# JEEHO RYOO

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## RESEARCH INTERESTS
- Computer architecture, memory systems, and operating systems
- Performance, energy efficiency, and hardware/software co-design
- Emerging workload and system characterization
- Education and learning technology

## EDUCATION

The University of Texas at Austin, College of Engineering, Austin, TX                    May 2017
Doctor of Philosophy in Electrical and Computer Engineering
Advisor: Lizy K. John

The University of Texas at Austin, College of Engineering, Austin, TX                    May 2014
Master of Science in Electrical and Computer Engineering
Advisors: Lizy K. John

Cornell University, College of Engineering, Ithaca, NY                    May 2011
Bachelor of Science in Electrical and Computer Engineering
Advisors: David H. Albonesi and Christopher Batten

## ACADEMIC EXPERIENCES

Assistant Professor                    July 2025 – Present
Olson College of Engineering and Science, Fairleigh Dickinson University, Vancouver, BC

Assistant Professor                    May 2024 – June 2025
Gildart Haase School of Computer Sciences and Engineering, Fairleigh Dickinson University, Vancouver, BC

Adjunct Professor                    July 2023 – April 2024
Gildart Haase School of Computer Sciences and Engineering, Fairleigh Dickinson University, Vancouver, BC

Research Associate                    March 2023 – April 2024
Laboratory for Computer Architecture, The University of Texas at Austin, Austin, TX

Faculty                    August 2021 – April 2024
British Columbia Institute of Technology, Vancouver, BC, Canada

## PUBLICATIONS
- **Journals**

  Mohammad Faisal Iqbal, Jim Holt, **Jee Ho Ryoo**, Gustavo de Veciana and Lizy K. John, "Dynamic Core Allocation and Packet Scheduling in Multicore Network Processors." *In IEEE Transactions on Computers*, vol. 65, no. 12, December, 2016.

  Jinsuk Chung, Ikhwan Lee, Michael Sullivan, **Jee Ho Ryoo**, Don Wan Kim, Doe Hyun Yoon, Larry Karplan and Mattan Erez, "Containment Domains: A Scalable, Efficient, and Flexible Resilience Scheme for Exascale Systems." *In the Journal of Scientific Programming*, vol. 21, no. 3-4, 2013.

- **Conference Proceedings**

**Jeeho Ryoo**[*], Michael Pin-Chuan Lin[*], Sahil Rai, Wenhao He, Seong Min Park, and Marco Ho. "WIP: Multi-Agent Artificial Intelligence Model to Enhance Self-Regulated Learning and Conceptual Understanding in Computer Science Education." *In the Proceedings of IEEE Frontiers in Education Conference (FIE)*, Nashville, Tennessee, USA, November, 2025. ([*]both co-first authors)

Marco Ho, Carly Orr, Rebecca Jeon, Michael Pin-Chuan Lin, and **Jeeho Ryoo**. "AI Literacy Through a Project-Based Learning Course." *In the Proceedings of IEEE Smart World Congress (SWC)*, Calgary, Alberta, Canada, August, 2025.

Michael Pin-Chuan Lin, Fuhua Lin, Yu-Feng Lan and **Jeeho Ryoo**. "Perceiving Generative AI in Teacher Practice: a Design-Based Case Study in a Graduate Course." *In the Proceedings of IEEE Smart World Congress (SWC)*, Calgary, Alberta, Canada, August, 2025.

Muge Zhang, Muhammad Ali Khaliq, Byeong Kil Lee, and **Jeeho Ryoo**. "Synthetic Magnetic Resonance Imaging Generation for the Diagnosis of Alzheimer's Disease using Machine Learning." *In the Proceedings of 8th International Conference on Multimedia Information Processing and Retrieval (MIPR)*, San Jose, California, USA, August, 2025.

Cory Davis, Patrick Stockton, **Jeeho Ryoo**, and Eugene John. "Improving Energy Efficiency of Graph Neural Network Execution by using a PIM Architecture." *the 1st International Workshop on Data Centers Energy Efficiency (DCEE-2025)*, Tokyo, Japan, June, 2025.

Michael Pin-Chuan Lin, Arita Li Liu, Saeed Saffari, Daniel Chang, and **Jeeho Ryoo**. "Mapping AI Tools in Education: A Topic Modeling Analysis of Cognitive, Metacognitive, & Affective Insights." *In Proceedings of the 21st International Conference on Intelligent Tutoring Systems (ITS)*, Alexandroupolis, Greece, June 2025

Seong Min Park, Marco Ho, Michael Pin-Chuan Lin, and **Jeeho Ryoo**. "Evaluating the Impact of Assistive AI Tools on Learning Outcomes and Ethical Considerations in Programming Education." *In the Proceedings of the 16th Global Engineering Education Conference (EDUCON)*, London, UK, April 2025.

Saeed Saffari, Michael Pin-Chuan Lin, Oscar Lin, and **Jeeho Ryoo**. "Investigating Open-Source Large Language Models in Digital Pedagogies." *In the Proceedings of the 18th International Conference on e-Learning & Innovative Pedagogies*, Changhua City, Taiwan, April 2025.

Muge Zhang, Dae Yeol Lee, Vasudevan Janarthanan, and **Jeeho Ryoo**, "Microarchitectural Analysis of Pre-Processing Stage in Machine Learning Workloads." *In Proceedings of the 7th International Conference on Algorithms, Computing and Artificial Intelligence (ACAI)*, Guangzhou, China, December 2024.

Kumar, Shvetha S., Reshma R. Nayak, Jismi S. Kannampuzha, Sahil Rai, **Jeeho Ryoo**, and Lizy K. John. "Evaluation of Pruning Techniques." *In the proceedings of the 43rd International Performance, Computing, and Communications Conference (IPCCC)*, Anaheim, California, USA, November 2023.

Jensen, Steffen, Jaekyu Lee, Dam Sunwoo, Matt Horsnell, Matthew Siggs, **Jeeho Ryoo**, and Lizy John. "Do Video Encoding Workloads Stress the Microarchitecture?." *In the proceedings of the International Symposium on Workload Characterization (IISWC)*, Ghent, Belgium, October 2023.

**Jee Ho Ryoo**, Shuang Song and Lizy K. John, "Puzzle Memory: A Multifractional Partitioned Heterogeneous Memory Scheme." *In the Proceedings of the 36th International Conference on Computer Design (ICCD)*, Orlando, Florida, USA, October 2018.

**Jee Ho Ryoo**, Lizy K. John, and Arkaprava Basu, "A Case for Granularity Aware Page Migration." *In the Proceedings of the 32nd International Conference on Supercomputing (ICS)*, Beijing, China, June 2018.

Yashwant, Marathe, Nagendra Gulur, **Jee Ho Ryoo**, Shuang Song, and Lizy K. John, "CSALT: Context Switch Aware Large TLB." *In the Proceedings of the 50th International Symposium on Microarchitecture (MICRO)*, Boston Massachusetts, USA, October 2017.

**Jee Ho Ryoo**, Nagendra Gulur, Shuang Song and Lizy K. John, "Rethinking TLB Designs in Virtualized Environments: A Very Large Part-of-Memory TLB." *In the Proceedings of the 44th International Symposium on Computer Architecture (ISCA)*, Toronto, Ontario, Canada, June 2017.

**Jee Ho Ryoo**, Mitesh R. Meswani, and Lizy K. John, "SILC-FM: Subblocked InterLeaved Cache-Like Flat Memory Organization." *In the Proceedings of the 23rd International Conference on High Performance Computer Architecture (HPCA)*, Austin, Texas, USA, February 2017.

Shuang Song, Meng Li, Xinnian Zheng, **Jee Ho Ryoo**, Reena Panda, Michael LeBeane, Andreas Gerstlauer, and Lizy K. John, "Proxy-Guided Load Balancing of Graph Processing Workloads on Heterogeneous Clusters." *In the Proceedings of the 45th International Conference on Parallel Processing (ICPP)*, Philadelphia, Pennsylvania, USA, August 2016.

Reena Panda, Xinnian Zheng, **Jee Ho Ryoo**, Michael LeBeane, Shuang Song Andreas Gerstlauer, and Lizy K. John, "Genesys: Automatically Generating Representative Training-sets." *In the Proceedings of the 16th International Conference on Embedded Computer Systems: Architecture, Modeling, and Simulation (SAMOS)*, Samos Island, Greece, July 2016.

Michael LeBeane, Shuang Song, Reena Panda, **Jee Ho Ryoo**, and Lizy K. John, "Data Partitioning Strategies for Graph Workloads in Heterogeneous Clusters." *In the Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC)*, Austin, Texas, USA, November 2015.

**Jee Ho Ryoo**, Karthik Ganesan, Yao-Min Chen, and Lizy K. John, "i-MIRROR: A Software Managed Die-Stacked DRAM-Based Memory Subsystem." *In the Proceedings of the 27th International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)*, Florianopolis, Brazil, October 2015.

Michael LeBeane, **Jee Ho Ryoo**, Reena Panda, and Lizy K. John, "WattWatcher: Fine-Grained Power Estimation For Emerging Workloads." *In the Proceedings of 2015 International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)*, Florianopolis, Brazil, October 2015.

Reena Panda, Christopher Erb, Michael LeBeane, **Jee Ho Ryoo**, and Lizy K. John, "Performance Characterization of Modern Databases on Out-of-order CPUs." *In the Proceedings of 2015 International Symposium on Computer Architecture and High Performance Computing (SBAC-PAD)*, Florianopolis, Brazil, October 2015.

**Jee Ho Ryoo**, Saddam Quirem, Michael LeBeane, Reena Panda, Shuang Song, and Lizy K. John, "GPGPU Benchmark Suites: How Well Do They Sample the Performance Spectrum." *In the Proceedings of the 44th International Symposium on Parallel Processing (ICPP)*, Beijing, China, September 2015. **(Best Paper Runner-Up)**

Wooseok Lee, Youngchun Kim, **Jee Ho Ryoo**, Dam Sunwoo, Andreas Gerstlauer, and Lizy K. John, "PowerTrain: A Learning-based Calibration of McPAT Power Models." *In the Proceedings of the International Symposium on Low Power Electronics and Design (ISLPED)*, Rome, Italy, July 2015.

Mohammad Faisal Iqbal, Jim Holt, **Jee Ho Ryoo**, Gustavo De Veciance, and Lizy K. John, "Flow Migration on Multicore Network Processors: Load Balancing While Minimizing Packet Reordering." *In the Proceedings of the 42nd International Conference on Parallel Processing (ICPP)*, Lyon, France, October 2013.

Jinsuk Chung, Ikhwan Lee, Michael Sullivan, **Jee Ho Ryoo**, Don Wan Kim, Doe Hyun Yoon, Larry Karplan, and Mattan Erez, "Containment Domains: A Scalable, Efficient, and Flexible Resilience Scheme for Exascale Systems." *In the Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC)*, Salt Lake City, Utah, USA, November 2012.

- **Posters**

Cory Davis, Patrick M. Stockton, Muge Zhang, **Jeeho Ryoo**, and Eugene John, "Microarchitectural Characterization of LightGCN and ExpressGNN and Architectural Implications." 2025 High Performance, Edge And Cloud computing (HiPEAC), January, 2025

**Jee Ho Ryoo**, Mitesh R. Meswani, Reena Panda, and Lizy K. John, "SILC-FM: Subblocked InterLeaved Cache-Like Flat Memory Organization." 2016 International Conference on Parallel Architecture and Compilation Techniques (PACT), September, 2016.

**Jee Ho Ryoo**, Michael LeBeane, Mohammad Faisal Iqbal, and Lizy K. John, "Control Flow Behavior of Cloud Workloads." 2014 International Conference on Workload Characterization (IISWC), October, 2014.

## PROFESSIONAL EXPERIENCES

Senior Performance Engineer                                    February 2018 – March 2019
ARM Inc., San Jose, CA
- Implemented DRAM cache simulation infrastructure modeling future ARM server systems
- Developed caching and prediction schemes tailored for emerging memory technology

Senior Software Engineer                                       July 2017 – February 2018
Oracle Corporation, Santa Clara, CA
- Identified bottleneck in Transparent Huge Pages (THP) when running enterprise applications
- Analyzed cloud application performance across various hardware platforms

Research Engineering Intern                                    May 2016 – December 2016
Advanced Micro Devices, Austin, TX
- Proposed granularity aware migration schemes in heterogeneous memory systems
- Implemented dynamic granularity migration schemes on Linux kernel running on real x86-64 systems

Research Engineering Intern                                    September 2015 – December 2015
Advanced Micro Devices, Austin, TX
- Proposed bandwidth efficient and high capacity utilization die-stacked DRAM management policy
- Developed heterogeneous memory simulation platform incorporating emerging memory technologies

Software Engineering Intern                                    May 2013 – August 2013
Oracle Corporation, Santa Clara, CA
- Proposed hardware-assisted, software-managed die-stacked DRAM management policy
- Evaluated the proposed scheme with commercial benchmarks such as SPECjbb, SPECjEnterprise, TPC-C

Performance Architecture Intern                               May 2012 – August 2012
Samsung Austin R&D Center, Austin, TX
- Developed the SimPoint tool for ARM ISA to analyze various Android benchmarks
- Evaluated various power-efficient floating point schedulers using the Gem5 simulator

Graduate Research Assistant                                    August 2011 – May 2017
Laboratory for Computer Architecture, The University of Texas at Austin, Austin, TX
- Proposed management policies for high bandwidth, low latency die-stacked DRAM technology
- Developed other uses of die-stacked DRAM such as a large TLB in virtual platforms

Undergraduate Research Assistant                              June 2010 – May 2011
Computer Systems Laboratory, Cornell University, Ithaca, NY
- Developed a digital ASIC tool-flow chain to synthesize the Verilog MIPS R10K microprocessor model
- Incorporated clock gating techniques at the functional block level (e.g. ALU, ROB) for power efficiency

Project Team Co-Director – Big Red Chip                        September 2010 – May 2011
Computer Systems Laboratory, Cornell University, Ithaca, NY
- Designed a superscalar OOO processor and on-board I/O interfaces on Xilinx Virtex-6 FPGA
- Provided project design guidelines for 5 sub-design teams and managed the project deadline

## TEACHING EXPERIENCES

Assistant Professor in Olson College of Engineering and Science
Fairleigh Dickinson University, Vancouver, BC

- CSCI 6806 – Computer Science Graduate Capstone Project (Fall 2025)
- CSCI 5565 – Assembly Programming (Fall 2025)
- INFO 4201– Information Technology Needs Assessment and Management (Fall 2025)

Assistant Professor in Gildart Haase School of Computer Sciences and Engineering
Fairleigh Dickinson University, Vancouver, BC
- CSCI 6806 – Computer Science Graduate Capstone Project (Summer 2025, Spring 2025, Fall 2024, Summer 2024)
- CSCI 5565 – Assembly Programming (Summer 2024)
- INFO 4201– Information Technology Needs Assessment and Management (Fall 2025)

Adjunct Professor in Gildart Haase School of Computer Sciences and Engineering
Fairleigh Dickinson University, Vancouver, BC
- CSCI 5565 – Assembly Programming (Spring 2024)
- CSCI 5565 – Assembly Programming (Spring 2024)
- CSCI 5565 – Assembly Programming (Summer 2023, Fall 2023, Spring 2024)

Faculty in the School of Computing and Academic Studies
British Columbia Institute of Technology, Vancouver, BC
- COMP 2510 – Procedural Programming in C (Winter 2022, Fall 2022, Winter 2023, Fall 2023)
- COMP 3522 – Object Oriented Programming 2 (Fall 2021, Winter 2022)
- COMP 4736 – Introduction to Operating Systems (Winter 2023)
- COMP 4800 – Projects Practicum 2 (Spring 2023)
- COMP 7035 – Operating Systems (Fall 2023)

Teaching Assistant
Electrical and Computer Engineering, The University of Texas at Austin, Austin, TX
- EE306 (Instructor: Yale Patt) – Introduction to Computing (Fall 2011)
- EE382N (Instructor: Lizy John) – Performance Evaluation and Benchmarking (Fall 2014)
- EE460N (Instructor: Mattan Erez) – Computer Architecture (Spring 2012)

Teaching Assistant
Electrical and Computer Engineering, Cornell University, Ithaca, NY
- ENGRD2300 (Instructors: David H. Albonesi, Adam W. Bojanczyk, José F. Martinez, and Edward G. Suh) – Introduction to Digital Logic Design (Spring 2010, Fall 2010, Spring 2011)

**SERVICES**
Chair
- Research Release Time (RRT) Committee, Gildart Haase School of Computer Sciences and Engineering, Fairleigh Dickinson University: 2026, 2025
- IEEE International Workshop on Smart Education in the Age of Generative AI (SEGA): 2025 (Co-Chair)

Technical Program Committee
- IEEE International Conference on Performance, Computing and Communications (IPCCC): 2025, 2024
- IEEE International Parallel and Distributed Processing Symposium (IPDPS): 2025

Reviewer
- ACM Computing Surveys: 2025, 2024
- IEEE Frontier in Education (FIE): 2025
- IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC): 2025
- Simulation Modelling Practice and Theory (SIMPAT): 2016
- IEEE Transactions on Computers (TC): 2015

Student Volunteer
- IEEE International Symposium on Workload Characterization (IISWC): 2011

- ACM/SPEC International Conference on Performance Engineering (ICPE): 2015

**GRANTS**
Fairleigh Dickinson University Grant-in-aid: 2,000 USD (2025-2026)
Google Cloud Research Credits (PI): Synthetic Input Generation for Alzheimer Diseases (2024-2025)
6921.75 USD

**STUDENTS**
Current Students
- Weidong Zhang, MS (Northeastern University): 2025 - Present
- Dashi Yang, MS (FDU): 2025-Present
- Jinxin Yin, MS (FDU): 2025-Present
- Seong Min Park, MS (FDU): 2025-Present
- Ebod Shojaei, BS (BCIT): 2024-Present
- Sahil Rai, BS (BCIT): 2023-Present

Past Students
- Muge Zhang, MS (FDU): 2024-2025
- Rebecca Jeon, BS (University of Victoria): 2025

**INVITED TALKS**
"Future of Computing and AI Impact," *Vancouver Korean IT Conference*, Vancouver, BC, July 15, 2023

**PATENTS**
Intelligently Partitioning Data Cache to Allocate Space for Translation Entries, Lizy K. John, **Jee Ho Ryoo**, Yashwant Marathe, Nagendra Gulur.
US Patent 10261915B2

Methodology to Utilize Heterogeneous Memories with Variable Properties, Lizy K. John, **Jee Ho Ryoo**, Hung-Ming Hsu, Karthik, Ganesan.
US Patent 20180260323A1

Page-Migration with Varying Granularity. Arkaprava Basu, and **Jee Ho Ryoo**.
US Patent 10503658B2

Processor Using a Level 3 Translation Lookaside Buffer Implemented in Off-Chip or Die-Stacked Dynamic Random-Access Memory. Lizy K. John, Nagendra Gulur, and **Jee Ho Ryoo**.
US Patent 10296465B2

Data Block Sizing for Channels in a Multi-Channel High-Bandwidth Memory. **Jee Ho Ryoo**, and Mitesh R. Meswani.
US Patent 10503655B2

Low Latency, High Bandwidth Memory Subsystem Incorporating Die-Stacked DRAM. **Jee Ho Ryoo**, Karthik Ganesan, and Yao-Min Chen.
US Patent 9406361B2

**AWARDS**
Samsung Award of Excellence (2012) – Intern award recipient for excellent work performance
Engineering Learning Initiatives (2010) – Motorola research funding recipient for two semesters
Roger Berman '70 Memorial Prize (2010) – Top presentation student in engineering communications program

**MISCELLANEOUS**
Industry Sponsored Project

- Binance (Fall 2024): Internal communication auditing full stack application
- UnifiedAI (Fall 2024): Block-chain based identify verification full stack application

University Recruitment
- QS Discover Master's Fair (Fall 2024): FDU Vancouver Master's program recruitment fair faculty panel