

Yusuke Izawa, Ph.D. student, PyPy Contributor

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Education

- 2020-now 📌 **Ph.D. Mathematical and Computing Science, Tokyo Institute of Technology.** (GPA 3.49)
- 2018-2020 📌 **M.Sc. Mathematical and Computing Science, Tokyo Institute of Technology.**
Thesis title: *Stack Hybridization: A Mechanism for Bridging Two Compilation Strategies in a Meta Compiler Framework*
- 2014-2018 📌 **B.Sc. Mathematical and Computing Science, Tokyo Institute of Technology.**
Thesis title: *BacCaml: A Meta-JIT Compiler Based on Both Tracing and Method JIT Compilations*

Employment History

- 2021.08 – 2021.10 📌 IBM Research – Tokyo, Research Internship (Paid).
- 2021.04 – 2023.3 📌 JSPS Research Fellow (DC2).
- 2020.11 – 2023.3 📌 Tokyo Institute of Technology, Dept. of Math. and Comp., Research Assistant.
- 2018.6 – 2019.2 📌 Recruit Marketing Partners, Inc., Software Engineer, Self-employment.
- 2018.8 📌 Cookpad, Inc., Software Engineer, Internship (**Won 2nd Place**, Paid).
- 2017.4 – 2018.3 📌 FOLIO, Inc., Software Engineer, Internship (Paid).
- 2016.8 – 2017.3 📌 DOWANGO, Inc., Software Engineer, Internship (Paid).
- 2016.1 – 2016.6 📌 Summaly, Inc., Software Engineer, Internship (Paid).

Grants, Honours and Scholarships

- 2021 📌 **Research Fellowship for Young Scientists (JSPS DC2).** Fellowship from the Japan Society for the Promotion of Science (JSPS), covering living expenses. Research expenses covered by KAKENHI.
- 2020 📌 **JST Strategic Basic Research Programs ACT-X.** Research expenses covered by Japan Science and Technology Agency (JST).
- 📌 **Tokyo Tech Tsubame Scholarship for Doctoral Students.** Covering living expenses.
- 2019 📌 **Travel Grants by Information Science Incentive Fund.** By dept. of mathematical and computing science, Tokyo Tech.
- 📌 **2nd Place, Graduate Category, ACM Student Research Competition, Association for Computing Machinery.** [*]
- 2014 📌 **Scholarship by the Showa Scholarship Foundation.** Covering living expensed by Showa Scholarship Foundation.

Selected Publications and Talks

Journal

- 1 Yusuke Izawa, Hidehiko Masuhara, Carl Friedrich Bolz-Tereick, and Youyou Cong. “Threaded Code Generation with a Meta-Tracing JIT Compiler.” In: *Journal of Object Technology* (2022), 2:1–11. ISSN: 1660-1769. 🌐DOI: 10.5381/jot.2022.21.2.a1. arXiv: 2106.12496.

- 2 Shusuke Takahashi, Yusuke Izawa, Hidehiko Masuhara, and Youyou Cong. “An approach to collect object graphs for data-structure live programming based on a language implementation framework.” In: *Journal of Information Processing* 30 (2022), pp. 451–463. [DOI: 10.2197/ipsjip.30.451](https://doi.org/10.2197/ipsjip.30.451).




Conference Proceedings

- 1 Yusuke Izawa, Hidehiko Masuhara, and Carl Friedrich Bolz-Tereick. “Two-level Just-in-Time Compilation with One Interpreter and One Engine.” In: *The ACM SIGPLAN Workshop on Partial Evaluation and Program Manipulation*. PEPM 2022. Virtual, Jan. 17, 2022. arXiv: 2201.09268. [URL: https://popl22.sigplan.org/details/pepm-2022-papers/3/Two-level-Just-in-Time-Compilation-with-One-Interpreter-and-One-Engine](https://popl22.sigplan.org/details/pepm-2022-papers/3/Two-level-Just-in-Time-Compilation-with-One-Interpreter-and-One-Engine).
- 2 Yusuke Izawa and Hidehiko Masuhara. “Amalgamating Different JIT Compilations in a Meta-Tracing JIT Compiler Framework.” In: *Proceedings of the 16th ACM SIGPLAN International Symposium on Dynamic Languages*. DLS 2020. Virtual, USA: Association for Computing Machinery, Nov. 17, 2020, pp. 1–15. ISBN: 9781450381758. [DOI: 10.1145/3426422.3426977](https://doi.org/10.1145/3426422.3426977).
- 3 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 2019. Genova, Italy: Association for Computing Machinery, Apr. 2, 2019, pp. 1–3. ISBN: 9781450362573. [DOI: 10.1145/3328433.3328466](https://doi.org/10.1145/3328433.3328466).
- 4 Yusuke Izawa, Hidehiko Masuhara, and Tomoyuki Aotani. “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 2019. Genova, Italy: Association for Computing Machinery, Apr. 2, 2019, pp. 1–3. ISBN: 9781450362573. [DOI: 10.1145/3328433.3328439](https://doi.org/10.1145/3328433.3328439).









Talk

- 1 Yusuke Izawa and Hidehiko Masuhara. *Taming an Interpreter for Threaded Code Generation with a Tracing JIT Compiler*. The 17th Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS 2022). Berlin, Germany, June 7, 2022. [URL: https://2022.ecoop.org/home/ICOOOLPS-2022](https://2022.ecoop.org/home/ICOOOLPS-2022).
- 2 Shusuke Takahashi, Yusuke Izawa, Hidehiko Masuhara, and Youyou Cong. *Efficient Object Graph Recording with Truffle for Live Data-Structure Programming*. Truffle/GraalVM Languages Workshop (Truffle 2022). Berlin, Germany, June 7, 2022. [URL: https://2022.ecoop.org/home/truffle-2022](https://2022.ecoop.org/home/truffle-2022).
- 3 Yusuke Izawa, Hidehiko Masuhara, Carl Friedrich Bolz-Tereick, and Youyou Cong. *Threaded Code Generation with a Meta-tracing JIT Compiler*. The 16th Workshop on Implementation, Compilation, Optimization of Object-Oriented Languages, Programs and Systems (ICOOOLPS 2021). Virtual, July 13, 2021. arXiv: 2106.12496v4. [URL: https://conf.researchr.org/track/ecoop-issta-2021/ecoop-issta-2021-icoolps](https://conf.researchr.org/track/ecoop-issta-2021/ecoop-issta-2021-icoolps).






Selected Projects

- 2021-  **Adaptive RPython.** This project lets the RPython framework do an adaptive compilation, which can select an appropriate compilation strategy depending on a runtime situation.
- 2020-  **Poly2Kanon.** Kanon is a live programming environment that can visualize data structures while editing code. Poly2Kanon aims to extend Kanon to support multi-language and multi-environment features.
- 2019-2020  **BacCaml.** It is a simple meta-tracing compiler framework, which can perform trace- and method-based compilations. It implements RPython-like tracing compilation by extending the MinCaml compiler.




Selected Academic Services

- 2023  Program Committee, ICCQ 2023.
- 2022  Artifact Evaluation Committee, The Programming Journal, Volume 7.
- 2021  Artifact Evaluation Committee, PACT 2021.
  Artifact Evaluation Committee, ECOOP 2021.
- 2020  Member of Student Volunteer, SPLASH 2020.
  Co-reviewer of Onward! Essays, SPLASH 2020.
  External reviewer of Scala Symposium, ECOOP 2020.
- 2019  Member of Student Volunteer, Programming 2019.

Teaching

- 2020  Programming II, Tokyo Institute of Technology, Math. and Comp. Science, TA.
- 2019  Programming II, Tokyo Institute of Technology, Math. and Comp. Science, TA.
  Introduction to Computer Science, Tokyo Institute of Technology, TA.
- 2018  Programming II, Tokyo Institute of Technology, Math. and Comp. Science, TA.
  Information Literacy I, Tokyo Institute of Technology, TA.

Skills

- Languages  English (fluent), Japanese (native)
- Coding  OCaml (S), Scala (S), Python (S), C (A), Java (A), Ruby (A), Shell (A), R (B), SQL (C), \LaTeX (SS)
- Misc.  Academic research, teaching, training, consultation, \LaTeX typesetting and publishing.