

Hiroshi Sasaki

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RESEARCH INTERESTS

Computer Architecture, Computer Security, Computer Systems, Workload Characterization

PROFESSIONAL EXPERIENCE

- Tokyo Institute of Technology** Apr. 2020 — Present
Associate Professor, Department of Information and Communications Engineering
- Tier IV, Inc.** Apr. 2019 — Present
Consultant
- Columbia University** Apr. 2016 — Mar. 2020
Associate Research Scientist, Department of Computer Science (Apr. 2016 — Mar. 2020)
Visiting Research Scientist, Department of Computer Science (Apr. 2014 — Mar. 2016)
- IBM T.J. Watson Research Center** July 2013 — Mar. 2014
Visiting Research Scientist, Reliability- and Power-Aware Microarchitectures Group
- Kyushu University** Aug. 2011 — Mar. 2014
Research Associate Professor, Department of Advanced Information Technology
- The University of Tokyo** Apr. 2008 — July 2011
Research Assistant Professor, Department of Information Physics and Computing (Apr. 2010 — July 2011)
Research Assistant Professor, Research Center for Advanced Science and Technology (Apr. 2008 — Mar. 2010)

EDUCATION

- The University of Tokyo**, PhD in Engineering Mar. 2008
- The University of Tokyo**, Master of Information Science and Technology Mar. 2005
- The University of Tokyo**, Bachelor of Engineering Mar. 2003

PUBLICATIONS

Conference papers

- [C1] Keisuke Nishimura, Takahiro Ishikawa, Hiroshi Sasaki, Shinpei Kato. RAPLET: demystifying publish/subscribe latency for ROS applications. In *Proceedings of the 27th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*, 2021.
- [C2] Hiroshi Sasaki, Miguel A. Arroyo, M. Tarek Ibn Ziad, Koustubha Bhat, Kanad Sinha, Simha Sethumadhavan. Practical byte-granular memory blacklisting using Califorms. In *Proceedings of the 52nd IEEE/ACM International Symposium on Microarchitecture (MICRO)*, pp.558–571, 2019.
IEEE Micro Top Picks Honorable Mention
- [C3] Hiroshi Sasaki, Fang-Hsiang Su, Teruo Tanimoto, Simha Sethumadhavan. Why do programs have heavy tails? In *Proceedings of the 2017 IEEE International Symposium on Workload Characterization (IISWC)*, pp.135–145, 2017.
- [C4] Hiroshi Sasaki, Alper Buyuktosunoglu, Augusto Vega, Pradip Bose. Characterization and mitigation of power contention across multiprogrammed workloads. In *Proceedings of the 2016 IEEE International Symposium on Workload Characterization (IISWC)*, pp.55–64, 2016.
- [C5] Yuan He, Masaaki Kondo, Takashi Nakada, Hiroshi Sasaki, Shinobu Miwa, Hiroshi Nakamura. Runtime multi-optimizations for energy efficient on-chip interconnections, In *Proceedings of the 33rd IEEE International Conference on Computer Design (ICCD)*, pp.455–458, 2015. (poster presentation)
- [C6] Takeshi Soga, Hiroshi Sasaki, Tomoya Hirao, Masaaki Kondo, Koji Inoue. A flexible hardware barrier mechanism for many-core processors, In *Proceedings of the 20th Asia and South Pacific Design Automation Conference (ASP-DAC)*, pp.61–68, 2015.
- [C7] Satoshi Imamura, Hiroshi Sasaki, Koji Inoue. Power-capped DVFS and thread allocation with ANN models on modern NUMA systems. In *Proceedings of the 32nd IEEE International Conference on Computer Design (ICCD)*, pp.324–331, 2014.
- [C8] Yuki Abe, Hiroshi Sasaki, Shinpei Kato, Koji Inoue, Masato Eda, Martin Peres. Power and performance characterization and modeling of GPU-accelerated systems. In *Proceedings of the 28th IEEE International Parallel and Distributed Processing Symposium (IPDPS)*, pp.113–122, 2014.
- [C9] Hiroshi Sasaki, Satoshi Imamura, Koji Inoue. Coordinated power-performance optimization in manycores. In *Proceedings of the 22nd International Conference on Parallel Architectures and Compilation Techniques (PACT)*, pp.51–62, 2013.
IEEE Computer Society Japan Chapter Young Author Award

- [C10] Yuan He, Hiroshi Sasaki, Shinobu Miwa, Hiroshi Nakamura. McRouter: multicast within a router for high performance network-on-chips. In *Proceedings of the 22nd International Conference on Parallel Architectures and Compilation Techniques (PACT)*, pp.842–850, 2013.
- [C11] Keitarou Oka, Hiroshi Sasaki, Koji Inoue. Line sharing cache: exploring cache capacity with frequent line value locality. In *Proceedings of the 18th Asia and South Pacific Design Automation Conference (ASP-DAC)*, pp.669–674, 2013.
- [C12] Masaaki Kondo, Son-Truong Nguyen, Tomoya Hirao, Takeshi Soga, Hiroshi Sasaki, Koji Inoue. SMYLEref: a reference architecture for manycore-processor SoCs. In *Proceedings of the 18th Asia and South Pacific Design Automation Conference (ASP-DAC)*, pp.561–564, 2013. (invited paper)
- [C13] Hiroshi Sasaki, Teruo Tanimoto, Koji Inoue, Hiroshi Nakamura. Scalability-based manycore partitioning. In *Proceedings of the 21st International Conference on Parallel Architectures and Compilation Techniques (PACT)*, pp.107–116, 2012.
- [C14] Takaaki Hanada, Hiroshi Sasaki, Koji Inoue, Kazuaki J. Murakami. Performance evaluation of 3D stacked multi-core processors with temperature consideration. In *Proceedings of the 2011 IEEE International 3D Systems Integration Conference (3DIC)*, pp.1–5, 2012.
- [C15] Noriko Takagi, Hiroshi Sasaki, Masaaki Kondo, Hiroshi Nakamura. Cooperative shared resource access control for low-power chip multiprocessors. In *Proceedings of the 14th ACM/IEEE International Symposium on Low Power Electronics and Design (ISLPED)*, pp.177–182, 2009.
- [C16] Hiroshi Sasaki, Masaaki Kondo, Hiroshi Nakamura. An intra-task DVFS technique based on statistical analysis of hardware events. In *Proceedings of the 4th ACM International Conference on Computing Frontiers (CF)*, pp.123–130, 2007.
- [C17] Hiroshi Sasaki, Masaaki Kondo, Hiroshi Nakamura. Energy-efficient dynamic instruction scheduling logic through instruction grouping. In *Proceedings of the 2006 ACM International Symposium on Low Power Electronics and Design (ISLPED)*, pp.43–48, 2006.

Journal papers

- [J1] Satoshi Imamura, Yuichiro Yasui, Koji Inoue, Takatsugu Ono, Hiroshi Sasaki, Katsuki Fujisawa. Evaluating energy-efficiency of DRAM channel interleaving schemes for multithreaded programs. *IEICE Transactions on Information and Systems*, Vol.E101-D, No.9, pp.2247–2257, Sep. 2018.
- [J2] Teruo Tanimoto, Takatsugu Ono, Koji Inoue, Hiroshi Sasaki. Enhanced dependence graph model for critical path analysis on modern out-of-order processors. *IEEE Computer Architecture Letters (CAL)*, Vol.16, Issue 2, pp.111–114, Jul-Dec 2017 (published in Mar 2017).
- [J3] Hiroshi Sasaki, Fang-Hsiang Su, Teruo Tanimoto, Simha Sethumadhavan. Heavy tails in program structure. *IEEE Computer Architecture Letters (CAL)*, Vol.16, Issue 1, pp.34–37, Jan-Jun 2017 (published in May 2016).
- [J4] Hiroshi Sasaki, Alper Buyuktosunoglu, Augusto Vega, Pradip Bose. Mitigating power contention: a scheduling based approach. *IEEE Computer Architecture Letters (CAL)*, Vol.16, Issue 1, pp.60–63, Jan-Jun 2017 (published in May 2016).
- [J5] Yuan He, Masaaki Kondo, Takashi Nakada, Hiroshi Sasaki, Shinobu Miwa, Hiroshi Nakamura. A runtime optimization selection framework to realize energy efficient networks-on-chip. *IEICE Transactions on Information and Systems*, Vol.E99.D, No.12, pp.2881–2890, Dec. 2016
- [J6] Yuan He, Hiroki Matsutani, Hiroshi Sasaki, Hiroshi Nakamura. Adaptive data compression on 3D network-on-chips. *IPSJ Transactions on Advanced Computing Systems*, Vol.5, No.1, pp.80–87, Jan. 2012.
- [J7] Hiroshi Sasaki, Masaaki Kondo, Hiroshi Nakamura. Energy-efficient dynamic instruction scheduling logic through instruction grouping. *IEEE Transactions on VLSI (TVLSI)*, Vol.17 Issue 6, pp.848–852, June 2009.

Workshop papers

- [W1] Satoshi Imamura, Yuichiro Yasui, Koji Inoue, Takatsugu Ono, Hiroshi Sasaki, Katsuki Fujisawa. Power-efficient breadth-first search with DRAM row buffer locality-aware address mapping. In *High Performance Graph Data Management and Processing Workshop 2016 (HPGDMP)*, pp.17–24, 2016. (held in conjunction with SC)
- [W2] Jie Yin, Ye Liu, Shinpei Kato, Hiroshi Sasaki, Hiroaki Takada. An empirical study on the NoC architecture based on bidirectional ring and mesh topologies. In *2016 Workshop on Multicore and Rack-scale Systems (MaRS)*, 2016. (held in conjunction with EuroSys)
- [W3] Yuan He, Hiroshi Sasaki, Shinobu Miwa, Hiroshi Nakamura. Predict-more router: a low latency NoC router with more route predictions. In *Proceedings of the 2013 IEEE International Parallel and Distributed Processing Workshops and Phd Forum (IPDPSW)*, Communication Architecture for Scalable Systems (CASS), pp.842–850, 2013.
- [W4] Yuki Abe, Hiroshi Sasaki, Martin Peres, Koji Inoue, Kazuaki Murakami, Shinpei Kato. Power and performance analysis of GPU-accelerated systems. In *2012 Workshop on Power-Aware Computing and Systems (HotPower)*, 2012. (held in conjunction with OSDI)
- [W5] Satoshi Imamura, Hiroshi Sasaki, Naoto Fukumoto, Koji Inoue, Kazuaki Murakami. Optimizing power-performance trade-off for parallel applications through dynamic core-count and frequency scaling. In *2nd Workshop on Runtime Environments/Systems, Layering, Virtualized Environments (RESOLVE)*, 2012. (held in conjunction with ASPLOS)
- [W6] Lovic Gauthier, Farhad Mehdipour, Koji Inoue, Shinya Ueno, Hiroshi Sasaki. Efficient barrier synchronization for 2D meshed NoC-based many-core processors. In *17th Workshop on Synthesis And System Integration of Mixed Information Technologies (SASIMI)*, 2012.
- [W7] Hiroshi Sasaki, Takatsugu Oya, Masaaki Kondo, Hiroshi Nakamura. Power-performance modeling of heterogeneous cluster-based web servers. In *Proceedings of the 2009 20th IEEE/ACM International Conference on Grid Computing (Grid)*, pp.225–231, 2009. (presented at Energy Efficient Grids, Clouds and Clusters Workshop (E2GC2))

- [W8] Toshiya Komoda, Hiroshi Sasaki, Masaaki Kondo, Hiroshi Nakamura. Compiler directed fine grain power gating for leakage power reduction in microprocessor functional units. In *Workshop on Optimizations for DSP and Embedded Systems (ODES)*, 2009. (held in conjunction with CGO)
- [W9] Masaaki Kondo, Hiroshi Sasaki, Hiroshi Nakamura. Improving fairness, throughput and energy-efficiency on a chip multiprocessor through DVFS. In *ACM SIGARCH Computer Architecture News*, Vol.35, Issue 1, pp.31–38, Mar. 2007. Workshop on Design, Architecture and Simulation of Chip Multi-Processors (dasCMP), 2006. (held in conjunction with MICRO)
- [W10] Hiroshi Sasaki, Masaaki Kondo, Hiroshi Nakamura. Dynamic instruction cascading on GALS microprocessor. In *International Workshop on Power And Timing Modeling, Optimization and Simulation (PATMOS)*, pp.30–39, 2005.

Book chapters

- [B1] Hiroshi Sasaki, Hideharu Amano, Kimiyoshi Usami, Masaaki Kondo, Mitaro Namiki, Hiroshi Nakamura. Geyser: energy-efficient MIPS CPU core with fine-grained run-time power gating. Book Chapter in *Handbook of Energy-Aware and Green Computing* edited by Ishfaq Ahmad and Sanjay Ranka, Chapman Hall/CRC Computer Information Science Series, pp.49–65, Jan. 2012.

PROFESSIONAL ACTIVITIES

Program committees

- ASPLOS (2023 ERC)
- ISCA (2022 ERC)
- MICRO (2019 ERC)
- CGO (2021)
- PACT (2014 ERC)
- IISWC (2016)
- ICCD (2014, 2015, 2016, 2017)
- ICDCIT (2015)
- EUC (2012, 2013)
- CPSNA (2011, 2012)

Organizing committees

- Organizer, Shonan Meeting No.134 “Advances in Heterogeneous Computing from Hardware to Software,” 2018.
- Publication chair for PACT 2013.

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