# Takaaki FUKAI

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## Summary

I received my Ph.D. from the department of computer science, University of Tsukuba in 2018, after obtaining a B.Eng. from Okayama University in 2013. Since January 2020, I have been postdoctoral research at RIKEN Center of Computational Science. Before that, I worked for IBM Japan as a software developer. My research interest centers on how to improve serviceability and security of computer systems without OS-modification and virtualization overhead, by exploiting thin-hypervisor. One of my important works is that I proposed a live migration scheme that works without OS modification and device virtualization.

## Affiliation

- Postdoctral researcher in High Performance Big Data Research Team,
  RIKEN Center of Computational Science (R-CCS)
- Visited Researcher at Information Technology Center, The University of Tokyo

## Research and Work Experience

- January 2020-Current: **Postdoctral researcher**
  *High Performance Big Data Research Team RIKEN Center of Computational Science*
  I am engaged in research about high-performance computing with next-generation hardware.
- June 2019-Current: **Visited Researcher**
  *Information Technology Center, The University of Tokyo*
  I am engaged in research about VMM live refreshing with on-demand nested virtualization [4].
- April 2018-December 2019: **Software Developer**
  *IBM Japan*
  I was engaged in the development of a web application, a SaaS cloud service, and a private cloud production.

## Education

- September 2018: **Doctor of Philosophy in Engineering, University of Tsukuba**
  Supervisor: Professor Kazuhiko Kato
- March 2015: **Master of Engineering, University of Tsukuba**
  Supervisor: Professor Kazuhiko Kato
- March 2013: **Bachelor of Engineering, Okayama University**
  Supervisor: Professor Hideo Taniguchi

## Award

- **IEEE Computer Society Japan Chapter Young Author Award 2019**.
  IEEE Computer Society Tokyo/Japan Joint Chapter, December 2019.

- **Best Paper Award**.
  The 10th IEEE International Conference on Cloud Computing Technology and Science, December 2018.

- **Best Paper Award**.
  The 8th IEEE/ACM International Conference on Utility and Cloud Computing, December 2015.

## Publications

### Journal Paper

[1] Takaaki Fukai, Takahiro Shinagawa, Kazuhiko Kato.
**Live Migration in Bare-metal Clouds.**
IEEE Transactions on Cloud Computing, Jul 2018.
(Open Access: `https://ieeexplore.ieee.org/document/8401692`)

### International Conference/Workshop Papers (Refereed)

[2] Takaaki Fukai, Satoru Takekoshi, Kohei Azuma, Takahiro Shinagawa and Kazuhiko Kato.
**BMCArmor: A Hardware Protection Scheme for Bare-Metal Clouds.**
In Proceedings of the 9th IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2017), Dec 2017.

[3] Takaaki Fukai, Yushi Omote, Takahiro Shinagawa, and Kazuhiko Kato.
**OS-Independent Live Migration Scheme for Bare-metal Clouds.**
In Proceedings of the 8th IEEE/ACM International Conference on Utility and Cloud Computing (UCC 2015), Dec 2015.
**[Best paper award]**.

### International Conference/Workshop Posters (Refereed)

[4] Ryosuke Yasuoka, Takaaki Fukai and Takahiro Shinagawa.
**Toward On-demand Nested Virtualization for Live-Refreshing Cloud Systems**.
The Fifteenth EuroSys Conference 2020 (EuroSys '20), poster, April, 2020 (To be appear).

[5] Takaaki Fukai, Yushi Omote, Takahiro Shinagawa, and Kazuhiko Kato.
**Live Migration of Bare-metal Instances**.
5th Asia-Pacific Workshop on Systems (APSys 2014), June, 2014

## Other publications

[6] Masanori Misono, Masahiro Ogino, Takaaki Fukai, Takahiro Shinagawa.
**FaultVisor2: Testing Hypervisor Device Drivers against Real Hardware Failures.**
In Proceedings of the 10th IEEE International Conference on Cloud Computing Technology and Science (CloudCom 2018), Dec 2018.

(Acceptance Ratio: 19.8%) **[Best paper award]**.

[7] Iori Yoneji, Takaaki Fukai, Takahiro Shinagawa and Kazuhiko Kato.
**Unified Hardware Abstraction Layer with Device Masquerade.**
In Proceedings of the 33rd ACM Symposium On Applied Computing (ACM SAC 2018), Apr 2018.

[8] Ilias Avramidis, Michael Mackay, Posco Tso, Takaaki Fukai, Takahiro Shinagawa.
**Live Migration on ARM-based Micro-datacentres.**
In Proceedings of the 3rd Workshop on Edge Computing (EdgeCom 2018), Jan 2018.

## Skills

- **Research Expertise**
  Thin-hypervisor, Virtualization, Operating systems, Firmware security, IaaS Clouds
- **Technical Expertise**
  Intel VT-x, PC-architecture low-level programming, Device driver, Linux kernel, QEMU/KVM
- **Software service development skills (Technical experience as software developer)**
  Docker, Kubernetes, CI/CD, Microservice architecture, Software test
- **Software Programming Skills**
  C language(10+ years), x86 assembly, Shell script, Python, Java (Include Android application), TypeScript
- **Platforms**
  Linux, Mac, Windows
- **Languages**
  Japanese(Native), English(Intermediate)

## Research Activities

**April 2020-Current** Editorial Board Member of IPSJ Transactions on Advanced Computing Systems (ACS)

**April 2020-Current** Steering Committee Member of IPSJ Special Interest Group on System Software and Operating Systems (SIGOS)

## Other Information

**Profile page** `https://fukai-t.github.io/profile-page/`

**ResearchGate** `https://www.researchgate.net/profile/Takaaki_Fukai`

**Linkedin** `https://www.linkedin.com/in/takaaki-fukai-b378a7141/`