

GEORGE PÎRLEA

george@pirlea.net

RESEARCH INTERESTS

Formal verification, distributed systems, automated reasoning, programming languages

EDUCATION

National University of Singapore

PhD Computer Science

Aug 2020 - ongoing

Singapore, SG

- Advised by Ilya Sergey at the NUS School of Computing
- Working at the intersection of programming languages and distributed systems

University College London

MEng Computer Science

Sep 2015 - Jun 2019

London, UK

- Degree classification: *First-Class Honours* (81 out of 100)
- Master's thesis: *Toychain: Formally Verified Blockchain Consensus*

RESEARCH EXPERIENCE

Stellar Development Foundation

Research Intern

Oct 2023 - Dec 2023

Remote

- Worked with Giuliano Losa on decidable reasoning for smart contracts
- Developed Ivy models of token & liquidity pools contracts and mypyvy to Ivy translation

Zilliqa Research Pte

Researcher

Oct 2019 - Jul 2020

London, UK

- Developed a smart contract sharding strategy based on static analysis
- Published at PLDI 2021; developed prototype integrating with Zilliqa blockchain

Max Planck Institute for Software Systems

Research Intern (Foundations of Programming)

Jun-Sep 2019

Saarbrücken, DE

- Formalised in-memory pinning in the λ_{Rust} semantic type system
- Verified the correctness of the `std::pin` module in the Rust standard library
- Used the Iris concurrent separation logic; supervised by Derek Dreyer and Ralf Jung

Microsoft Research Ltd

Research Intern (Confidential Computing)

Jun-Aug 2018

Cambridge, UK

- Developed F* formalisation of the Coco enterprise blockchain framework
- Proved sequential consistency for the formal model; supervised by Christoph Wintersteiger
- Found critical concurrency-related safety bug in the Coco C++ implementation

UCL Computer Science

Research Intern (Programming Principles, Logic, and Verification)

Jul-Sep 2017

London, UK

- Formalised and verified a parametric blockchain consensus protocol in Coq
- Joint paper with supervisor Ilya Sergey accepted at CPP 2018

PUBLICATIONS

1. Vladimir Gladshstein, **George Pîrlea**, Ilya Sergey. [Small Scale Reflection for the Working Lean User](#). *Under submission*.

2. Qiyuan Zhao, **George Pîrlea**, Zhendong Ang, Umang Mathur, and Ilya Sergey. [Rooting for Efficiency: Mechanised Reasoning about Array-Based Trees in Separation Logic](#). In *Proceedings of the 13th ACM SIGPLAN International Conference on Certified Programs and Proofs (CPP 2024)*. January 2024. ACM. (**Distinguished Paper Award**)
3. Ruijie Meng*, **George Pîrlea***, Abhik Roychoudhury, and Ilya Sergey. [Greybox Fuzzing of Distributed Systems](#). In *Proceedings of the 2023 ACM SIGSAC Conference on Computer and Communications Security (CCS 2023)*. November 2023. ACM.
4. Yasunari Watanabe, Kiran Gopinathan, **George Pîrlea**, Nadia Polikarpova, and Ilya Sergey. [Certifying the Synthesis of Heap-Manipulating Programs](#). In *Proc. ACM Program. Lang. 5 (ICFP 2021)*. August 2021. ACM.
5. **George Pîrlea**, Amrit Kumar, and Ilya Sergey. [Practical Smart Contract Sharding with Ownership and Commutativity Analysis](#). In *42nd ACM SIGPLAN International Conference on Programming Language Design and Implementation (PLDI 2021)*. June 2021. ACM.
6. **George Pîrlea** and Ilya Sergey. [Mechanising Blockchain Consensus](#). In *7th ACM SIGPLAN International Conference on Certified Programs and Proofs (CPP 2018)*. Los Angeles, CA, USA, January 2018. ACM.

* – joint first author

ACADEMIC SERVICE

1. External reviewer for *Object-Oriented Programming, Systems, Languages and Applications 2023 (OOPSLA 2023)*
2. Student volunteer at ESEC/FSE 2022 (Singapore) and SPLASH 2022 (Auckland, NZ)
3. External reviewer for *10th ACM SIGPLAN International Conference on Certified Programs and Proofs (CPP 2021)*
4. Program Committee member for *NUS Computer Science Research Week August 2021*
5. Program Committee member for *4th ACM SIGPLAN Symposium on Principles of Programming Languages Artifact Evaluation (POPL 2021 AE)*
6. External reviewer for *18th Asian Symposium on Programming Languages and Systems (APLAS 2020)*
7. External reviewer for *9th ACM SIGPLAN International Conference on Certified Programs and Proofs (CPP 2020)*
8. Co-organiser of *ICFP Programming Contest 2019*: 143 teams from 25 countries participated

OTHER

- I maintain a popular list of [errors found in distributed protocols](#).