

Bryan S. Kim

Assistant Professor
Syracuse University
4-181 CST, 111 College Pl, Syracuse, NY 13244

bkim01@syr.edu
sites.google.com/view/bryansjkim
1.315.443.1249

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* ISLPED'21
International Symposium on Low Power Electronics and Design, 2021
- 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* OSDI'21
and Implementation, 2021 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 Technologies*, 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
Guest lecturer on Oct. 19th Syracuse University
Fall 2020
- CIS600/CIS700/CSE691/CSE791: Storage Systems for Big Data
Instructor Syracuse University
Spring 2020
- CIS341: Computer Organization & Programming Systems
Instructor Syracuse University
Spring 2020
- CIS486: Design of Operating Systems
Guest lecturer on Oct. 15th Syracuse University
Fall 2019
- ECS 101: Introduction to Engineering and Computer Science
Guest lecturer on Oct. 11th Syracuse University
Fall 2019
- ECS 691: Fundamentals of Research
Guest lecturer on Oct. 9th Syracuse University
Fall 2019
- CSE791: Storage for Big Data & Cloud Computing
Instructor Syracuse University
Fall 2019
- 035.001: Introduction to Computer Science
Instructor (rating: 4.68/5.00) Seoul National University
Spring 2019
- 035.001: Introduction to Computer Science
Instructor (rating: 4.62/5.00) Seoul National University
Spring 2018
- CSE140: Digital Systems Design
Teaching assistant (rating: 4.75/5.00) University of California, San Diego
Winter 2012
- CSE240A: Advanced Computer Architecture
Teaching assistant (rating: 4.51/5.00) University of California, San Diego
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*
- 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*