Yusuke Izawa

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Current position

PhD Candidate, Department of Mathematical and Computing Science, Tokyo Institute of Technology【東京工業大学 情報理工学院 数理・計算科学系 博士課程】

Areas of specialisation

Computer Science; Programming Language【計算機科学, プログラミング言語】

Work experience

2018-2019	Recruit Marketing Partners, Inc., Software Engineer, Self-employment.
2018	Cookpad, Inc., Software Engineer, Internship. (Won **2nd Place**)
2016-2017	FOLIO, Inc., Software Engineer, Internship.
2016-2017	KADOKAWA, Inc., Software Engineer, Internship.
2015-2016	Summaly, Inc., Software Engineer, Internship.

Education

2020	MSc in Mathematical and Computing Science, Tokyo Institute of Technology.
2018	BSc in Mathematical and Computing Science, Tokyo Institute of Technology.

Grants, honours & awards

2021.4–2023.3 **Research Fellowship for Young Scientists (JSPS DC2)【日本学術振興会特別研究員 DC2】.**
Fellowship from the Japan Society for the Promotion of Science (JSPS), covering living expenses. Research expenses covered by KAKENHI (科研費).

2020.11–2023.3 **JST ACT-X.**
Research expenses covered by Japan Science and Technology Agency (JST).

2020.4–2021.3 **Tokyo Tech Tsubame Scholarship for Doctoral Students【東京工業大学 つばめ博士学生奨学金】.**
Tokyo Tech's scholarship for doctoral students, covering living expenses.

2019.4 **2nd Place, Graduate Category, ACM Student Research Competition,** ***Association for Computing Machinery.*** [⋆]

2019.4 **Travel Grants by Information Science Incentive Fund【情報科学奨励基金】.**
Covered by dept. of mathematical and computing science, Tokyo Tech.

2014.4–2018.3 **Scholarship by the Showa Scholarship Foundation 【昭和奨学会奨学金】.**
Japanese scholarship by Showa Scholarship Foundation (昭和奨学会), covering living expenses.

Publications & talks

Peer-reviewed

2020 Hidehiko Masuhara, Shusuke Takahasi, Yusuke Izawa, and Youyou Cong. Toward a Multi-Language and Multi-Environment Framework for Live Programming. Proceedings of the LIVE 2020 Workshop co-located with SPLASH 2020. November 2020. (to appear)

2020 Yusuke Izawa, and Hidehiko Masuhara. Amalgamating Different JIT Compilations in a Meta-tracing JIT Compiler Framework. Proceedings of the 16th ACM SIGPLAN International Symposium on Dynamic Languages (DLS'20). November 2020. 15 pages. (to appear)

2019 Yusuke Izawa, Hidehiko Masuhara, and Tomoyuki Aotani. 2019. Extending a meta-tracing compiler to mix method and tracing compilation. In Proceedings of the Conference Companion of the 3rd International Conference on Art, Science, and Engineering of Programming (Programming '19). ACM, New York, NY, USA, Article 5, 1 – 3. DOI : https://doi.org/10.1145/3328433.3328439

2019 Yusuke Izawa. BacCaml : the meta-hybrid just-in-time compiler. In Proceedings of the Conference Companion of the 3rd International Conference on Art, Science, and Engineering of Programming (Programming '19). ACM, New York, NY, USA, Article 32, 1 – 3. DOI :https://doi.org/10.1145/3328433.3328466 (**Awarded** [⋆])

Non-peer-reviewed

2020 高橋修祐, 伊澤侑祐, 増原英彦. ライブプログラミング環境は多言語化/多開発環境化の夢を見るか. The 37th JSSST Anual Conference. Japan Society for Software Science and Technology (JSSST'20). No. 69. September 2020. Poster presentation (in Japanese).

2020 Yusuke Izawa. Toward Hybrid Compilation in a Practical Meta-tracing JIT Compiler. PLMW : Programming Language Mentoring Workshop co-located with 41st ACM SIGPLAN Conference on Programming Language Design and Implementation (PLDI'20). June 2020. Short talk.

2020 Yusuke Izawa, and Hidehiko Masuhara. Making different JIT compilations dancing to the same tune, acting in the meta-level. The 22nd JSSST Workshop on Programming and Programming Languages (PPL '20), March 2020. Poster presentation.

2019 Yusuke Izawa, Hidehiko Masuhara, Tomoyuki Aotani, and Youyou Cong. A stack hybridization for meta-hybrid just-in-time compilation. In Kei Ito, editor, Proceedings of the 36th JSSST Annual Conference, pages No. 2 – L. Japan Society for Software Science and Technology (JSSST'19), August 2019.

2018 伊澤侑祐, 増原英彦, 青谷知幸. メタ混合 JIT コンパイラの提案. The 20nd JSSST Workshop on Programming and Programming Languages (PPL '18), March 2018. Poster presentation (in Japanese).

Teaching

2020 (4Q)	Programming II, Tokyo Institute of Technology, Teaching Assistant
2019 (1Q)	Programming II, Tokyo Institute of Technology, Teaching Assistant
2019 (1Q)	Introduction to Computer Science, Tokyo Institute of Technology, Teaching Assistant
2018 (3Q)	Programming I, Tokyo Institute of Technology, Teaching Assistant
2018 (1Q)	Information Literacy 1, Tokyo Institute of Technology, Teaching Assistant

Academic services

2020	Member of Student Volunteer, SPLASH 2020, November 2020.
2020	Co-reviewer of Onward! Essays, SPLASH 2020, November 2020.
2020	Candidate of Programming Language Mentoring Workshop, PLDI 2020, June 2020.
2019	Member of Student Volunteer, Programming 2019, April 2019.

Projects

BacCaml (source code at GitHub)

Trace-based compilation and method-based compilation are two major compilation strategies in JIT compilers. In general, the former excels in compiling programs with deeper method calls and more dynamic branches, while the latter is suitable wide range of programs.

This project aims at developing fundamental mechanism for compiling with both trace-based and method-based strategies. Instead of developing a compiler for one particular language, we provide such a mechanism in a meta-compilation framework, which generates a virtual machine with a JIT compiler from an interpreter definition of a programming language.

We are developing the BacCamel meta-compiler framework as a proof-of-concept, which is based on the MinCaml compiler.

Poly^2 Kanon (source code at GitHub)

Kanon is a live programming environment that automatically and instantly visualizes runtime data-structures while the programmer is editing a program. Our goal is to have all languages running on top of Kanon and to make the program run fast.