

# NICK FENG

fengnick@cs.toronto.edu

## RESEARCH INTEREST

---

I am a PhD candidate at the University of Toronto in the Software Engineering group. I'm interested in automated reasoning, SAT, program analysis, and requirement verification.

## EDUCATION

---

**PhD. Computer Science** May 2020- Present  
University of Toronto  
Supervised by Marsha Chechik

**M.Sc. Computer Science** Sept 2018- April 2020  
University of Toronto  
Supervised by Marsha Chechik  
Title: Scaling Client-Specific Equivalence Checking via Impact Boundary Search

**B.Sc. Computer Science** Sept 2012 - May 2017  
Received Honours degree with high distinction  
University of Toronto

## INDUSTRIAL EXPERIENCE

---

**Applied Scientist Intern, Amazon, AWS Automated Reasoning Group** 2022 Summer  
Design and developed scalable network traffic compression and summarization algorithms to enable efficient offline security rule analysis.

**Applied Scientist Intern, Amazon, AWS Automated Reasoning Group** 2021 Summer  
Supported proof of unsatisfiability for the back-end satisfiability reasoning engine, MonoSAT, to enhance the overall trustworthiness of services relying on it.

**Software Engineer, IBM Canada** 2017-2018  
Developed Eclipse-based IDE features for Code Coverage and Profiling. Lead the development of branch code coverage for Java and COBOL

**Software Engineer Intern, IBM Canada,** 2015-2016  
Developed and maintained Eclipse-based IDE features for Java Code Coverage and Profiling

## PUBLICATIONS

---

- [1] **N. Feng**, L. Marsso, S. Getir Yaman, I. Standen, Y. Baatartogtokh, R. Ayad, V. Oldemburgo de Mello, B. Townsend, H. Bartels, A. Cavalcanti, R. Calinescu, M. Chechik, “Normative Requirements Operationalization with Large Language Models”, the 46th International Conference on Software Engineering (RE 2024)
- [2] **N. Feng**, L. Marsso, S. Yaman, B. Townsend, Y. Baatartogtokh, R. Ayad, V. Mello, Y. Kholodetskaya, I. Standen, I. Stefanakos, C. Imrie, G. Rodrigues, A. Cavalcanti, R. Calinescu, and M. Chechik, “Analyzing and Debugging Normative Requirements via Satisfiability Checking”, the 46th International Conference on Software Engineering (ICSE 2024, **distinguished paper**)
- [3] **N. Feng**, A. Hu, S. Bayless, S. Iqbal, P. Trentin, M. Whalen, L. Pike, and J. Backes, “DRAT Proofs of Unsatisfiability for SAT Modulo Monotonic Theories”, the 30th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2024)

- [4] **N. Feng**, L.Marsoo, M.Sabetzadeh, M.Chechik, “Early Verification of Legal Compliance via Bounded Satisfiability Checking”, the 35th International Conference on Computer Aided Verification (CAV 2023)
- [5] **N. Feng**, L.Marsoo, S. Yaman, B. Townsend, A. Cavalcanti, R. Calinescu, M.Chechik, “Towards a Formal Framework for Normative Requirements Elicitation”, the 38th IEEE/ACM International Conference on Automated Software Engineering (ASE 2023)
- [6] A. Wang, **N. Feng**, M.Chechik, “Code-Level Functional Equivalence Checking of Annotative Software Product Lines”, the 27th ACM International Systems and Software Product Line Conference (SPLC 2023)
- [7] M. Akhundov, F. Mora, **N. Feng**, V. Hui, M. Chechik, “Verification by Gambling on Program Slices”, the 19th International Symposium on Automated Technology for Verification and Analysis (ATVA 2021)
- [8] **N. Feng**, F. Mora, V. Hui, and M. Chechik, “Scaling Client-Specific Equivalence Checking via Impact Boundary Search”, the 35th IEEE/ACM International Conference on Automated Software Engineering (ASE 2020)
- [9] **N. Feng**, F. Bacchus, “Clause Size Reduction with all-UIP Learning”, 23rd International Conference on Theory and Applications of Satisfiability Testing (SAT 2020)

## AWARD AND SERVICES

---

- ICSE 2024 Distinguished Paper Award: Analyzing and Debugging Normative Requirements via Satisfiability Checking
- Amazon Research Award 2021: Unsatisfiability proofs for monotonic theories
- Co-reviewed research papers for Software Engineering and Formal Methods:
  - The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2023
  - International Conference on Formal Engineering Methods (ICFEM) 2023
  - International Conference on Fundamental Approaches to Software Engineering (FASE) 2023
  - The IEEE/ACM International Conference on Software Engineering (ICSE) 2023
  - The ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE) 2022
  - The 16th NASA Formal Methods Symposium (NFM) 2024

Member of Artifact Evaluation Committee for the 51st ACM SIGPLAN Symposium on Principles of Programming Languages (POPL) 2024

## SUMMER/WINTER SCHOOLS AND COMPETITIONS

---

**Cadical-trail and Cadical-alluip-trail won the planning track** at the SAT Competition 2020

R. Hickey, **N. Feng**, F. Bacchus

**Summer School Marktoberdorf 2023 on Safety and Security through Formal Verification**

August 2023, Marktoberdorf

**International Winter School on Verification, Model Checking, and Abstract Interpretation**

January 2020, New Orleans

## SKILLS

---

**Languages:** Mandarin (Native), English (Fluent)

**Programming:** Python, Java, C, C++, Racket, Haskell

**Technical frameworks and tools:**

- Reasoning engine: SAT/SMT solvers, CUDD (binary decision diagram), Rosette
- Program analysis: CBMC, SeaHorn, KLEE, Java, pycparser, JVM
- Model Checking: nuXmv, Spacer(Z3)
- Language support: textX, Antlr4

## MENTORSHIP

---

Master students: Alan (Shuolin) Wong

Undergraduate students: Muard Akhundov, Natalie Ashgriz, Yesugen Baatartogtokh, Ruotong Cheng, Andrew Feng, Yuliia Kholodetska, Vaskar Nath