Curriculum Vitae

Heechul Yun

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Table of Contents

I. SHORT BIO

Heechul Yun is an associate professor in the department of Electrical Engineering and Computer Science at the University of Kansas. His research interests include OS, computer architecture, and real-time embedded systems with special emphasis on addressing real-time, security, and safety related issues on safety-critical cyber-physical systems (e.g., autonomous cars and airplanes). His work regularly appears in top embedded real-time systems venues such as RTAS, ECRTS and Transactions on Computers; and received multiple awards and recognition (Outstanding Paper Award from RTAS'19, Best Paper Award and Outstanding Paper Award from RTAS'16, Editor's Pick of the Year Award from IEEE Transactions on Computers in 2016, Best Student Paper Nomination from RTCSA'16, and Best Paper Nomination from ECRTS'10). He received a Ph.D. degree in Computer Science from the University of Illinois at Urbana-Champaign in 2013. Prior to his Ph.D., he worked at Samsung Electronics as a senior software engineer.

II. EDUCATION

Ph.D., Computer Science, University of Illinois at Urbana-Champaign, 2013 (Advisor: Lui Sha)
M.S., Computer Science, KAIST, Korea, 2001 (Advisor: Joonwon Lee)
B.S., Computer Science, KAIST, Korea, 1999

III. EMPLOYMENT HISTORY

Associate Professor, EECS, University of Kansas, Lawrence, KS, August 2019 – Current
Assistant Professor, EECS, University of Kansas, Lawrence, KS, August 2013 – July 2019
System Software Intern, NVIDIA, Santa Clara, CA, May 2011 – August 2011
Visiting Scholar/Graduate Research Assistant, UIUC, Champaign, IL, February 2009 – July 2013
Senior Software Engineer, Samsung Electronics, Suwon, Korea, January 2004 – January 2009
Research Engineer, ETRI, Daejeon, Korea, March 2001 - December 2003

IV. HONORS AND AWARDS

Bellows Faculty Scholar Award, School of Engineering, University of Kansas, 2023
Miller Professional Development Award, School of Engineering, University of Kansas, 2022
Best Paper Award, IEEE RTSS, 2020
Miller Scholar Award, School of Engineering, University of Kansas, 2019
Outstanding Paper Award, IEEE RTAS, 2019
Best Paper Award & Outstanding Paper Award, IEEE RTAS, 2016
Editor's Pick of the Year & Feature Article of the Month, IEEE Transactions on Computers, 2016
Nomination for Best Student Paper, IEEE RTCSA, 2016
Nomination for Best Paper, ECRTS, 2010

V. RESEARCH RECORD

A. Research Publications and Other Creative Works

Total citations: 2733, h-index: 27, i10-index: 42 (Google Scholar, as of November 24, 2023)
Publications at top tier conferences and journals: ⭐
Indications of impact (>50 citations, awards): red color.
My students and myself: **bold face**.
Code: [J] Journal; [C] Conference; [W] Workshop; [O] Others (Preprint, WIP, etc.)

Major Publications (Journals, Conferences)

1. [C] **Eric Seals, Michael Bechtel, Heechul Yun. "**BandWatch: A System-Wide Memory Bandwidth Regulation System for Heterogeneous Multicore**."** *IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA),* August 2023

2. [C] Johnson Umeike, Neel Patel, Alex Manley, Amin Mamandipoor, **Heechul Yun** and Mohammad Alian. "Profiling an Architectural Simulator." *IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*, April 2023.

3. [C] **Michael Garrett Bechtel and Heechul Yun**. "Cache Bank-Aware Denial-of-Service Attacks on Multicore ARM Processors." *IEEE Intl. Conference on Real-Time and Embedded Technology and Applications Symposium (RTAS)*, May 2023 ⭐

4. [C] **Ahmet Soyyigit**, Shuochao Yao and **Heechul Yun**. "Anytime-Lidar: Deadline-aware 3D Object Detection." *IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*, August 2022

5. [C] **Michael Bechtel, Qitao Weng** and **Heechul Yun**. "DeepPicarMicro: Applying TinyML to Autonomous Cyber Physical Systems." *IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*, August 2022

6. [C] Parul Sohal, **Michael Bechtel**, Renato Mancuso, **Heechul Yun**, Orran Krieger. "A Closer Look at Intel Resource Director Technology (RDT)." *International Conference on Real-Time Networks and Systems (RTNS)*, June 2022

7. [C] **Michael Garrett Bechtel and Heechul Yun**. "Denial-of-Service Attacks on Shared Resources in Intel's Integrated CPU-GPU Platforms." *IEEE International Symposium on Real-Time Distributed Computing (ISORC),* May 2022

8. [J**] Jacob Fustos, Michael Bechtel,** and **Heechul Yun**. "A Framework for Leaking Secrets to Past Instructions." *Journal of Cryptographic Engineering*, 2022

9. [J] **Michael Garrett Bechtel** and **Heechul Yun**. "Memory-Aware Denial-of-Service Attacks on Shared Cache in Multicore Real-Time Systems." *IEEE Transactions on Computers*, 2021. ⭐

10. [J] Shengzhong Liu, Shuochao Yao, Xinzhe Fu, Huajie Shao, Rohan Tabish, Simon Yu, Ayoosh Bansal, **Heechul Yun**, Lui Sha, Tarek Abdelzaher. "Real-Time Task Scheduling for Machine Perception in In Intelligent Cyber-Physical Systems." *IEEE Transactions on Computers*, 2021 ⭐

11. [J] Rohan Tabish, Jen-Yang Wen, Rodolfo Pellizzoni, Renato Mancuso, **Heechul Yun**, Marco Caccamo, Lui Raymond Sha. "An analyzable inter-core communication framework for high-performance multicore embedded systems." *Journal of Systems Architecture*, 2021

12. [C] **Waqar Ali**, Rodolfo Pellizzoni, **Heechul Yun**. "Virtual Gang based Scheduling of Parallel Real-Time Tasks." *Design, Automation and Test in Europe Conference (DATE)*, February 2021.

13. [C] Shengzhong Liu, Shuochao Yao, Xinzhe Fu, Rohan Tabish, Simon Yu, Ayoosh Bansal, **Heechul Yun**, Lui Sha and Tarek Abdelzaher. "On Removing Algorithmic Priority Inversion from Mission-critical Machine Inference Pipelines." *IEEE Real-Time Systems Symposium (RTSS)*, December 2020. ⭐
Best Paper Award

14. [C] Homa Aghilinasab, **Waqar Ali, Heechul Yun,** Rodolfo Pellizzoni. Dynamic Memory Bandwidth Allocation for Real-Time GPU-Based SoC Platforms. *ACM/IEEE Intl. Conference on Embedded Software (EMSOFT)*, September 2020 ⭐

15. [C] **Farzad Farshchi**, Qijing Huang, and **Heechul Yun**. "BRU: Bandwidth Regulation Unit for Real-Time Multicore Processors." *IEEE Intl. Conference on Real-Time and Embedded Technology and Applications Symposium (RTAS)*, April 2020 ⭐

16. [C] Renato Mancuso, **Heechul Yun**, Isabelle Puaut. "Impact of DM-LRU on WCET: a Static Analysis Approach." *Euromicro Conference on Real-Time Systems (ECRTS)*, July 2019 ⭐

17. [C**] Jacob Michael Fustos, Farzad Farshchi**, and **Heechul Yun**. "SpectreGuard: An Efficient Data-centric Defense Mechanism against Spectre Attacks." *ACM/IEEE Design Automation Conference (DAC)*, June 2019 ⭐
Citations: 73

18. [C**] Waqar Ali** and **Heechul Yun**. "RT-Gang: Real-Time Gang Scheduling Framework for Safety-Critical Systems." *IEEE Intl. Conference on Real-Time and Embedded Technology and Applications Symposium (RTAS)*, April 2019 ⭐

19. [C] **Michael Garrett Bechtel** and **Heechul Yun**. "Denial-of-Service Attacks on Shared Cache in Multicore: Analysis and Prevention." *IEEE International Conference on Real-Time and Embedded Technology and Application Symposium (RTAS)*. April 2019 ⭐
Outstanding Paper Award
Citations: 55

20. [C] **Michael Garrett Bechtel, Elise McEllhiney**, Minje Kim, and **Heechul Yun**. "DeepPicar: A Low-cost Deep Neural Network-based Autonomous Car." *IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*. pp:1-11. August 2018
Citations: 127

21. [C] **Waqar Ali and Heechul Yun**. "Protecting Real-Time GPU Applications on Integrated CPU-GPU SoC Platforms." *Euromicro Conference on Real-Time Systems (ECRTS)*. pp:1-22. July 2018. ⭐

22. [C] **Farzad Farshchi, Prathap Kumar Valsan,** Renato Mancuso, and **Heechul Yun**. "Deterministic memory abstraction and supporting multicore system architecture." In *Euromicro Conference on Real-Time Systems (ECRTS)*. pp:1-24. July 2018. ⭐

23. [J] **Prathap Kumar Valsan, Heechul Yun, and Farzad Farshchi**. "Addressing Isolation Challenges of Non-blocking Caches for Multicore Real-Time Systems." *Real-Time Systems* (Springer) pp: 673–708. https://doi.org/10.1007/s11241-017-9280-9. ISSN: 0922-6443. September 2017

24. [J] **Heechul Yun, Waqar Ali, Santosh Gondi, and Siddhartha Biswas**. "BWLOCK: A Dynamic Memory Access Control Framework for Soft Real-Time Applications on Multicore Platforms." *IEEE Transactions on Computers*. pp: 1247 - 1252. July 2017 ⭐

25. [J] Lui Sha, Marco Caccamo, Renato Mancuso, Jung-Eun Kim, Man-Ki Yoon, Rodolfo Pellizzoni, **Heechul Yun**, Russell Kegley, Dennis Perlman, Greg Arundale, and Richard Bradford. "Real-Time Computing on Multicore Processors." *IEEE Computer*. pp: 69-77. ISSN: 0018-9162. September 2016. ⭐

26. [C] **Prasanth Vivekanandan**, Gonzalo Garcia**, Heechul Yun**, and Shawn Keshmiri. "A Simplex Architecture for Intelligent and Safe Unmanned Aerial Vehicles." *IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA)*. pp: 1-7. August 2016.
Nominated for Best Student Paper.

27. [C] **Prathap Kumar Valsan**, **Heechul Yun, and Farzad Farshchi**. "Taming Non-blocking Caches to Improve Isolation in Multicore Real-Time Systems." *IEEE International Conference on Real-Time and Embedded Technology and Applications Symposium (RTAS)*. pp: 1-12. April 2016 ⭐
Best Paper Award and Outstanding Paper Award
Citations: 129

28. [C] Rodolfo Pellizzoni, and **Heechul Yun.** "Memory Servers for Multicore Systems." In *IEEE International Conference on Real-Time and Embedded Technology and Applications Symposium (RTAS)*. pp: 1-12. April 2016. ⭐

29. [J] **Heechul Yun**, Gang Yao, Rodolfo Pellizzoni, Marco Caccamo, and Lui Sha. "Memory Bandwidth Management for Efficient Performance Isolation in Multicore Platforms." *IEEE Transactions on Computers*, 65, no. 2. pp: 562 - 576. February 2016 ⭐
Editors Pick of the Year 2016 & Feature Article of the Month.
Citations: 79

30. [J] Gang Yao, Rodolfo Pellizzoni, Stanley Bak, **Heechul Yun**, and Marco Caccamo. "Global Real-Time Memory-Centric Scheduling for Multicore Systems." *IEEE Transactions on Computers*. pp: 2739 - 2751. 2015 ⭐
Citations: 67

31. [C] **Prathap Kumar Valsan and Heechul Yun.** "MEDUSA: A Predictable and High-Performance DRAM Controller for Multicore based Embedded Systems." *IEEE Intl. Conference on Cyber-Physical Systems, Networks, and Applications (CPSNA)*. pp: 86-93. August 2015.

32. [C] Renato Mancuso, Rodolfo Pellizzoni, Marco Caccamo, Lui Sha, and **Heechul Yun**. "WCET(m) Estimation in Multi-Core Systems using Single Core Equivalence." *Euromicro Conference on Real-Time Systems (ECRTS)*. pp: 174 – 183. July 2015. ⭐
Citations: 83

33. [C] **Heechul Yun**, Rodolfo Pellizzoni, and **Prathap Kumar Valsan**. "Parallelism-Aware Memory Interference Delay Analysis for COTS Multicore Systems." *Euromicro Conference on Real-Time Systems (ECRTS)*. pp: 184 – 195. July 2015. ⭐
Citations: 100

34. [J] Gang Yao, **Heechul Yun**, Zheng Pei Wu, Rodolfo Pellizzoni, Marco Caccamo, and Lui Sha. "Schedulability Analysis for Memory Bandwidth Regulated Multicore Real-Time Systems." *IEEE Transactions on Computers*. pp: 601-614. 2015. ⭐

35. [C] **Heechul Yun**, Renato Mancuso, Zheng-Pei Wu, and Rodolfo Pellizzoni. "PALLOC: DRAM Bank-Aware Memory Allocator for Performance Isolation on Multicore Platforms." *IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*. pp: 155-166. IEEE, April 2014. ⭐
Citations: 298

36. [C] Sibin Mohan, Stanley Bak, Emilliano Betti, **Heechul Yun**, Lui Sha, and Marco Caccamo. "S3A: Secure System Simplex Architecture for Enhanced Security of Cyber-Physical Systems." *IEEE/ACM High Condence Networked Systems (HiCoNS)*. 65-74. April 2013.
Citations: 144

37. [C] **Heechul Yun**, Gang Yao, Rodolfo Pellizzoni, Marco Caccamo, and Lui Sha. "MemGuard: Memory Band-width Reservation System for Efficient Performance Isolation in Multicore Platforms." *IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*. pp. 55-64. April 2013. ⭐
Citations: 387

38. [C] **Heechul Yun**, Gang Yao, Rodolfo Pellizzoni, Marco Caccamo, and Lui Sha. "Memory Access Control in Multiprocessor for Real-time Systems with Mixed Criticality." *Euromicro Conference on Real-Time Systems (ECRTS)*. pp. 299-308. June 2012. ⭐
Citations: 194

39. [J] **Heechul Yun**, Po-Liang Wu, Anshu Arya, Tarek Abdelzaher, Cheolgi Kim, and Lui Sha. "System-wide Energy Optimization for Multiple DVS Components and Real-time Tasks." *Real-Time Systems,* vol 47, pp: 489-515. doi:10.1007/S11241-011-9125-X. 2011. ⭐

40. [C] **Heechul Yun**, Po-Liang Wu, Anshu Arya, Tarek Abdelzaher, Cheolgi Kim, and Lui Sha. "System-wide Energy Optimization for Multiple DVS Components and Real-time Tasks." *Euromicro Conference on Real-Time Systems (ECRTS)*. pp. 134-142. July 2010. ⭐
Nominated for Best Paper.

41. [C] Cheolgi Kim, Mu Sun, Sibin Mohan, **Heechul Yun**, Abdullah Al-Nayeem, and Lui Sha. "A Framework for the Safe Interoperability of Medical Devices in the Presence of Connection Failures." *ACM Cyber-Physical Systems (ICCPS)*. pp. 149-158. April 2010. ⭐
Citations: 81

28. [C] **Heechul Yun**, Po-Liang Wu, Maryam Rahmaniheris, Cheolgi Kim, and Lui Sha. "A Reduced Complexity Design Pattern for Distributed Hierarchical Command and Control System." *ACM Cyber-Physical Systems (ICCPS)*. pp. 42-49. April 2010. ⭐

Minor Publications (Workshops, Preprints, etc.)

42. [W] **Jacob Fustos, Michael Garrett Bechtel, Heechul Yun**. SpectreRewind: Leaking Secrets to Past Instructions. *Workshop on Attacks and Solutions in Hardware Security (ASHES)*, November 2020

Yun, Heechul

43. [O] **Michael Garrett Bechtel and Heechul Yun**. "Memory-Aware Denial-of-Service Attacks on Shared Cache in Multicore Real-Time Systems." arXiv preprint, arXiv:2005.10864, 2020.

33. [O] **Waqar Ali and Heechul Yun**. "Virtual Gang based Scheduling of Real-Time Tasks on Multicore Platforms." *arXiv preprint arXiv:1912.10959 [cs.OS]*, December 2019

34. [W] **Waqar Ali, Michael Bechtel and Heechul Yun**. "Analyzable and Practical Real-Time Gang Scheduling on Multicore Using RT-Gang." *Workshop on Operating Systems Platforms for Embedded Real-Time applications (OSPERT)*, July 2019

35. [W] **Farzad Farshchi**, Qijing Huang, and **Heechul Yun**. "Integrating NVIDIA Deep Learning Accelerator (NVDLA) with RISC-V SoC on FireSim." *Workshop on Energy Efficient Machine Learning and Cognitive Computing for Embedded Applications (EMC^2)*, February 2019
Citations: 54

36. [O] **Waqar Ali and Heechul Yun**. "Work-In-Progress: Protecting Real-Time GPU Applications on Integrated CPU-GPU SoC Platforms." *IEEE Real-Time and Embedded Technology and Applications Symposium-Work-In-Progress (RTAS-WIP)*, April 2017.

37. [W] **Heechul Yun and Prathap Kumar Valsan**. "Evaluating the Isolation Effect of Cache Partitioning on COTS Multicore Platforms." *Workshop on Operating Systems Platforms for Embedded Real-Time applications (OSPERT)*. July 2015.

38. [O] **Prathap Kumar Valsan and Heechul Yun**. "An Enhanced COTS DRAM Controller Design for Real Time Systems." *Real-Time Systems Symposium Work-In-Progress (RTSS-WIP)*. IEEE, December 2014.

39. [W] **Santosh Gondi, Siddhartha Biswas, and Heechul Yun**. "Performance Isolation for Real-Time Applications on Multicore Platforms using PALLOC and MemGuard." *Real-Time Linux Workshop*. Dusseldorf, Germany: October 2014.

40. [W] Michael Jantz, Kshitij Doshi, Prasad Kulkarni, and **Heechul Yu**n. "Leveraging MPST in Linux with Application Guidance to Achieve Power-Performance Goals." Ottawa Linux Symposium. 2014

41. [O] Lui Sha, Marco Caccamo, Renato Mancuso, Jung-Eun Kim, Man-Ki Yoon, Rodolfo Pellizzoni, **Heechul Yun**, Russel Kegley, Dennis Perlman, Greg Arundale, Richard Bradford "Single-core Equivalent Virtual Machines for Hard Real-Time Computing on Multicore Processors." *Technical Report, University of Illinois, Urbana-Champaign,* 2014.
Citations: 62

42. [W] **Heechul Yun**. "Improving Real-Time Performance on Multicore Platforms Using MemGuard." *Real-Time Linux Workshop*. October 2013.

43. [O] **Heechul Yun**, Cheolgi Kim, and Lui Sha. "Deterministic Real-time Scheduling." *IEEE Real-Time and Embedded Technology and Applications Symposium Work-In-Progress (RTAS-WIP)*. April 2011.

44. [W] Hyoksung Choi and **Heechul Yun**. "Context Switching and IPC Performance

7

Comparison between uClinux and Linux on the ARM9 based Processors." *Samsung Tech Conference*. 2005.

45. [W] Sangkwon Lee, **Heechul Yun**, and Joonwon Lee. "Adaptive Prefetching Technique for Home-based Lazy Release Consistency." *Workshop on Software Distributed Shared Memory (held in conjunction with CCGRID)*. 2001.

46. [W] **Heechul Yun**, Sankwon Lee, and Joonwon Lee. "An Efficient Lock Protocol for Home-based Lazy Release Consistency." *Workshop on Software Distributed Shared Memory (held in conjunction with CCGRID)*. 2001.

Software and Hardware Artifacts

47. **AnytimeLidar**: Anytime Capable Lidar-based Object Detector
https://github.com/CSL-KU/Anytime-Lidar

48. **DeepPicarMicro**: Deep Neural Network based autonomous RC car on a Microcontroller
https://github.com/CSL-KU/DeepPicarMicro

49. **SpectreRewind**: Leaking Secrets to Past Instructions
https://github.com/CSL-KU/SpectreRewind-PoC

50. **SpectreGuard**: An Efficient Data-centric Defense Mechanism Against Spectre Attacks
https://github.com/CSL-KU/SpectreGuard

51. **RT-Gang**: A Real-Time Gang Scheduler for Safety Critical Real-Time Systems
https://github.com/CSL-KU/RT-Gang

52. **FireSim-NVDLA**: An Open-Source RISC-V SoC with NVIDIA Deep Learning Accelerator
https://github.com/CSL-KU/firesim-nvdla (Star: 154)

53. **DeepPicar**: Deep Neural Network based autonomous RC car
https://github.com/mbechtel2/DeepPicar-v2 (Star: 120)

54. **DetMem**: Linux and Gem5 simulator extensions supporting Deterministic Memory
https://github.com/CSL-KU/detmem

55. **BWLOCK++**: Real-Time GPU kernel protection mechanism for Integrated CPU-GPU SoC
https://github.com/wali-ku/BWLOCK-GPU

56. **BWLOCK**: Memory bandwidth locking mechanism for SMP multicore
https://github.com/CSL-KU/BWLOCK

57. **IsolBench**, Micro-benchmarks to quantify the quality of isolation of multicore systems
https://github.com/CSL-KU/IsolBench

58. **PALLOC**: DRAM Bank-Aware Kernel Memory Allocator
https://github.com/heechul/palloc

59. **MemGuard**: Memory bandwidth reservation system for multi-core platforms
https://github.com/heechul/memguard

60. **CREST-Z3:** Non-linear arithmetic support for CREST (concolic execution engine)
   https://github.com/heechul/crest-z3

61. **Linux kernel patches:** ARM multicore performance improvements in mainline kernel
   ARM: 6998/2: kernel: use proper memory barriers for bitops
   ARM: 6995/2: mm: remove unnecessary cache flush on v6 copypage

Patents

62. H. Yun, Y. Jeon, M. Choi. "Apparatus and method for storing data in nonvolatile cache memory considering update ratio", KR100725390B1, Korea.

63. H. Yun. "A method for managing flash memory and flash memory system", KR100739722B1, Korea.

64. Y. Oh, H. Yun. "Apparatus and method of providing contents service", KR100840609B1, Korea / US9298748B2, USA

65. W. Kang, H. Yun. "Method for integrating Linux kernel and application software packages and generating installation le list based on CML2 computer language", US7367013B2, USA.

Books

66. Hyejin Kim, Heechul Yun. "Linux 3.0 Power User" (Korean), PCBOOK, 1996

B. **Scholarly Presentations/Lectures (Selected)**

1. "Understanding Hardware Interference Channels in Multicore."
   Real-Time Systems Community of Practice @ Collins Aerospace, Online, September 2023

2. "Safe and Secure Computing Infrastructure for Intelligent Cyber-Physical Systems."
   Korea Computer Systems Society, February 2021

3. "Micro-Architectural Attacks on Cyber-Physical Systems."
   Real-Time Scheduling Open Problems Seminar (RTSOPS), Paris, France. July 2019

4. "RT-Gang: Real-Time Gang Scheduling Framework for Safety-Critical Systems."
   IEEE RTAS, Montreal, Canada, April 2019

5. "OS and Architecture Support for High-Performance Safe-Critical Embedded Real-Time Systems." Seoul National University, Seoul, Korea. August 2018

6. "Micro-Architectural Side-Channel Attack Resistant OS and Architecture."
   NSA SoS Lablet Kickoff Meeting, College Park, MD, USA. April 2018

7. "System-level Support for Intelligent and Safe Cyber-Physical Systems."
   Kansas State University, Manhattan, Kansas. October 2017
   University of Illinois at Urbana–Champaign (UIUC), Champaign, Illinois. September 2017.
   Sungkyunkwan University, Suwon, South Korea. July 2017.
   Electronics and Telecommunications Research Institute (ETRI), South Korea. July 2017.

8. "Cache Partitioning on Contemporary COTS Multicore Processors."
   Second TCRTS Workshop on Certifiable Multicore Avionics and Automotive Systems (CMAAS), Pittsburgh, PA, USA. April 2017.

9. "Computing Infrastructure Support for Intelligent and Safe Cyber-Physical Systems."
   Seoul National University, Seoul. South Korea. August 2016.

10. "Taming Non-Blocking Caches to Improve Isolation in Multicore Real-Time Systems."
    IEEE RTAS, Vienna, Austria. 2016.

11. "A Simplex Architecture for Intelligent and Safe Unmanned Aerial Vehicles."
    AFRL Safe & Secure Systems and Software Symposium (S5), Dayton, Ohio. July 14, 2016.

12. "Taming Non-Blocking Caches to Improve Isolation in Multicore Real-Time Systems."
    Embedded Computing Community of Practice at Lockheed Martin, Webinar. June 2016.

13. "Parallelism-Aware Memory Interference Delay Analysis for COTS Multicore Systems."
    ECRTS, Lund, Sweden. July 2015.

14. "Toward certifiable avionics platforms: Single Core Equivalent (SCE) techniques."
    First TCRTS Workshop on Certifiable Multicore Avionics Systems (CMAS). April 2015.

15. "Memory-Aware Power/Energy Management.
    ETRI, Daejun, Korea. July 2014.

16. "PALLOC: DRAM Bank-Aware Memory Allocator for Performance Isolation on Multicore Real-Time Systems." IEEE RTAS, Berlin, Germany. April 2014.

17. "Operating System Level Shared Resource Management in the Multicore Era."
    Sungkyunkwan University, Suwon, South Korea. December 12, 2013.
    Korea Aerospace University, Goyang, South Korea. December 11, 2013.
    University of Seoul, Seoul, South Korea. December 10, 2013.

18. "MemGuard: Memory Bandwidth Reservation System for Efficient Performance Isolation in Multi-core Platforms." IEEE RTAS, Philadelphia, PA. April 2013.

19. "Single-core Equivalent Multicore Platform Technologies."
    Lockheed Martin, Littleton, CO. January 2013.

20. "Single-core Equivalent Configuration for Multicore Avionics Systems."
    Rockwell Collins, Cedar Rapids, IA. August 2012.

21. "Memory Access Control in Multiprocessor for Real-time Systems with Mixed Criticality."
    ECRTS, Pisa, Italy. July 2012.

22. "System-wide Energy Optimization for Multiple DVS Components and Real-time Tasks."
    ECRTS, Brussels, Belgium. July 2010.

C. Grants and Contracts

$9.4 million is awarded in total, out of which I am credited with $**3.0 million**.

External Funding

1. "Applied Research and Innovation Scholarship for Engineering Students in Advanced Aerospace Technologies, AI, and Cybersecurity (ARISE)."
    Investigators: Shawn Keshmiri (KU PI), Drew Davidson (Co-PI), Carl Leuschen (Co-PI), Heechul Yun (Co-PI)
    Agency: Kansas State University / Department of Defense (DoD)
    KU total budget: $ 3,097,582 (Share: 15%)
    Period: September 2023- September 2027

2. "PDG: Anytime Perception and Control for Intelligent and Safe Advanced Air Mobility."
    Investigators: Heechul Yun (**PI**) and Shawn Keshmiri (Co-PI)
    Agency: Kansas NASA EPSCoR
    KU total budget: $22,028 (Share: 100%)
    Period: May 2023- January 2024

3. "HIC Theory Life Cycle (HTLC)."
    Investigators: Heechul Yun (**PI**)
    Agency: Collins Aerospace
    KU total budget: $40,000 (Share: 100%)
    Period: June 2023- December 2023

4. "Collaborative Research: CPS: Medium: Real-time Criticality-Aware Neural Networks for Mission-critical Cyber-Physical Systems."
    Investigators: Tarek Abdelzaher (PI / UIUC), Shouchao Yao (Co-PI / GMU), Heechul Yun (**Co-PI / KU**),
    Agency: National Science Foundation (NSF)
    KU total budget: $321,379 (Share: 100%)
    Period: July 2021- July 2024

5. "Learning, Exploration, and Application for Prospective Engineering Students (LEAPES)"
    Investigators: Shawn Keshmiri (KU PI), Suzanne Shontz (Co-PI), Weizhang Huang (Co-PI), Heechul Yun (Co-PI)
    Agency: Kansas State University / Department of Defense (DoD)
    KU total budget: $945,350 (Share: 22.5%)
    Period: September 2021 – September 2024.

6. "A54 - Propose UAS Right-of-Way Rules for Unmanned Aircraft Systems,"
    Investigators: Mark Ewing (KU PI), Shawn Keshmiri, S. (Co-PI), Heechul Yun. (Co-PI)
    Agency: Federal Aviation Administration (FAA)
    KU Total budget: $741,788
    Period: October 2021 – October 2024

7. "CSR: Small: Collaborative Research: Real-Time Computing Infrastructure for Integrated CPU-GPU SoC Platforms."
    Investigators: Heechul Yun (**PI / KU**), Lui Sha (Co-PI / UIUC)
    Agency: National Science Foundation (NSF)
    Total budget: $500,000 (Share: 56%)
    Period: September 2018 - August 2021.

8. "Evolving and Certifiable Autopilot for Unmanned Aerial Systems"
   Investigators: Willem Anemaat (PI), Shawn Keshmiri (Co-PI / Sub-award), Heechul Yun
   (**Co-PI / Sub-award**), Mark Ewing (Co-PI / Sub-award)
   Agency: National Aeronautics and Space Administration (NASA) / DARcorporation
   Phase I: Total budget: $124,959 (Share: 15%), Period: June 2018 – December 2018
   Phase II: Total budget: $750,000 (Share: 15%), Period: August 2019 – July 2021

9. "Micro-Architectural Side-Channel Attack Resistant OS and Architecture."
   Investigator: Heechul Yun (**PI**).
   Agency: National Security Agency (NSA) via KU Science of Security Lablet
   Total budget: $482,737 (Share: 100%)
   Period: February 2018 – September 2022.

10. "CSR: Small: The Deterministic Memory Approach for Predictable and High Performance
    Cyber Physical Systems."
    Investigator: Heechul Yun (**PI**).
    Agency: National Science Foundation (NSF)
    Total budget: $300,000 (Share: 100%)
    Period: July 2017 - June 2020.

11. "Integration and Flight Test Verification of Mission Plan Computer in a UAV."
    Investigators: Shawn Keshmiri (PI), Mark Ewing (Co-PI), Heechul Yun (**Co-PI**).
    Agency: Lockheed Martin
    Total budget: $81,107 (Share: 30%)
    Period: August 2017 – July 2018.

12. "Research on Backup Flight Control System for Reliable Unmanned Aerial Vehicles."
    Investigators: Heechul Yun (**PI**) and Shawn Keshmiri (Co-PI).
    Agency: Electronics and Telecommunications Research Institute (ETRI).
    Total budget: $56,000 (Share: 55%)
    Period: September 2017 - November 2017.

13. "Multichannel Sense-and-Avoid Radar for Small UAVs."
    Investigators: Christopher Allen (PI), Shawn Keshmiri (Co-PI), Guanghui Wang (Co-PI), and
    Heechul Yun (**Co-PI**).
    Agency: National Aeronautics and Space Administration (NASA)
    Total budget: $795,583 (Share: 22.5%)
    Period: September 2015 - August 2017.

14. "Shared Resource Management (Cache, DRAM) Techniques for Multicore RTOS."
    Investigator: Heechul Yun (**PI**).
    Agency: Electronics and Telecommunications Research Institute (ETRI)
    Total budget: $50,000 (Share: 100%)
    Period: June 2016 - January 2017

15. "Research on Shared Resource Management Techniques for Multicore RTOS."
    Investigator: Heechul Yun (**PI**).
    Agency: Electronics and Telecommunications Research Institute (ETRI)
    Total budget: $37,000 (Share: 100%)
    Period: October 2015 - January 2016

16. "CSR: Medium: Multicore Real-Time Virtual Partitions."
    Investigators: Lui Sha (PI), Tarek Abdelzaher (Co-PI), Marco Caccamo (Co-PI), Heechul
    Yun (**Co-PI / Sub-award**)
    Agency: National Science Foundation (NSF) / University of Illinois, Urbana-Champaign
    Total budget: $ 1,049,481 (Share: 13.6%)
    Period: September 2013 - August 2016

Internal Funding

17. "ASCEND: Anytime Perception and Control for Intelligent and Safe Advanced Air
    Mobility."
    Investigator: Heechul Yun (**PI**).
    Agency: University of Kansas (General Research Fund)
    Total budget: $7,915 (Share: 100%)
    Period: March 2023 – March 2024.

18. "Operating System Support for Intelligent Cyber-Physical Systems."
    Investigator: Heechul Yun (**PI**).
    Agency: University of Kansas (General Research Fund)
    Total budget: $7,915 (Share: 100%)
    Period: March 2016 – March 2017.

19. "An OS and Hardware Co-Design Approach for Predictable and High-performance Real-
    Time Computing on Multicore Platforms."
    Investigator: Heechul Yun (**PI**).
    Agency: University of Kansas (New Faculty General Research Fund)
    Total budget: $8,000 (Share: 100%)
    Period: March 2015 - March 2016.

20. "Anytime Perception and Control for Efficient and Safe Advanced Air Mobility."
    Investigator: Heechul Yun (**PI**)
    Agency: University of Kansas (ASCEND Funding Program)
    Total budget: $15,000 (Share: 100%)
    Period: January 2023 – March 2024

Donation, Gift

21. Amazon, AWS Cloud Credits for Research (Total value: $20,000), 2019

22. NVIDIA, Titan XP and Jetson TX2 (Total value: $1,800), 2018

23. Intel, Xeon E5-2658 v3 CPU x 2 (Total value: $3,600), 2016

24. Xilinx, UEF-SDSOC-25, (Total value: $299), 2016

25. Xilinx, UEF-VIVADO-SYSTEM-25, UEF-PR-VIVADO x 2 (Total value: $3,099), 2015

26. Xilinx, DIGILAB-ZedBoard-410-248P-KIT x 2 (Total value: $990), 2015

27. NVIDIA, Jetson TK1 x 1 (Total value: $192), 2014

VI. TEACHING RECORD

A. List of Courses Taught

Course Number	Course Title	Sem/Year	# Enrolled	% Taught	Evaluation (*)
EECS 690/700	Embedded Machined Learning	Fall 2023	36	100	4.79
EECS 678	Introdctn to Operating Systems	Spring 2023	112	100	3.94
EECS 753	Embd&Real Time Computer Systms	Spring 2022	4	100	5.00
EECS 678	Introdctn to Operating Systems	Spring 2022	94	100	4.10
EECS 750	Advanced Operating Systems	Fall 2021	7	100	4.70
EECS 753	Embd&Real Time Computer Systms	Spring 2021	10	100	N/A
EECS 678	Introdctn to Operating Systems	Spring 2021	109	100	N/A
EECS 750	Advanced Operating Systems	Fall 2020	14	100	N/A
EECS 753	Embd&Real Time Computer Systms	Spring 2020	6	100	N/A
EECS 388	Embedded Systems	Spring 2020	91	100	N/A
EECS 388	Embedded Systems	Fall 2019	90	100	3.83
EECS 678	Introdctn to Operating Systems	Spring 2019	78	100	4.33
EECS 753	Embd&Real Time Computer Systms	Spring 2019	7	100	4.75
EECS 678	Introdctn to Operating Systems	Fall 2018	28	100	4.93
EECS 678	Introdctn to Operating Systems	Spring 2018	84	100	4.40
EECS 750	Advanced Operating Systems	Spring 2018	12	100	5.00
EECS 678	Introdctn to Operating Systems	Fall 2017	33	100	4.74
EECS 678	Introdctn to Operating Systems	Spring 2017	65	100	4.30
EECS 753	Embd&Real Time Computer Systms	Spring 2017	23	100	4.73
EECS 678	Introdctn to Operating Systems	Fall 2016	38	100	4.33
EECS 678	Introdctn to Operating Systems	Spring 2016	80	100	4.28
EECS 750	Advanced Operating Systems	Spring 2016	8	100	5.00
EECS 678	Introdctn to Operating Systems	Fall 2015	23	100	4.80
EECS 678	Introdctn to Operating Systems	Spring 2015	67	100	4.48
EECS 750	Advanced Operating Systems	Spring 2015	10	100	4.78
EECS 678	Introdctn to Operating Systems	Fall 2014	22	100	4.54
EECS 750	Advanced Operating Systems	Spring 2014	14	100	4.36

(*) Course evaluation score: 5 is the maximum score.

B. Graduate and Postgraduate Advising Record

Ph.D. Students

1. Waqar Ali, Spring 2016 – Fall 2020
   - First employment: NVIDIA, CA
2. Farzad Farshchi, Fall 2015 – Present (on-leave)
   - Status: Post-Qualifier
3. Michael Garrett Bechtel, Spring 2018 – Present
   - First employment: Garmin, KS
4. Ahmet Soyyigit, Spring 2020 – Present

- Status: Post-qualifier

Master Students

5. Prathap Kumar Valsan, Fall 2014 - Summer 2016 (Thesis)
    - Awards: Best Paper Award (RTAS16), Richard K. & Wilma S. Moore Thesis Award
    - First employment: Intel, OR
6. Prasanth Veerapan Chattir Vivekanandan, Summer 2015 - Spring 2017 (Thesis)
    - First employment: On Semiconductor, OR
7. Siddhartha Biswas, Fall 2015 (Project)
    - First employment: Walmart Research, AK
8. Navajit Baruah, Summer 2017 (Project)
    - First employment: Continental, IL
9. Jacob Michael Fustos, Spring 2019 – May 2020 (Thesis)
    - First employment: Sandia National Lab, NM
10. Eric Seals, 2021- 2022
    - First employment: Garmin, KS
11. Qitao Weng, 2022 - Current

VII. SERVICE RECORD

A. Professional Service

Program Committee

IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)
    (2021, 2019, 2018, 2017, 2015)
IEEE Real-Time Systems Symposium (RTSS)
    (2023, 2021, 2020, 2019, 2017, 2015)
IEEE Embedded and Real-Time Computing Systems and Applications (RTCSA)
    (2017, 2016, 2015)
ACM International Conference on Embedded Software (EMSOFT)
    (2017)
ACM/IEEE Design Automation Conference (DAC)
    (2021, 2020)
Euromicro Conference on Real-Time Systems
    (2023, 2021)
ACM Conference on Languages, Compilers, and Tools for Embedded Systems (LCTES)
    (2020, 2014)
IEEE International Symposium on Real-Time Computing (ISORC)
    (2017)
Euromicro Conference on Digital System Design (DSD)
    (2019, 2018)
IEEE Real-Time Systems Symposium, Artifact Evaluation
    (2017)
IEEE Real-Time Systems Symposium, Brief Presentations
    (2018)
IEEE Real-Time Systems Symposium, Work-in-Progress
    (2015, 2014, 2013)

IEEE Real-Time and Embedded Technology and Applications Symposium, Artifact Evaluation
(2018)
IEEE Real-Time and Embedded Technology and Applications Symposium, Work-In-Progress
(2015)
Workshop on Security and Dependability of Critical Embedded Real-Time Systems (CERTS)
(2018, 2017, 2016)
Workshop on Operating Systems Platforms for Embedded Real-Time applications (OSPERT)
(2019, 2015)
Workshop on Mixed Criticality Systems (WMC)
(2018)
Embedded Operating System Workshop (EWiLi)
(2019, 2018, 2017)

Organizer

IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS),
General Chair (2023)
Program Chair (2022)
Track Chair (Track 3: Hardware Architectures and Analysis Tools) (2019)
Workshop on Operating Systems Platforms for Embedded Real-Time applications (OSPERT)
Co-Chair (2018, 2017)
Workshop on Certifiable Multicore Avionics Systems (CMAS)
Co-Chair (2015)
IEEE Real-Time Systems Symposium, RTSS@work (demo session)
Chair (2016)
Tutorial: Single Core Equivalent Architecture Framework for Safety Critical Multicore Systems
Co-Organizer (2014)

Editor

Leibniz Transactions on Embedded Systems (LITES)
Editorial Board Member (July 2023 – Current)
ACM SIGBED Review/Blog
(August 2019 – July 2021)

Reviewer

IEEE Transactions on Computers (TC)
(2023, 2022, 2020, 2019, 2017, 2016)
ACM Transactions on Embedded Computing Systems (TECS)
(2023, 2020, 2017, 2015)
ACM Computing Surveys (CSUR)
(2018)
IEEE Embedded Systems Letters (ESL)
(August 2022, November 2022)
IEEE Transactions on Design Automation of Electronic Systems (TODAES)
(2017)
IEEE Transactions on Parallel and Distributed Systems (TPDS)
(2016)
IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
(2016)

Journal of Systems Architecture (JSA)
(2018, 2017)

B. **University of Kansas Service**

Department/Unit Service
Untenured Faculty Committee (2023, 2022, 2021)
Engineering Senate. (2018, 2017)
Scholarships Committee. (2018, 2017)
New Faculty Hiring Committee. (2020, 2017, 2016, 2015, 2014)
CS Curriculum Committee. (2016, 2014)

School/College Service
Presentation at Society of Women Engineers (SWE). Speaker. (2016)

University Service
Graduate Research Competition Judge. (2019, 2017)
Undergraduate Research Award (UGRA) Competition Judge. (May 2016)