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| RESEARCH INTERESTS | Next-Generation Edge Intelligence / HD Computing for Cognitive learning / Machine Learning / In-Memory Computing / Operating Systems / Computer Architecture |
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PUBLICATIONS Conference

- **Yeseong Kim**, Mohsen Imani, Niema Moshiri and Tajana Rosing, “GenieHD: Efficient DNA Pattern Matching Accelerator Using Hyperdimensional Computing”, *IEEE/ACM Design Automation and Test in Europe Conference (DATE)*, Mar 2020 (Best Paper Nominated)
- Mohsen Imani, Mohammad Samragh, **Yeseong Kim**, Saransh Gupta, Farinaz Koushanfar, Tajana Rosing, “Deep Learning Acceleration with Neuron-to-Memory Transformation”, *IEEE International Symposium on High-Performance Computer Architecture (HPCA)*, Feb 2020 (Accepted and will appear)
- Mohsen Imani, **Yeseong Kim**, Sadegh Riazi, John Merssely, Patrick Liu, Farinaz Koushanfar and Tajana S. Rosing, “A Framework for Collaborative Learning in Secure High-Dimensional Space”, *IEEE Cloud Computing (CLOUD)*, Jul 2019 (**M. Imani and Y. Kim contributed equally, acceptance rate 14.3%**)
- Mohsen Imani, Saransh Gupta, **Yeseong Kim**, and Tajana S. Rosing, “FloatPIM: In-Memory Acceleration of Deep Neural Network Training with High Precision”, *International Symposium on Computer Architecture (ISCA)*, Jun 2019
- Joonseop Sim, Saransh Gupta, Mohsen Imani, **Yeseong Kim**, and Tajana S. Rosing, “UPIM: Unipolar Switching Logic for High Density Processing-in-Memory Applications”, *ACM Great lakes symposium on VLSI (GLSVLSI)*, May 2019
- Anthony Thomas, Yunhui Guo, **Yeseong Kim**, Baris Aksanli, Arun Kumar, and Tajana S. Rosing, “Hierarchical and Distributed Machine Learning Inference Beyond the Edge”, *IEEE International Conference on Networking, Sensing and Control (ICNSC)*, May 2019
- Dongwon Park, Ilgweon Kang, **Yeseong Kim**, Sicun Gao, Bill Lin, and Chung-Kuan Cheng, “ROAD: Routability Analysis and Diagnosis Framework Based on SAT Techniques”, *International Symposium on Physical Design (ISPD)*, Apr 2019
- Joonseop Sim, Minsu Kim, **Yeseong Kim**, Saransh Gupta, Behnam Khaleghi, Tajana Rosing, “MAPIM: Mat Parallelism for High Performance Processing in Non-volatile Memory Architecture”, *International Symposium on Quality Electronic Design (ISQED)*, Mar 2019
- **Yeseong Kim**, Ankit More, Emily Shriver, and Tajana S. Rosing, “Application Performance Prediction and Optimization Under Cache Allocation Technology”, *IEEE/ACM Design Automation and Test in Europe Conference (DATE)*, Mar 2019
- Mohsen Imani, **Yeseong Kim**, Thomas Worley, Saransh Gupta, and Tajana S. Rosing, “HDCluster: An Accurate Clustering Using Brain-Inspired High-Dimensional Computing”, *IEEE/ACM Design Automation and Test in Europe Conference (DATE)*, Mar 2019
- Minxuan Zhou, Mohsen Imani, Saransh Gupta, **Yeseong Kim**, and Tajana S. Rosing, “GRAM: Graph Processing in a ReRAM-based Computational Memory”, *IEEE Asia and South Pacific Design Automation Conference (ASP-DAC)*, Jan 2019
- **Yeseong Kim**, Mohsen Imani, and Tajana S. Rosing, “Efficient Human Activity Recognition Using Hyperdimensional Computing”, *IEEE Conference on Internet of Things (IoT 2018)*, Oct 2018

- Anthony Thomas, Yunhui Guo, **Yeseong Kim**, Baris Aksanli, Arun Kumar, Tajana S. Rosing, “Pushing Down Machine Learning Inference to the Edge in Heterogeneous Internet of Things Applications”, *arXiv preprint*, 2018
- Mohsen Imani, Mohammad Samragh, **Yeseong Kim**, Saransh Gupta, Farinaz Koushanfar, Tajana S. Rosing, “RAPIDNN: In-Memory Deep Neural Network Acceleration Framework”, *arXiv preprint*, 2018
- Joonseop Sim, Mohsen Imani, Woojin Choi, **Yeseong Kim**, and Tajana S. Rosing, “LUPIS: Latch-up Based Ultra Efficient Processing in-Memory System”, *2018 International Symposium on Quality Electronic Design (ISQED 2018)*, March 2018
- **Yeseong Kim**, Pietro Mercati, Ankit More, Emily Shriver, and Tajana S. Rosing, “P4: Phase-Based Power/Performance Prediction of Heterogeneous Systems via Neural Networks”, *2017 International Conference on Computer-Aided Design (ICCAD 2017)*, November 2017
- **Yeseong Kim**, Mohsen Imani, and Tajana S. Rosing, “ORCHARD: Visual Object Recognition Accelerator Based on Approximate In-Memory Processing”, *2017 International Conference on Computer-Aided Design (ICCAD 2017)*, November 2017
- Mohsen Imani, **Yeseong Kim**, and Tajana S. Rosing, “Brain-Inspired Hyperdimensional Computing: An Efficient Classifier for Embedded Devices”, *2017 International Conference on Computer-Aided Design (ICCAD 2017)*, November 2017
- Mohsen Imani, **Yeseong Kim**, and Tajana S. Rosing, “NNgine: Ultra-Efficient Nearest Neighbor Accelerator Based on In-Memory Computing”, *IEEE International Conference on Rebooting Computing (ICRC 2017)*, November 2017
- Joonseop Sim, Mohsen Imani, **Yeseong Kim**, and Tajana S. Rosing, “Enabling Efficient System Design Using Vertical Nanowire Transistor Current Mode Logic”, *25th IEEE International Conference on Very Large Scale Integration (VLSI-SoC 2017)*, October 2017
- **Yeseong Kim**, Mohsen Imani, and Tajana S. Rosing, “CHOIR: General-Purpose Online Classification Accelerator via In-Memory Computing”, *TECHCON SRC Conference (TECHCON 2017)*, September 2017
- Mohsen Imani, Daniel Peroni, **Yeseong Kim**, Abbas Rahimi, and Tajana S. Rosing, “Efficient Neural Network Acceleration on GPGPU using Content Addressable Memory”, *20th Design Automation and Test in Europe (DATE 2017)*, March 2017
- Mohsen Imani, **Yeseong Kim**, and Tajana S. Rosing, “MPIM: Multi-Purpose In-Memory Processing Using Configurable Resistive Memory”, *22nd Asia and South Pacific Design Automation Conference (ASPDAC 2017)*, January 2017
- Wanlin Cui, **Yeseong Kim**, and Tajana S. Rosing, “Cross-Platform Machine Learning Characterization for Task Allocation in IoT Ecosystems”, *7th IEEE Annual Computing and Communication Workshop and Conference (CCWC 2017)*, January 2017 (Best Paper)
- **Yeseong Kim**, Pietro Mercati, and Tajana S. Rosing, “Power Efficient, Hierarchical, Introspection Framework for HPC Systems”, *TECHCON SRC Conference (TECHCON 2016)*, September 2016
- Mohsen Imani, **Yeseong Kim**, Abbas Rahimi and Tajana S. Rosing, “Acam: Approximate computing based on adaptive associative memory with online learning”, *2016 International Symposium on Low Power Electronics and Design (ISLPED 2016)*, August 2016
- Mohsen Imani, Abbas Rahimi, **Yeseong Kim** and Tajana S. Rosing, “A Low-Power Hybrid Magnetic Cache Architecture Exploiting Narrow-Width Values”, *5th Non-Volatile Memory Systems and Applications Symposium (NVMSA 2016)*, August 2016
- Mohsen Imani, **Yeseong Kim**, Abbas Rahimi and Tajana S. Rosing, “Associative Memory with Online Learning for Approximate Computing”, *IEEE/ACM Design Automation Conference (DAC 2016)*, June 2016
- Shruti Patil, **Yeseong Kim**, Kunal Korgaonkar, Ibrahim Awwal, and Tajana S. Rosing, “Characterization of User’s Behavior Variations for Design of Replayable

Mobile Workloads”, *7th EAI International Conference on Mobile Computing, Applications and Services (MobiCASE 2015)*, November 2015

- **Yeseong Kim**, Francesco Paterna, Sameer Tilak, and Tajana S. Rosing, “Smartphone Analysis and Optimization based on User Activity Recognition”, *2015 International Conference on Computer-Aided Design (ICCAD 2015)*, November 2015
- **Yeseong Kim**, Mohsen Imani, Shruti Patil, and Tajana S. Rosing, “CAUSE: Critical Application Usage-Aware Memory System using Non-volatile Memory for Mobile Devices”, *2015 International Conference on Computer-Aided Design (ICCAD 2015)*, November 2015
- **Yeseong Kim**, Qingqing Zhang, Nosub Sung, and Jihong Kim, “A Mobile Network Emulation Environment for Repeatable Smartphone Performance Evaluations”, *2012 Korea Computer Congress (KCC’13)*, June 2013 (Best Presentation Paper)
- **Yeseong Kim**, Wook Song, and Jihong Kim, “A Smartphone Network Energy Optimization Technique Using Personalized Network Usage Behavior”, *2012 Korea Computer Congress (KCC’12)*, June 2012 (Best Paper)
- **Yeseong Kim**, Jongwook Choi, Sungjin Lee, and Jihong Kim, “A Fast File Search Technique Using Direct Access of Metadata Area”, *2011 Korea Computer Congress (KCC’11)*, June 2011

Journal

- **Yeseong Kim**, Mohsen Imani, and Tajana S. Rosing, “Image Recognition Accelerator Design Using In-Memory Processing”, *IEEE MICRO, IEEE Computer Society*, Jan/Feb 2019
- **Yeseong Kim**, Boyeong Jeon, and Jihong Kim, “A Personalized Network Activity-Aware Approach to Reducing Radio Energy Consumption of Smartphones”, *IEEE Transaction on Mobile Computing (IEEE TMC)*, March 2016
- Wook Song, **Yeseong Kim**, Hakbong Kim, Jehun Lim, and Jihong Kim, “Personalized Optimization for Android Smartphones”, *ACM Transaction on Embedded Computing Systems (ACM TECS)*, January 2014
- **Yeseong Kim**, Qingqing Zhang, Nosub Sung, and Jihong Kim, “A Mobile Network Emulation Environment for Repeatable Performance Evaluations of Smartphones”, *Journal of Korean Institute of Information Scientists and Engineers : Computer Practices (KIISE)*, December 2013
- **Yeseong Kim**, Wook Song, and Jihong Kim, “A Personalized Network Tail Energy Optimization Technique Based on Smartphone Network Usage Behavior”, *Journal of Korean Institute of Information Scientists and Engineers : Computer Systems and Theory (KIISE)*, December 2012

Workshop

- Mohsen Imani, **Yeseong Kim**, and Tajana S. Rosing, “Hyperdimensional Computing: A Light-Weight Cognitive Machine”, *NSF IoT Workshop*, Nov 2018
- **Yeseong Kim**, Mohsen Imani, and Tajana S. Rosing, “Visual Object Recognition Accelerator Based on Approximate In-Memory Processing”, *Non-Volatile Memory Workshop (NVMW 2018)*, March 2018
- Mohsen Imani, **Yeseong Kim**, and Tajana S. Rosing, “In-Memory Processing to Support Search-Based and Bitwise Computation”, *Non-Volatile Memory Workshop (NVMW 2017)*, March 2017
- **Yeseong Kim**, and Jihong Kim, “Personalized Diapause: Reducing Radio Energy Consumption of Smartphones by Network-context Aware Dormancy Predictions”, *2012 USENIX conference on Power-Aware Computing and Systems (HotPower’12 co-located with OSDI’12)*, October 2012 (One of 10 accepted out of 39 submissions)

POSTERS

- **Yeseong Kim**, Mohsen Imani, and Tajana S. Rosing, “NNgine: Ultra-Efficient Nearest Neighbor Accelerator Based on Near Data Computing” *The 54th Design Automation Conference (DAC’17)*, June 2017
The 10th IEEE International Conference on Distributed Computing in Sensor Systems

(DCOSS'14), May 2014

- **Yeseong Kim**, Yeseong Kim, Francesco Paterna, Tajana S. Rosing, and Sameer Tilak, "Fine-grained Analysis and Optimization of Smartphone Applications via Automated Phase Recognition for Improved User Experience" *The 10th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS'14)*, May 2014
- Nosub Sung, **Yeseong Kim**, Jehun Lim, Jihong Kim, "Towards User-Centric Response Time Analysis and Optimization for Smart Devices" *The 10th USENIX Symposium on Operating Systems Design and Implementation (OSDI'12)*, October 2012
- Wook Song, **Yeseong Kim**, Jehun Lim, Jihong Kim, "Personalized Optimization for Android Smartphones" *The 2012 Asia-Pacific Workshop on Systems (APSys'12)*, July 2012
- **Yeseong Kim**, Jihong Kim, "Personalized Diapause: A Novel Predictive Dormancy Approach for Reducing Radio Energy Consumption of Smartphones" *The 2012 Asia-Pacific Workshop on Systems (APSys'12)*, July 2012

TALKS

- "Energy-efficient system design for heterogeneous IoT ecosystems" at *Daegu Gyeongbuk Institute of Science and Technology (DGIST)*, September 2018
- "Embedded System Development and Security Issues" *Seminar on Forward Thinking for IoT Security*, January 2016

PROJECTS / GRANTS

- "Center for Research on Intelligent Storage and Processing-in-memory (CRISP), Joint University Microelectronics Program (JUMP)," SRC, 2018 - 2020
- "Power Efficient, Hierarchical, Introspection Framework for HPC Systems," Intel, 2016 - 2019
- "Cognitive Hardware and Software Ecosystem Community Infrastructure (CHASE-CI)," NSF (National Science Foundation) grant awarded, 2017 - 2020
- "ENACT: Environment-Aware Management of Mobile Systems," NSF (National Science Foundation) grant awarded, 2015 - 2020

AWARDS

- **Yeseong Kim**, Mohsen Imani, Niema Moshiri and Tajana Rosing, "GenieHD: Efficient DNA Pattern Matching Accelerator Using Hyperdimensional Computing", *Best Paper Nominated in IEEE/ACM Design Automation and Test in Europe Conference (DATE)*, Mar 2020
- Wook Song, **Yeseong Kim**, Hakbong Kim, Je-hun Lim, Sang-woo Jun, Jihong Kim, "Personalized Optimization for Android Smartphones" *Third Place in Android Competition in Embedded Systems Week (ESWeek'11)*, Taiwan, 2011
- Team Bacchus(**Yeseong Kim**, Hwanghyun oh), "Mobileaver" *The First Prize in Samsung IT Festival*, Seoul, 2007

PATENTS

- "Method of Network Connection Control for a Wireless Communication Device" Jihong Kim, **Yeseong Kim**, 2014, Korea
- "Personalized Optimization Apparatus in a Mobile Terminal Platform" Jihong Kim, Wook Song, **Yeseong Kim**, 2011, Korea
- "System and Method That Exchange User Created Contents Information, and Construct and Manage User Created Contents, Connecting Computers and Portable Devices" Yeonggil Shin, Hyeonsang Eom, **Yeseong Kim**, Hwanghyun Oh, 2007, Korea

EDUCATION

Ph.D, Computer Science and Engineering 2013~2020
University of California San Diego, US
Advisor: Tajana S. Rosing

B.S., Computer Science and Engineering 2004~2011

Seoul National University, Korea
Advisor: Jihong Kim

WORKING
EXPERIENCE

Academia

2020.06~Present, Assistant Professor, Information & Communication Engineering
Department, DGIST

Teaching

2018.10~2018.12, CSE291: Software for Accelerators, “Google’s TensorFlow on
Tensor Processing Units”, UCSD

2018.01~2018.03, CSE237A: Introduction to Embedded Computing, Teaching Assistant,
UCSD

2017.03~2017.06, CSE291: Alternative Computing Paradigm, UCSD

Internship

2017.05~2017.09, DCG(Data Center Group), Intel

2015.06~2015.09, SCL(Strategic CAD Lab), Intel

2014.06~2014.09, ASEL(Advanced System Engineering Lab), Samsung Research
America

Research Activity

2018~Present, External Reviewer of *Design Automation Conference (DAC)*

Research Associate

2013.09~2020.03, SEELAB(System Energy Efficiency laboratory), UCSD

2011.07~2013.08, CARES(Computer ARchitecture and Embedded Systems laboratory),
SNU

Software Developer

2007.01~2010.02, FINALData Inc, Korea