Yu-Yang Lin

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I am currently a Research Fellow at Trinity College Dublin. My main interest is in formal methods, verification and programming languages. In particular, I am interested in the development of tools that automatically reason about programs, especially those written in higher-order languages.

EDUCATION

- **PhD Computer Science – Queen Mary University of London [2022] (Viva Passed: 2020[1])**
- **MSci Computer Science – University of Birmingham [2016] (First Class)**
- **BSc Computer Science – University of Birmingham [2014] (First Class)**
- **IB (International Baccalaureate) – Markham College [2011] (34/45)**
- **IGCSE – Markham College [2009] (8 A's out of 11 passes)**

WORK EXPERIENCE

2020/present – School of Computer Science and Statistics, Trinity College Dublin

- **Research Fellow** in the Software and Systems Discipline with a focus in Formal Methods
- **Project Titles (Primary or Co-Author in Proposal):**
  - **Lero:** Core Technology for Enabling Regression Verification in Concurrent Software **[SFI]**
  - **CISCO & EF:** Automated Relational Verification of Smart Contracts **[SVCF + EF + Lero]**
  - **Govt. of Ireland Postdoctoral Fellowship:** Equivalence Verification for Privacy in Erlang **[IRC]**

2016/19 – School of Electronic Engineering and Computer Science, Queen Mary University of London

- **Demonstrator** for Algorithms and Data Structures, Automata and Formal Languages, Functional Programming, Computer Systems and Networks, Introduction to Object-Oriented Programming, and Compilers. **Responsibilities:** occasional lecturing, interacting with students in labs and lectures, grading assignments, adding and checking questions for lab assignments, automation of testing and grading of software assignments.
- **Organising committee** for the conference Highlights of Logic, Games and Automata, London 2017.

2015 – College of Engineering and Physical Sciences, University of Birmingham

- **Demonstrator** for Foundations of Computer Science. **Responsibilities:** interacting with students in labs, workshop lecture, creating and checking model answers for assignments.
- **Paid internship**. Developed proof checker (https://github.com/LaifsV1/YUP).

2015 – King Edward VI Camp Hill School for Boys

- **Teacher assistant.** Taught Year 8 and 12 students. **Responsibilities:** collaborated with the teacher and independently developed and delivered lectures.

2010 – SINGRAF: *Engineering for the Advertising Industry*

- Worked with CAD/CAM software and machines, and managed spreadsheets.

1 Graduation Ceremony and Award delayed due to COVID19

PUBLICATIONS AND SCHOLARLY WORK

- **Publications (refereed)**
  - Koutavas, Lin, Tzevelekos. "Pushdown Normal-Form Bisimulation: A Nominal Context-Free Approach to Program Equivalence", LICS 2024.
  - Koutavas, Lin, Tzevelekos. "Fully Abstract Normal Form Bisimulation for Call-by-Value PCF", LICS 2023. **Awarded *Distinguished Paper*. Invited for publication at the JACM (submitted).**
  - Koutavas, Lin, Tzevelekos. "From Bounded Checking to Verification of Equivalence via Symbolic Up-to Techniques", TACAS 2022.
  - Lin, Tzevelekos. "Symbolic Execution Game Semantics" FSCD 2020.
  - Lin, Tzevelekos. "A Bounded Model Checking Technique for Higher-Order Programs", SETTA 2019.
- **Theses**
  - **PhD:** "Bounded Verification of Higher-Order Stateful Programs", Queen Mary University of London, School of Electronic Engineering and Computer Science, 2021.
  - **MSci:** "Compiler Optimisations for High-Level Synthesis", University of Birmingham, College of Engineering and Natural Sciences, 2016.
- **Technical Reports and Non-refereed Articles**
  - Koutavas, Lin, Tzevelekos. "Pushdown Normal-Form Bisimulation: A Nominal Context-Free Approach to Program Equivalence", arXiv 2023.
  - Koutavas, Lin, Tzevelekos. "There and Back Again: From Bounded Checking to Verification of Program Equivalence via Symbolic Up-to Techniques", arXiv 2021
  - Lin, Tzevelekos. "Higher-Order Bounded Model Checking", arXiv 2018.
- **Presentations at Conferences, Symposia and Workshops (excluding those for publication)**
  - Koutavas, Lin, Tzevelekos. "From Bounded Checking to Verification of Equivalence via Symbolic Up-to Techniques (Extended Abstract)", PERR 2022.
  - Koutavas, Lin, Tzevelekos. "Hobbit: A Tool for Contextual Equivalence Checking Using Bisimulation Up-to Techniques", ML Workshop (ICFP) 2021.
  - Lin. "A Bounded Model Checking Technique for Higher-Order Programs", invited talk, IMDEA 2019.
  - Lin, Tzevelekos. "A Framework for Compositional Model Checking", GaLoP (ETAPS) 2019.

RESEARCH TOOLS DEVELOPED & CONTRIBUTIONS TO CODEBASES

- **Hobbit-PDNF** (github.com/LaifsV1/Hobbit-PDNF): Pushdown version of Hobbit (OCaml)
- **pcfeq** (github.com/LaifsV1/pcfeq): Equivalence Checking tool (OCaml)
- **Hobbit** (github.com/LaifsV1/Hobbit): Equivalence Checking tool (OCaml)
- **HOLiK** (github.com/LaifsV1/HOLiK): Safety Verification tool (K)
- **BMC-2** (github.com/LaifsV1/BMC-2): Safety Verification tool (OCaml)
- **YUP** (github.com/LaifsV1/YUP): Proof Checking tool (OCaml)
- **GOS compiler** (www.veritygos.org/): High-Level Synthesis compiler for Verity

OTHER PROJECTS

- **2x2x3 Simulator** (github.com/LaifsV1/2x2x3-Simple-Simulator): simulator for 2x2x3 puzzle cube
- **Countdown Solver** (github.com/LaifsV1/CountdownSolver): *Countdown Numbers Round* solver
- **C4** (github.com/LaifsV1/C4): interpreter for esoteric language based on a 4-counter machine

SKILLS

- **Main Programming Languages:** OCaml, Java, Python, Haskell
- **Verification and Proof Languages:** Agda, PROMELA, K, SMT-LIB (e.g. Z3)
- **Web Programming:** XHTML, CSS, JavaScript, MySQL
- **Other Programming Languages:** C/C++, MATLAB, CUDA, Racket (Lisp), EVM Yul
- **Natural Languages:** fluent English and Spanish, and spoken Mandarin
- **Music:** I play guitar, piano and violin (LCM – grade 6 piano and violin, 2008)