

Dr. Anthony Widjaja Lin¹

Position: Professor
Employer: Technische Universität Kaiserslautern, Germany
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Email: lin@cs.uni-kl.de
Citizenship: Australian
Personal: Married with two children



Education

University of Edinburgh, PhD in Informatics, September 2006 – August 2010

Thesis: *Model Checking Infinite-state Systems: Generic and Specific Approaches*
Supervisors: Prof. Leonid Libkin (FRSE) and Dr. Richard Mayr

University of Melbourne, BSc (Honours) in Computer Science & Mathematics, February 2001 – December 2004

Thesis: *On Unary-conjunctive-view Queries*
Adviser: Prof. James Bailey

Research Interests

Logical methods for programming technologies: constraint solving, automata theory, formal verification, and program analysis focussing on the applications to cybersecurity, web performance optimisation, concurrent systems, and databases.

Grants

- 10/2019 – 09/2024 *Max-Planck Fellowship* (€500,000.-)
- 11/2017 – 10/2022 *ERC Starting Grant* (€1,500,000.-)
Title: Algorithmic Verification of String-Manipulating Programs
- 03/2017 – now *Google Faculty Research Award* (US\$54,000.-)
Title: Cascading Style Sheet Minification via Constraint Solving
- 08/2015 – 08/2018 *Ministry of Education Large Tier-1 Grant, Singapore* (SG\$150,000.-)
Title: Foundations of String Solving for Vulnerability Detection
- 06/2014 – 05/2017 *Yale-NUS Startup Research Grant, Singapore* (SG\$50,000.-)
Title: Algorithmic verification of infinite-state systems
- 08/2016 – 10/2016 *IMS Workshop Grant, Singapore* (SG\$180,000.-) [with Luke Ong]
Title: Six Themes in Formal Verification
- 10/2010 – 09/2013 *EPSRC Postdoctoral Research Fellowship* (£250,894.-)
Title: Transducer-based approach to infinite-state model checking

Awards

- 2017 *Google Faculty Research Award*
- 2010 *LICS Kleene Award for Best Student Paper*

Positions (after PhD)

Technische Universität Kaiserslautern — Department of Informatics, Germany, March 2019 – present

Position: Professor

University of Oxford — Department of Computer Science, UK, October 2016 – February 2019

Position: Associate Professor (Official Fellow of Kellogg College)

Yale-NUS College — Singapore, May 2014 – Oct 2016

Position: Assistant Professor in Computer Science

University of Oxford — Department of Computer Science, UK, October 2010 – September 2013

Position: EPSRC Postdoctoral Research Fellow in Theoretical Computer Science

Two short postdoc research stints at **Singapore University of Technology and Design** (January – May 2014) and **Academia Sinica, Taiwan** (October 2013–December 2013)

¹previously known as Anthony Widjaja To

Teaching Experience (as a Main Instructor)

TU Kaiserslautern, Kaiserslautern, Germany

Automated Reasoning (Summer 2020)

Logic and Semantics of Programming Languages (Winter 2019–2020)

Seminar on Logic and Verification (Summer 2019)

Logik (Summer 2019)

Peking University, Beijing, China

- Logic for Program Verification (Summer'17)

University of Oxford, Oxford, UK

- Object-Oriented Programming (March'17),
- First Assessor: Robust Programming (Feb 2017)
- Automata, Logic and Games (Hilary'12)

National Taiwan University, Taipei, Taiwan

- Logic for Program Verification (Summer'15)

Yale-NUS College, Singapore

- Introduction to Computation and Programming (Spring'15, Spring'16)
- Theory of Computation (Spring'16),
- Logic in Computer Science (Fall'16),
- Scientific Inquiry (Fall'14, Fall'15),
- Quantitative Reasoning (Spring'15).

Supervision/Advising

Postdocs: Muhammad Najib (Oct 2019 – present), Reino Niskanen (June 2018 – Feb 2019), Xuan Bach Le (Aug 2018 – Feb 2019),

PhD students (ongoing/graduated): Xuan Bach Le (2014 – 2017), Chih-Duo Hong (2017– now),

Bachelor and Masters students: Oliver Markgraf (current part-time research staff), Geri Gokaj (Bachelors thesis), Dario Simonetti (completed MSc in 2017, received a distinction for his dissertation), Marcin Cembrzynski (completed MSc in 2019).

Undergraduate/Masters interns: Jatin Arora (2018), Farzad Jafarrahmani (2016), Evan Asava Aree (2015–2016), and Aaron Ong (2015)

Services

PC chair and main conference/workshop organiser: (i) APLAS'19, (ii) MOSCA [Meeting On String Constraints and Applications] 2019 (co-organised by Loris D'Antoni and Philipp Rümmer) (iii) ICECCS'18 (co-chaired by Jun Sun) (iv) 6-week Workshop Series on Formal Verification at NUS Institute of Mathematical Sciences (2016) [co-chaired by C.H.- Luke Ong and jointly organised by Rajeev Alur, Mikolaj Bojanczyk, Jin Song Dong, Javier Esparza, Joxan Jaffar, Naoki Kobayashi, Marta Kwiatkowska, David Rosenblum, and Moshe Vardi], (v) INFINITY'16 (co-chaired by Matthew Hague)

PC member: LICS('18,'15), ICALP'17, FoSSaCS'17, VMCAI'19, ATVA'19, PPDP'19, APLAS'16, CAV'20, CAV'19 Verification Mentoring Workshop (Organization Committee Member), PSI('17,'15), INFINITY'13

Regular reviewers for: LICS, CAV, ICALP, LATA, JCSS, FSTTCS, MFCS, DLT, PODS, TACAS, Algorithmica, JCSS, FORMATS, TIME, STACS, CSL, FoSSaCS, CONCUR, ACM TODS, Information and Computation, and INFINITY.

Admin Roles at Colleges/Universities: Faculty Recruiting and Curricular Design Committees at Mathematical and Computational Sciences Division (Yale-NUS College), Governing Body Fellow (Kellogg College, Oxford), Member of IT Committee (Kellogg College, Oxford).

Examination at Oxford University: an assessor for four MSc dissertations in 2017, an assessor for DPhil Confirmation (Tim Zakian) in 2018

Selected Publications

CSS Minification via Constraint Solving, ACM Trans. Program. Lang. Sys. 41(2): 12:1–12:76 (2019). (with Matthew Hague and Chih-Duo Hong) [Journal-first publication presented at POPL'19]

Decision procedures for path feasibility of string-manipulating programs with complex operations, Proceedings of the ACM on Programming Languages (PACM), Vol. 3, POPL, 2019. (with Taolue Chen, Matthew Hague, Philipp Rümmer, and Zhilin Wu)

Quadratic Word Equations with Length Constraints, Counter Systems, and Presburger Arithmetic with Divisibility, Automated Technology for Verification and Analysis (ATVA), 2018. (with Rupak Majumdar)

String Constraints with Concatenation and Transducers Solved Efficiently, Proceedings of the ACM on Programming Languages (PACM), Vol. 2, POPL, 2018. (with Lukas Holik, Petr Janku, Philipp Ruemmer, and Tomas Vojnar)

What is Decidable About String Constraints with ReplaceAll Function, Proceedings of the ACM on Programming Languages (PACM), Vol. 2, POPL, 2018. (with Taolue Chen, Yan Chen, Matthew Hague, and Zhilin Wu)

Fair Termination for Probabilistic Concurrent Systems, Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 2017. (with Ondrej Lengal, Rupak Majumdar, and Philipp Ruemmer)

String Solving with Word Equations and Transducers: Towards a Logic for Analysing Mutation XSS, In Symposium on Principles of Programming Languages (POPL), 2016:123–136. (with Pablo Barcelo)

Liveness of Randomised Parameterised Systems under Arbitrary Schedulers, Computer Aided Verification (CAV), 2016:2:112–133 (with Philipp Ruemmer)

Expressive Languages for Path Queries over Graph-Structured Data, ACM Transactions on Database Systems 37(4):1–31, 2012. (with Pablo Barcelo, Leonid Libkin, and Peter Wood)

Model Checking Recursive Programs with Numerical Data Types, Computer Aided Verification (CAV) 2011: 743–759 (with Matthew Hague)

Parikh Images of Grammars: Complexity and Applications, IEEE Symposium on Logic in Computer Science (LICS) 2010: 80–89 (with Eryk Kopczynski) [LICS Kleene Award]

Algorithmic Metatheorems for Decidable LTL Model Checking over Infinite Systems, Foundation of Software Science and Computation Structures (FoSSaCS) 2010: 221–236 (with Leonid Libkin)

Recurrent Reachability Analysis in Regular Model Checking, International Conference on Logic for Programming Artificial Intelligence and Reasoning (LPAR) 2008: 198–213 (with Leonid Libkin)