Hyungmin Cho, Ph.D.

Assistant Professor

Department of Software
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EDUCATION

Apr. 2010 – Aug. 2015	Ph.D. in Electrical Engineering Stanford University, Stanford, CA Research Advisor: Prof. Subhasish Mitra Thesis: "System-level Effects of Soft Errors"
Sep. 2008 – Mar. 2010	M.S. in Electrical Engineering Stanford University, Stanford, CA Research Advisor: Prof. Subhasish Mitra
Mar. 2001 – Feb. 2005	B.S. in Computer Science and Engineering Seoul National University, Seoul, South Korea Honors: Summa Cum Laude (GPA: 4.04/4.3)

RESEARCH INTERESTS

- Computer architecture
  - Error resilient robust systems architecture
  - Processor security
- Efficient deep-learning architecture
  - FPGA-based deep neural network acceleration
  - Architecture design for reinforcement learning
  - GPU scheduling techniques
- Hardware reliability
  - Application-level error resilience techniques
  - Soft error mitigation techniques

EXPERIENCES

Sep. 2019 – Present	Department of Software, Sungkyunkwan University Assistant Professor
Mar. 2017 – Aug. 2019	Department of Computer Engineering, Hongik University Assistant Professor
Oct. 2015 – Feb. 2017	Intel Corporation Santa Clara, CA Research Scientist, Microarchitecture Research Lab
Apr. 2009 – Aug. 2015	Robust Systems Group, Stanford University Research Assistant • Robust hardware design • Error-resilient software execution models • System-level soft error analysis
Jun. 2011 – Sep. 2011	Texas Instruments Inc. Dallas, TX Intern, Signal Processing VLSI Group
Jun. 2009 – Sep. 2009	NEC Laboratories America, Inc. Princeton, NJ Intern, Computer Systems Architecture group
Feb. 2005 – May 2008	Bluebird Inc. Seoul, South Korea System Programmer, Platform development team
Oct. 2006 – Apr. 2007	Advanced Compiler Research Lab, Seoul National University Research Intern • Linker level data scratch pad memory allocation mechanism for ARM based system

AWARD & SCHOLARSHIP

Aug. 2007	Fellowship for graduate studies from the Korea Foundation for Advanced Studies (KFAS)
Feb. 2005	Graduated with Summa Cum Laude honors, Seoul National University
Sep. 2004	Full scholarship from Computer Science and Engineering department, Seoul National University

Research Grants

- High-Efficiency Adaptive Architecture for Deep Neural Network Training (고효율 적응형 딥러닝 학습 플랫폼), PI (연구책임자), Ministry of Science and ICT (과학기술정보통신부/한국연구재단), 875,000,000 KRW, Jun. 2019 – Feb. 2021.

- Research on CPU Vulnerability Detection and Validation (컴퓨터 프로세서의 구조적 보안 취약점 검증 및 공격 탐지대응), Co-PI (참여기관 연구책임자), Ministry of Science and ICT (과학기술정보통신부/정보통신기획평가원), 5,600,000,000 KRW, Apr. 2019 – Dec. 2022.

- Efficient Neural Network Computation Platform for Internet of Things (사물인터넷 환경에서의 효율적인 인공지능 계산 플랫폼 연구), PI (연구책임자), Ministry of Science, ICT and Future Planning (미래창조과학부/한국연구재단), 90,000,000 KRW, Mar. 2017 – Feb. 2020.

COURSES TAUGHT

- Undergrad Courses at Hongik University
    - **101510**: Computer Architecture
    - **004174**: Introduction to Computer Science and Engineering
    - **101408**: Assembly Programming Language
    - **101711**: Embedded Systems
- Graduate Courses at Hongik University
    - **1072025**: Advanced Topics in Microprocessors

SKILLS

Hardware design	System Verilog, VHDL, FPGA, VLSI back-end flow
Software	C, C++, Objective-C, Python, Perl, Matlab, TensorFlow, OpenCL, CUDA

CONFERENCE PUBLICATIONS

- **Hyungmin Cho**, Pyeongseok Oh, Jiyoung Park, Wookeun Jung, and Jaejin Lee, “FA3C: FPGA-Accelerated Deep Reinforcement Learning,” *Proc. International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS)*, Providence, RI, USA, April 2019 (Acceptance rate: 21.1%)

- Eric Cheng, Jacob Abraham, Pradip Bose, Alper Buyuktosunoglu, Keith Campbell, Deming Chen, Cheng-Yong Cher, **Hyungmin Cho**, Binh Le, Klas Lilja, Shahrzad Mirkhani, Kevin Skadron, Mircea Stan, Lukasz Szafaryn, Christos Vezyrtzis, and Subhasish Mitra, “Cross-layer resilience in low-voltage digital systems: key insights,” *Proc. International Conference on Computer Design (ICCD)*. Boston, MA, USA, Nov. 2017 (Invited).

- E. Cheng, S. Mirkhani, L. Szafaryn, C.-Y. Cher, **Hyungmin Cho**, K. Skadron, M. Stan, K. Lilja, J. Abraham, P. Bose and S. Mitra, “CLEAR: Cross-Layer Exploration for Architecting Resilience: Combining Hardware and Software Techniques To Tolerate Soft Errors in Processor Cores,” *Proc. Design Automation Conf. (DAC)*, Austin, TX, USA , June 2016 (Acceptance rate: 17%).

- **Hyungmin Cho**, C.-Y. Cher, T. Shepherd, and S. Mitra, “Understanding Soft Errors in Uncore Components,” *Proc. Design Automation Conf (DAC)*, San Francisco, CA, USA, June 2015 (Acceptance rate: 20.5%).

- S. Mitra, P. Bose, E. Cheng, **Hyungmin Cho**, R. Joshi, Y. M. Kim, C. R. Lefurgy, Y. Li, K. P. Rodbell, K. Skadron, J. Stathis and L. Szafaryn, “The Resilience Wall: Cross-Layer Solution Strategies," *Proc. IEEE Intl. Symp. VLSI Technology, Systems and Applications and IEEE Intl. Symp. VLSI Design, Automation and Test*, Hsinchu, Taiwan, April 2014 (Invited).

- S. Mirkhani, **Hyungmin Cho**, S. Mitra, and J. A. Abraham, “Rethinking Error Injection for Effective Resilience,” *Proc. Asia and South Pacific Design Automation Conf. (ASPDAC)*, Jan. 2014 (Invited).

- **Hyungmin Cho**, S. Mirkhani, C.-Y. Cher, J. A. Abraham, and S. Mitra, “Quantitative Evaluation of Soft Error Injection Techniques for Robust System Design,” *Proc. Design Automation Conf. (DAC)*, Austin, TX, USA, June 2013 (Acceptance rate: 23%).

- L. Leem, **Hyungmin Cho**, H.-H. K. Lee, Y. M. Kim, Y. Li, and S. Mitra, “Cross-Layer Error Resilience for Robust Systems,” *Proc. Intl. Conf. Computer-Aided Design (ICCAD)*, Nov. 2010 (Invited).

- L. Leem, **Hyungmin Cho**, J. Bau, Q. A. Jacobson, S. Mitra, “ERSA: Error Resilient System Architecture for probabilistic applications,” *Proc. Design, Automation & Test in Europe (DATE)*, March 2010 (Acceptance rate: 25%).

- **Hyungmin Cho**, B. Egger, J. Lee, and H. Shin, “Dynamic Data Scratchpad Memory Management for a Memory Subsystem with an MMU,” *Proc. Languages, Compilers, and Tools for Embedded Systems (LCTES)*, June 2007.

JOURNAL PUBLICATIONS

- **Hyngmin Cho** and Kon-Woo Kwon, "Modeling Application-Level Soft Error Effects for Single-Event Multi-Bit Upsets," *IEEE Access*, vol. 7, 2019

- HyungGyoon Kim, **Hyungmin Cho**, and Changwoo Pyo, "GPU-based acceleration of the linear complexity test for random number generator testing," *Journal of Parallel and Distributed Computing*, vol. 128, 2019

- Eric Cheng, Shahrzad Mirkhani, Lukasz G Szafaryn, Chen-Yong Cher, **Hyungmin Cho**, Kevin Skadron, Mircea R Stan, Klas Lilja, Jacob A Abraham, Pradip Bose, Subhasish Mitra, "Tolerating soft errors in processor cores using clear (cross-layer exploration for architecting resilience)," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems,* vol.37, no.9, pp.1839-1852, Sept. 2018.

- **Hyngmin Cho**, "ASIC-Resistance of Multi-Hash Proof-of-Work Mechanisms for Blockchain Consensus Protocols," *IEEE Access*, vol. 6, 2018

- **Hyngmin Cho**, "Impact of Microarchitectural Differences of RISC-V Processor Cores on Soft Error Effects," *IEEE Access*, vol. 6, 2018

- **Hyungmin Cho,** E. Cheng, T. Shepherd, C.-Y. Cher, and S. Mitra, "System-level Effects of Soft Errors in Uncore Components," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems,* vol.36, no.7, pp.1497-1510, Sept. 2017.

- S. M. S. Yazdi, **Hyungmin Cho**, L. Dolecek, "Gallager B decoder on noisy hardware," *IEEE Transactions on Communications,* vol.61, no.5, pp.1660-1673, May 2013.

- **Hyungmin Cho,** L. Leem, and S. Mitra, "ERSA: Error Resilient System Architecture for Probabilistic Applications," *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems,* vol.31, no.4, pp.546-558, April 2012.

- S. Mitra, **Hyungmin Cho**, T. Hong, Y. M. Kim, H.-H. K. Lee, L. Leem, Y. Li, D. Lin, E. Mintarno, S.-B., Park, N. Patil, H. Wei and J. Zhang, "Robust System Design," *IPSJ Trans. System LSI Design Methodology,* 2011 (Invited)

PATENTS

- S. Chakradhar, **Hyungmin Cho**, A. Raghunathan, "Cross-layer system architecture design," US Patent 8,762,794, June 2014.