Bryan S. Kim
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Syracuse University
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Research Interests

- Flash and non-volatile memory-based systems
- Data storage systems
- File systems and key-value store

Professional Experience

- Assistant Professor — Aug. 2019 – present
  Department of Electrical Engineering & Computer Science — *Syracuse University*
- Postdoctoral Researcher — Mar. 2018 – June 2019
  Institute of Computer Technology — *Seoul National University*

Education

- Seoul National University
  Ph.D. in Computer Science & Engineering — *Feb. 2018*
  - Advisor: the late Prof. Sang Lyul Min
  - Thesis: An Autonomic SSD Architecture
- Seoul National University
  M.S. in Electrical Engineering & Computer Science — *Aug. 2009*
  - Advisor: the late Prof. Sang Lyul Min
  - Thesis: Efficient Flash Memory Read Request Handling Based on Split Transactions
- University of California, Berkeley
  B.S. in Electrical Engineering & Computer Science — *May 2006*

Funding & Grants

- Bryan S. Kim. Dynamically-Provisioned SSDs for Container-Native Storage. Funded by *Samsung Electronics*, 2021 — Samsung *$50,000*
- Bryan S. Kim. CNS Core: Small: CPR for Flash-Based Storage Systems. Funded by *National Science Foundation*, 2020 — NSF *$488,277*

Publications

- Hyeongyu Lee, Juwon Lee, Minwook Kim, Donghwa Shin, Sungjin Lee, Bryan S. Kim, Eunji Lee, Sang Lyul Min SpartanSSD: a Reliable SSD under Capacitance Constraints To appear in *ACM/IEEE International Symposium on Low Power Electronics and Design*, 2021 — ISLPED'21
- Junsu Im, Jooyoung Song, Juhyung Park, Eunji Lee, Bryan S. Kim, and Sungjin Lee. Modernizing File System through In-Storage Indexing To appear in *USENIX Symposium on Operating Systems Design and Implementation*, 2021 — OSDI'21 *acceptance rate: 18.8%*

- Manoj P. Saha, Adnan Maruf, Bryan S. Kim, and Janki Bhimani. KV-SSD: What Is It Good For? To appear in *Design Automation Conference*, 2021 — DAC'21 *acceptance rate: 23.0%*
- Jeseong Yeon, Leeju Kim, Youil Han, Hyeon Gyu Lee, Eunji Lee, and Bryan S. Kim. JellyFish: A Fast Skip List with MVCC. In *ACM/IFIP International Middleware Conference*, 2020 — Middleware'20 *acceptance rate: 25.2%*
- Youil Han, Bryan S. Kim, Jeseong Yeon, Sungjin Lee, and Eunji Lee. TeksDB: Weaving Data Structures for a High-Performance Key-Value Store. In *ACM International Conference on Measurement and Modeling of Computer Systems*, 2019 — SIGMETRICS'19 *acceptance rate: 17.1%*
- Bryan S. Kim, Eunji Lee, Sungjin Lee, and Sang Lyul Min. CPR for SSDs. In *ACM SIGOPS Workshop on Hot Topics in Operating Systems*, 2019 — HotOS'19 *acceptance rate: 24.0%*
- Youil Han, Bryan S. Kim, Jeseong Yeon, Sungjin Lee, and Eunji Lee. TeksDB: Weaving Data Structures for a High-Performance Key-Value Store. In *Proceedings of the ACM on Measurement and Analysis of Computing Systems*, 3(1): 8:1–8:23, 2019 — POMACS'19
- Bryan S. Kim, Jongmoo Choi, and Sang Lyul Min. Design Tradeoffs for SSD Reliability. In *USENIX Conference on File and Storage Techologies*, 2019: 281–294 — FAST'19 *acceptance rate: 17.9%*
- Bryan S. Kim. The Human Manual. In *ACM Crossroads Student Magazine*, 25(1): 34–37, 2018 — XRDS'18
- Geonhee Lee, Hyeon Gyu Lee, Juwon Lee, Bryan S. Kim* and Sang Lyul Min. An Empirical Study on NVM-based Block I/O Caches. In *ACM SIGOPS Asia-Pacific Workshop on Systems*, 2018 — APSys'18 *acceptance rate: 36.0%*
- Bryan S. Kim, Hyun Suk Yang, and Sang Lyul Min. AutoSSD: an Autonomic SSD Architecture. In *USENIX Annual Technical Conference*, 2018: 677–689 — ATC'18 *acceptance rate: 20.1%*
- Bryan S. Kim. Utilitarian Performance Isolation in Shared SSDs. In *USENIX Workshop on Hot Topics in Storage and File Systems*, 2018 — HotStorage'18 *acceptance rate: 36.7%*
- Bryan S. Kim, Yonggun Lee, and Sang Lyul Min. Framework for Efficient and Flexible Scheduling of Flash Memory Operations. In *IEEE Non-Volatile Memory Systems and Applications*, 2017: 1–5 — NVMSA'17 *acceptance rate: 33.3%*
- Bryan S. Kim and Sang Lyul Min. QoS-aware Flash Memory Controller. In *IEEE Real-Time and Embedded Technology and Applications Symposium*, 2017: 51–62 — RTAS'17 *acceptance rate: 23.7%*
- Eyee Hyun Nam, Bryan S. Kim, Hyeonsang Eom, and Sang Lyul Min. Ozone (O3): An Out-of-Order Flash Memory Controller Architecture. In *IEEE Transactions on Computers*, 60(5): 653–666, 2011 — TC'11

- Bryan S. Kim, Eyee Hyun Nam, Yoon Jae Seong, Hang Jun Min, and Sang Lyul Min. Efficient Flash Memory Read Request Handling Based on Split Transactions. In *International Workshop on Software Support for Portable Storage*, 2009 — IWSSPS'09
- Joon Ho Um, Bryan S. Kim, Sung Gab Lee, Eyee Hyun Nam, and Sang Lyul Min. Flash Memory-Based Development Platform for Homecare Devices. In *IEEE International Conference on Systems, Man, and Cybernetics*, 2008: 2259–2263 — SMC'08
- Jin Hyuk Yoon, Eyee Hyun Nam, Yoon Jae Seong, Hongseok Kim, Bryan S. Kim, Sang Lyul Min, and Yookun Cho. Chameleon: A High Performance Flash/FRAM Hybrid Solid State Disk Architecture. In *IEEE Computer Architecture Letters*, 7(1): 17–20, 2008 — CAL'08

Patents

- Bryan S. Kim and Sang Lyul Min. Control Device for Dynamically Allocating Storage Space and Data Storage Device Including the Control Device. Korea Patent Application 10-2018-0116646: filed Sep. 2018; U.S. Patent 10,929,028: filed Feb. 2019 and issued Feb. 2021 — Korea: filed; U.S.: granted
- Bryan S. Kim and Sang Lyul Min. Semiconductor Device for Scheduling Tasks for Memory Device and System Including the Same. Korea Patent Application 10-2017-0153547: filed Nov. 2017; U.S. Patent 10,635,351: filed Mar. 2018 and issued Apr. 2020; China Patent Application 2018-1-0298334.X: filed Apr. 2018 — Korea: filed; U.S.: granted; China: filed
- Bryan S. Kim and Eyee Hyun Nam. Memory Apparatus and Control Method Thereof. Korea Patent 10-1564574: filed Nov. 2013 and issued Oct. 2015 — Korea: granted
- Hongseok Kim, Bryan S. Kim, and Eyee Hyun Nam. Memory Apparatus and Control Method Thereof. Korea Patent 10-1531965: filed Nov. 2013 and issued June 2015 — Korea: granted
- Sang Lyul Min, Bryan S. Kim, Jinhyuk Kim, Donggi Lee, Taesung Jung, Byeongse So, Duckhyun Chang. Memory Device and Program Method Thereof. Korea Patent 10-1544607: filed Oct. 2008 and issued Aug. 2015; U.S. Patent 8,493,782: filed Oct. 2009 and issued July 2013; China Patent 101727983: filed Oct. 2009 and issued June 2016 — U.S.: granted; Korea: granted; China: granted

Industry Experience

- SK Telecom — Seongnam, South Korea
  Manager at Storage Tech. Lab — *Apr. 2013 – Sep. 2015*
- Oracle Corporation — Santa Clara, USA
  Research intern at Solaris kernel team — *June 2011 – Sep. 2011*
- Samsung Advanced Institute of Technology — Yongin, South Korea
  Research intern at Semiconductor lab — *July 2010 – Sep. 2010*
- n&k Technology Inc. — San Jose, USA
  Application engineer — *July 2006 – July 2007*

Teaching

- ECS 100: Leadership Scholar Forum — Syracuse University
  Guest lecturer on Oct. 19th — *Fall 2020*
- CIS600/CIS700/CSE691/CSE791: Storage Systems for Big Data — Syracuse University
  Instructor — *Spring 2020*
- CIS341: Computer Organization & Programming Systems — Syracuse University
  Instructor — *Spring 2020*
- CIS486: Design of Operating Systems — Syracuse University
  Guest lecturer on Oct. 15th — *Fall 2019*
- ECS 101: Introduction to Engineering and Computer Science — Syracuse University
  Guest lecturer on Oct. 11th — *Fall 2019*
- ECS 691: Fundamentals of Research — Syracuse University
  Guest lecturer on Oct. 9th — *Fall 2019*
- CSE791: Storage for Big Data & Cloud Computing — Syracuse University
  Instructor — *Fall 2019*
- 035.001: Introduction to Computer Science — Seoul National University
  Instructor (rating: 4.68/5.00) — *Spring 2019*
- 035.001: Introduction to Computer Science — Seoul National University
  Instructor (rating: 4.62/5.00) — *Spring 2018*
- CSE140: Digital Systems Design — University of California, San Diego
  Teaching assistant (rating: 4.75/5.00) — *Winter 2012*
- CSE240A: Advanced Computer Architecture — University of California, San Diego
  Teaching assistant (rating: 4.51/5.00) — *Fall 2011*

Talks

- CPR for SSDs
  ACM Workshop on Hot Topics in Operating Systems — *May 2019*
- Towards Performant and Reliable Flash-Based Storages
  Technische Universität Dresden — *May 2019*
- Taming Performance Variability in SSDs
  Soongsil University — *Apr. 2019*
- Design Tradeoffs for SSD Reliability
  USENIX Conference on File and Storage Technologies — *Feb. 2019*
- SSD Reliability Management for Unreliable Flash Memory
  Korean Conference on Semiconductors — *Feb. 2019*
- Performance Predictability for Flash-Based Storages
  Syracuse University, University of Wisconsin–Madison — *Feb. 2019*
- Performance Implications for Flash Memory Error Handling
  SK Hynix — *Dec. 2018*

- AutoSSD: an Autonomic SSD Architecture
  USENIX Annual Technical Conference *July 2018*
- Utilitarian Performance Isolation in Shared SSDs
  USENIX HotStorage *July 2018*
- The Balancing Act in SSDs
  DGIST *June 2018*
- Evaluating the Performance and Reliability of Flash Storages
  SK Hynix *June 2018*
- An Autonomic SSD
  KIISE SIG on File and Storage Technology *May 2018*
- NVM-based Storage Systems for HPC I/O Nodes
  KIISE SIG on Heterogenous Computing and Storage *Jan. 2018*
- DRAM-less Flash Memory Storage Device
  SK Hynix *Nov. 2017*
- Efficient and Flexible Flash Memory Operation Scheduling
  IEEE Non-Volatile Memory Systems and Applications *Aug. 2017*
- QoS-aware Flash Memory Controller
  IEEE Real-Time and Embedded Technology and Applications Symposium *Apr. 2017*

Institutional Services

- Undergraduate academic advising
- Ph.D. thesis committee
  - Amit Ahlawat *(advisor: Prof. Wenliang Du)* *Fall 2020*
  - Amar Shrestha *(advisor: Prof. Qinru Qiu)* *Fall 2020*
- EECS search committee *2020–2021*
- CISE doctoral program qualifying exam committee *2019–2020*
- Faculty reviewer for SOURCE (undergrad research proposal) *2019–2020*

Academic Services

- Journal of Systems Research (JSys)
  - Editorial Board *2021*
- IEEE Non-Volatile Memory Systems and Applications Symposium (NVMSA)
  - Reviewer *2021*
- IEEE Transactions on Computer-Aided Design (TCAD)
  - Reviewer *2019–2020*
- Design Automation Conference (DAC)
  - Technical Program Committee *2019–2021*
  - Session co-chair *2020*

Student Mentoring

- Xiangqun Zhang *(Ph.D., Syracuse University)* — *Aug. 2020 – present*
- Omkar Desai *(Ph.D., Syracuse University)* — *Aug. 2020 – present*
- Ziyang Jiao *(Ph.D., Syracuse University)* — *Aug. 2020 – present*
- Minwook Kim *(Ph.D., Seoul National University)* — *June 2018 – Mar. 2020*
- Hyeongyu Lee *(Ph.D., Seoul National University)* — *Jan. 2018 – Mar. 2020*
- Juwon Lee *(M.S., Seoul National University)* — *Jan. 2018 – Mar. 2020*
- Seunggeun Chi *(B.S., Seoul National University)* — *Jan. 2018 – Dec. 2018*
- Geonhee Lee *(M.S., Seoul National University)* — *Jan. 2018 – July 2018*
- Yonggun Lee *(M.S., Seoul National University)* — *Jan. 2017 – Aug. 2017*