XUAN-BACH LE

RESEARCH FELLOW
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EDUCATION

National University of Singapore Jan 2013 – Dec 2017
PhD in Computer Science
Thesis title: *Disjoint Fractional Permissions in Verification: Applications, Systems, and Theory*
Supervisor: Aquinas Hobor Advisor: Anthony W. Lin

National University of Singapore Aug 2007 – Jun 2012
Double Degrees in Computer Science & Mathematics
Specialization: Algorithms and Computation
First-class Honours

EXPERIENCE

Research Fellow, Nanyang Technological University, Singapore July 2023 – Now
Reinforcement Learning for AI. Devised optimal-preserving algorithms to translate LTL constraints for Reinforcement Learning into limit-average reward machines.

Research Scientist, Singapore Management University, Singapore Jan 2022 – Jan 2023
Formal methods for Program Verification.

Research Fellow, Nanyang Technological University, Singapore May 2019 – Dec 2021
Formalized mathematical reasoning frameworks to verify the correctness of complex systems that feature concurrency, quantum computation, and probabilities. Developed automatic verification tool ReGaSol and decision procedures from these frameworks.

Research Fellow, University of Oxford, UK Aug 2018 – Mar 2019
Algorithmic Verification of String-Manipulating Programs. Investigated the monadic decomposibility problem to decompose complex string constraints into simpler monadic constraints that are solvable. Proved the tight complexity bounds of the decomposibility problem for regular string constraints expressed by DFA and NFA.

Research Associate&Fellow, National University of Singapore, Singapore Sep 2017 – Aug 2018
Developed formal proof system and tool ShareInfer to handle tree share constraints that are used to model permissions in concurrent programs. Investigated methods for symbolic execution to verify programs with loops.

GOOGLE SCHOLAR

https://scholar.google.com.sg/citations?user=FnjHppEAAAAJ

SELECTED PUBLICATIONS

1. Xuan-Bach Le, Dominik Wagner, Leon Witzman, Alexander Rabinovich, Luke Ong. *Reinforcement Learning with LTL and ω-Regular Objectives via Optimality-Preserving Translation to Average Rewards.* To appear in NeurIPS 2024.
2. Xuan-Bach Le, Aquinas Hobor, Shang-Wei Lin. *PRISM: Probabilistic Reasoning Invoking Separation Methods.* Under review.

3. Xuan-Bach Le, Shang-Wei Li, Sun Jun, David Sanán. *A Quantum Interpretation of Separating Conjunction for Local Reasoning of Quantum Programs Based on Separation Logic* . In POPL, 2022.
4. Xuan-Bach Le, David Sanán, Sun Jun and Shang-Wei Lin. *Automatic Verification of Multi-threaded Programs by Inference of Rely-Guarantee Specifications.* In ICECCS, 2020.
5. Pablo Barceló, Chih-Duo Hong, Xuan-Bach Le, Anthony W. Lin, Reino Niskanen (alphabetical order). *Monadic Decomposability of Regular Relations.* In ICALP, 2019.
6. Xuan-Bach Le, Aquinas Hobor. *Reasoning over disjoint permissions.* In ESOP, 2018.
7. Xuan-Bach Le, Aquinas Hobor, Anthony W. Lin. *Complexity analysis of tree share operations.* In APLAS, 2018.
8. Xuan-Bach Le, Thanh-Toan Nguyen, Wei Ngan Chin, Aquinas Hobor. *A certified decision procedure for tree shares.* In ICFEM, 2017

TEACHING EXPERIENCE AND SERVICES

Teaching Assistant and Lab Assistant, National University of Singapore, Singapore 2009 – 2015
CS1231 (Discrete Maths, S1/11-12, S1/13-14), CS1010 (Programming Methodology, S1/10-11), CS1102/1020 (Data Structures I, S2/09-10, S2/10-11), CS3234 (Logic & Formal Systems, S1/10-11, S2/12-13)

Grader, Yale-NUS, Singapore Jan 2017 – May 2017

YCC1212 (Introduction to Computer Science, S2/16-17), YCC2202 (Data Structures & Algorithm, S2/16-17)

Professional Services. Program Committee Member of APLAS 2022. External reviewer of APLAS 2016, ICALP 2017, PLDI 2018, LICS 2018, APLAS 2018, VMCAI 2019.

SKILLS

Programming Languages and Frameworks

Basic:	Machine Learning (SVM, Probabilistic Prediction Network)
Intermediate:	Web Programming (JavaScript, PHP, HTML, MYSQL),
	Integer Programming, Constraint Solving (Z3)
Expert:	Coq, Java, C++, OCaml

Languages

Vietnamese: Mothertongue, English: Fluent, French: Basic Knowledge

AWARDS AND SCHOLARSHIPS

President Graduate Fellowship 2013 – 2017
ASTAR Pre-graduate Scholarship 2007–2012
NUS Donated Scholarship
Dean List Award 2007, 2008, 2010
Certificate of Special Program in Computing