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Summary

I obtained a PhD in Software Engineering from the School of Computer Science at UTS and have completed one year of postdoc research at UNSW. My academic focus encompasses **formal languages, compiler theory, and program analysis**. Noteworthy achievements include publications in top-tier international conferences such as PLDI, OOPSLA, and SAS, where he received awards such as the **SAS Best Paper**. I have over 5 years of experience in C/C++ programming, with an open-source CFL-reachability analysis tool called **POCR**, honored by the **ACM SIPLAN Distinguished Artifact Award**. I also serves as a developer and maintainer for the open-source C/C++ pointer analysis tool **SVF** (GitHub 1.3k star).

Employment History

2023 – 2024 📌 **Postdoc Fellow**, University of New South Wales, NSW, Australia.

Education

2018 – 2023 📌 **Ph.D. in Software Engineering**, University of Technology Sydney, NSW, Australia.
Thesis title: *Improving the Efficiency of Graph-Based Static Analysis*.

Skills

Programming 📌 C/C++, CMake, Linux, Clang, LLVM, Git, Docker, SQL, Python, Matlab, \LaTeX .
Knowledge 📌 Formal language, compiler theory, program analysis.
Misc. 📌 Academic research, supervision, technical writing, \LaTeX typesetting and publishing.


Awards

2022 📌 ACM SIPLAN Distinguished Artifact Award.
2019 📌 Radhia Cousot Young Researcher Best Paper Award








Projects

2020 – now 📌 **Creator** and **developer** of the CFL-reachability analysis tool **POCR** (C++, <https://github.com/kisslune/POCR>). The artifact was honored with the **ACM SIPLAN 2022 Distinguished Artifact Award**. Four papers were accepted and published in top-tier international conferences PLDI (Core A*) and OOPSLA (Core A) based on this tool.
2018 – now 📌 **Developer** and **maintainer** of the C/C++ pointer analysis tool **SVF** (C++, <https://github.com/SVF-tools/SVF>, 1.3k stars). Based on the tool, 18 papers were accepted and published in top-tier international conferences (Core A*/A) on software engineering.
2023 – now 📌 **Member** of the U.S. NSF project *Program Analysis with Precise Abstractions*. In charge of the optimization and simplification of the abstract models of programs.

Projects (continued)

2022 – now  **Member** of the ARC project *Learning Software Security Analysers with Imperfect Data*. In charge of optimizing the performance (in both time and memory usages) of the analysers.

Research Publications

- 1 **Y. Lei**, C. Bossut, Y. Sui, and Q. Zhang, “Context-free language reachability via skewed tabulation,” *Proceedings of the ACM on Programming Languages*, vol. 8, PLDI 2024.  DOI: [10.1145/3656451](https://doi.org/10.1145/3656451).
- 2 P. Xu, **Y. Lei***, Y. Sui, and J. Xue, “Iterative-epoch online cycle elimination for context-free language reachability,” *Proceedings of the ACM on Programming Languages*, vol. 8, pp. 1437–1462, OOPSLA1 2024.  DOI: [10.1145/3649862](https://doi.org/10.1145/3649862).
- 3 **Y. Lei**, Y. Sui, S. H. Tan, and Q. Zhang, “Recursive state machine guided graph folding for context-free language reachability,” *Proceedings of the ACM on Programming Languages*, vol. 7, pp. 318–342, PLDI 2023.  DOI: [10.1145/3591233](https://doi.org/10.1145/3591233).
- 4 **Y. Lei**, Y. Sui, S. Ding, and Q. Zhang, “Taming transitive redundancy for context-free language reachability,” *Proceedings of the ACM on Programming Languages*, vol. 6, pp. 1556–1582, OOPSLA2 2022.  DOI: [10.1145/3563343](https://doi.org/10.1145/3563343).
- 5 **Y. Lei** and Y. Sui, “Fast and precise handling of positive weight cycles for field-sensitive pointer analysis,” *Static Analysis: 26th International Symposium, SAS 2019, Porto, Portugal, October 8–11, 2019, Proceedings 26*, pp. 27–47, 2019.  DOI: [10.1007/978-3-030-32304-2_3](https://doi.org/10.1007/978-3-030-32304-2_3).
- 6 J. Gou, **Y. Lei**, W. Guo, C. Wang, Y. Cai, and W. Luo, “A novel improved particle swarm optimization algorithm based on individual difference evolution,” *Applied Soft Computing*, vol. 57, pp. 468–481, 2017.  DOI: [10.1016/j.asoc.2017.04.025](https://doi.org/10.1016/j.asoc.2017.04.025).
- 7 **Y. Lei**, J. Gou, C. Wang, W. Luo, and Y. Cai, “Improved differential evolution with a modified orthogonal learning strategy,” *IEEE Access*, vol. 5, pp. 9699–9716, 2017.  DOI: [10.1109/ACCESS.2017.2705019](https://doi.org/10.1109/ACCESS.2017.2705019).