

## Bryan S. Kim

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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

- Hyun Gyu 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*  
acceptance rate: %
- 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: DAC'21
- WHAT IS IT GOOD FOR? To appear in *Design Automation Conference*, 2021 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*
- European Conference on Computer Systems (EuroSys)
  - Shadow Program Committee *2019*

- International Symposium on Computer Architecture (ISCA)
  - Student Volunteer

2016

## Student Mentoring

- Shao-Peng Yang (*Ph.D., Syracuse University*) *Aug. 2021 – present*
- 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*