. 101-102 2 p. (CSERC '20).

Atelier for creative programming

Fehnker, A. & Mader, A., 2020, *CSEDU 2020: Final Program and Book of Abstracts*. Setubal, Portugal: SciTePress, p. 43 1 p.

Atelier for Creative Programming - Poster Video

Fehnker, A. & Mader, A. H., 2020

Atelier – Support for Creative Programming Education

Fehnker, A. & Mader, A. H., 2020.

Atelier voor Creatief Programmeren

Fehnker, A., Mader, A. H., Rump, A., Rutgers, M. & Steenmeijer, L., 2020.

Double-spending analysis of bitcoin

Chaudhary, K., Chand, V. & Fehnker, A., 2020, *24th Pacific Asia Conference on Information Systems: Information Systems (IS) for the Future, PACIS 2020*. Dubai: Association for Information Systems, p. 1-14 14 p.

## **Preface**

Fehnker, A. & Garavel, H., 2020, *Proceedings of the 4th Workshop on Models for Formal Analysis of Real Systems, MARS 2020*. Fehnker, A. & Garavel, H. (eds.). Waterloo, NSW: Open Publishing Association, 1 p. (Electronic Proceedings in Theoretical Computer Science, EPTCS).

Proceedings of the 4th Workshop on Models for Formal Analysis of Real Systems, MARS 2020

Fehnker, A. (ed.) & Garavel, H. (ed.), 2020.

Tinkering in informatics as teaching method

Mader, A. H., Fehnker, A. & Dertien, E., 2020, *CSEDU 2020 - Proceedings of the 12th International Conference on Computer Supported Education*. Lane, H. C., Zvacek, S. & Uhomobhi, J. (eds.). Setúbal, Portugal: SciTePress, p. 450-457 8 p. (CSEDU 2020 - Proceedings of the 12th International Conference on Computer Supported Education; vol. 1).

Detecting and addressing design smells in novice Processing programs

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Adaptive formal framework for WMN routing protocols

Kamali, M. & Fehnker, A., 2018, *Formal Aspects of Component Software: 15th International Conference, FACS 2018 Pohang, South Korea, October 10–12, 2018 Proceedings*. Bae, K. & Ölveczky, P. C. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 175-195 21 p. (Lecture Notes in Computer Science; vol. 11222).

An even better approach: improving the B.A.T.M.A.N. protocol through formal modelling and analysis

Fehnker, A., Chaudhary, K. & Mehta, V., 2018, *NASA Formal Methods: 10th International Symposium, NFM 2018 Newport News, VA, USA, April 17–19, 2018 Proceedings*. Dutle, A., Muñoz, C. & Narkawicz, A. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 164-178 15 p. (Lecture Notes in Computer Science; vol. 10811).

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Twenty percent and a few days: optimising a Bitcoin majority attack

Fehnker, A. & Chaudhary, K., 2018, *NASA Formal Methods: 10th International Symposium, NFM 2018 Newport News, VA, USA, April 17–19, 2018 Proceedings*. Dutle, A., Muñoz, C. & Narkawicz, A. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 157-163 7 p. (Lecture Notes in Computer Science; vol. 10811).

Automated Program Analysis for Novice Programmers

Blok, T. & Fehnker, A., 2017, *Proceedings of the 3rd International Conference on Higher Education Advances, HEAd '17*. Domenech, J., Vincent-Vela, M. C., de la Poza, E. & Blazquez, D. (eds.). València: Editorial Universitat Politècnica de València , p. 1138-1146 9 p.

Evaluating the stream control transmission protocol using Uppaal

Saini, S. & Fehnker, A., 2017, *Proceedings 2nd Workshop on Models for Formal Analysis of Real Systems (MARS 2017)*. Hermanns, H. & Höfner, P. (eds.). Waterloo, NSW: Open Publishing Association, p. 1-13 13 p. (EPTCS; vol. 244).

Modelling, verification, and comparative performance analysis of the B.A.T.M.A.N. protocol

Chaudhary, K., Fehnker, A. & Mehta, V., 2017, *Proceedings 2nd Workshop on Models for Formal Analysis of Real Systems, MARS@ETAPS 2017*. Hermanns, H. & Höfner, P. (eds.). Waterloo, NSW: Open Publishing Association, p. 53-65 13 p. (Electronic Proceedings in Theoretical Computer Science (EPTCS); vol. 244).

Model checking a client-side micro payment protocol

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**Logic for programming, artificial intelligence, and reasoning: 20th international conference, LPAR-20 2015 Suva, Fiji, november 24–28, 2015 proceedings**

Davis, M. (ed.), Fehnker, A. (ed.), Mclver, A. (ed.) & Voronkov, A. (ed.), 2015, Heidelberg: Springer, Springer Nature. 640 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 9450)

Model checking a server-side micro payment protocol

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Modeling and verification of the Bitcoin protocol

Chaudhary, K., Fehnker, A., van de Pol, J. & Stoelinga, M., 2015, *Proceedings of the Workshop on Models for Formal Analysis of Real Systems (MARS 2015)*. van Glabbeek, R., Groote, J. F. & Höfner, P. (eds.). Waterloo, NSW: Open Publishing Association, p. 46-60 15 p. (Electronic Proceedings in Theoretical Computer Science; vol. 196).

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Davis, M., Fehnker, A., Mclver, A. & Voronkov, A., 2015, *Logic for Programming, Artificial Intelligence, and Reasoning: 20th International Conference, LPAR-20 2015 Suva, Fiji, November 24–28, 2015, Proceedings*. Davis, M., Fehnker, A., Mclver, A. & Voronkov, A. (eds.). Berlin: Springer, Springer Nature, 1 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 9450).

Modeling and verification for the server-side Netpay protocol

Chaudhary, K., Fehnker, A. & Dai, X., 2014, *Asia-Pacific World Congress on Computer Science and Engineering, APWC on CSE 2014*. Piscataway, NJ: Institute of Electrical and Electronics Engineers (IEEE), p. 1-8 8 p.

Model checking driven static analysis for the real world: designing and tuning large scale bug detection

Fehnker, A. & Huuck, R., Mar 2013, In: *Innovations in Systems and Software Engineering*. 9, 1, p. 45-56 12 p.

The quest for precision: a layered approach for data race detection in static analysis

Mund, J., Huuck, R., Fehnker, A. & Artho, C., 2013, *Automated Technology for Verification and Analysis: 11th International Symposium, ATVA 2013 Hanoi, Vietnam, October 15-18, 2013, Proceedings*. Hung, D. V. & Ogawa, M. (eds.). Cham, Switzerland: Springer, Springer Nature, p. 516-525 10 p. (Lecture Notes in Computer Science; vol. 8172).

Topology-based mobility models for wireless networks

Fehnker, A., Höfner, P., Kamali, M. & Mehta, V., 2013, *Quantitative Evaluation of Systems: 10th International Conference, QEST 2013 Buenos Aires, Argentina, August 27-30, 2013, Proceedings*. Joshi, K. R., Siegle, M., Stoelinga, M. & D'Argenio, P. R. (eds.). Heidelberg: Springer, Springer Nature, p. 389-404 16 p. (Lecture Notes in Computer Science; vol. 8054).

## **Automated analysis of AODV using UPPAAL**

Fehnker, A., Van Glabbeek, R., Höfner, P., Mclver, A., Portmann, M. & Tan, W. L., 2012, *Tools and Algorithms for the Construction and Analysis of Systems - 18th Int. Conf., TACAS 2012, Held as Part of the European Joint Conf. on Theory and Practice of Software, ETAPS 2012, Proceedings*. Flanagan, C. & König, B. (eds.). Heidelberg, Germany: Springer, Springer Nature, Vol. 7214 LNCS. p. 173-187 15 p. (Lecture Notes in Computer Science (including subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics); vol. 7214 LNCS).

SMT-based false positive elimination in static program analysis

Junker, M., Huuck, R., Fehnker, A. & Knapp, A., 2012, *Formal Methods and Software Engineering: 14th International Conference on Formal Engineering Methods, ICFEM 2012 Kyoto, Japan, November 12-16, 2012, Proceedings*. Aoki, T. & Taguchi, K. (eds.). Heidelberg: Springer, Springer Nature, p. 316-331 16 p. (Lecture Notes in Computer Science; vol. 7635).

Cyber security at software development time

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Model checking dataflow for malicious input

Fehnker, A., Huuck, R. & Rödiger, W., 2011, *Proceedings of the Workshop on Embedded Systems Security, WESS '11*. New York, NY: Association for Computing Machinery (ACM), p. 1-10 10 p. 4

### Modelling and analysis of AODV in UPPAAL

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### Fade to grey: tuning static program analysis

Fehnker, A., Huuck, R., Seefried, S. & Tapp, M., 12 Oct 2010, In: *Electronic Notes in Theoretical Computer Science*. 266, p. 17-32 16 p.

### Counterexample guided path reduction for static program analysis

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### Software metrics in static program analysis

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### An abstract specification language for static program analysis

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### Automatic bug detection in microcontroller software by static program analysis

Fehnker, A., Huuck, R., Schlich, B. & Tapp, M., 2009, *SOFSEM 2009: Theory and Practice of Computer Science: 35th Conference on Current Trends in Theory and Practice of Computer Science Špindlerův Mlýn, Czech Republic, January 24-30, 2009, Proceedings*. Nielsen, M., Kucera, A., Miltersen, P. B., Palamidessi, C., Tuma, P. & Valencia, F. D. (eds.). Berlin: Springer, Springer Nature, p. 267-278 12 p. (Lecture Notes in Computer Science; vol. 5404).

### Incremental false path elimination for static software analysis

Fehnker, A., Huuck, R. & Seefried, S., 2009, *Automated Technology for Verification and Analysis: 7th International Symposium, ATVA 2009 Macao, China, October 14-16, 2009, Proceedings*. Liu, Z. & Ravn, A. P. (eds.). Berlin: Springer, Springer Nature, p. 255-270 16 p. (Lecture Notes in Computer Science; vol. 5799).

### On the impact of modelling choices for distributed information spread: a comparative study

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### Survey on directed model checking

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### Goanna: syntactic software model checking

Huuck, R., Fehnker, A., Seefried, S. & Brauer, J., 2008, *Automated Technology for Verification and Analysis: 6th International Symposium, ATVA 2008 Seoul, Korea, October 20-23, 2008, Proceedings*. Cha, S., Choi, J-Y., Kim, M., Lee, I. & Viswanathan, M. (eds.). Berlin: Springer, Springer Nature, p. 216-221 6 p. (Lecture Notes in Computer Science; vol. 5311).

### Some assembly required: program analysis of embedded system code

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Goanna - a static model checker

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Model checking software at compile time

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Refining abstractions of hybrid systems using counterexample fragments

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Temporal logic model checking

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Abstraction and counterexample-guided refinement in model checking of hybrid systems

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Specification-guided analysis of hybrid systems using a hierarchy of validation methods

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#### Modeling and verifying a Lego car using hybrid I/O automata

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#### Verification of hybrid systems based on counterexample-guided abstraction refinement

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#### Verification and optimization of a PLC control schedule

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#### As cheap as possible: efficient cost-optimal reachability for priced timed automata

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#### Efficient guiding towards cost-optimality in UPPAAL

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#### Minimum-cost reachability for priced timed automata

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#### UPPAAL - now, next, and future

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#### Automotive control revisited: linear inequalities as approximation of reachable sets

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#### Operational and logical semantics for polling real-time systems

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