

Yejin Lee

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- CURRENT POSITION** **Meta - Fundamental AI Research (FAIR)**, Boston, United States **July 2023 - Present**
Postdoctoral Researcher
- EDUCATION** **Seoul National University**, Seoul, Republic of Korea **Mar. 2018 - Aug. 2023**
College of Engineering
M.S. /Ph.D. Student in Computer Science and Engineering
Advisor: Professor Jae W. Lee
Research Area: Hardware-Software Codesign for Emerging AI Applications
- Sogang University**, Seoul, Republic of Korea **Mar. 2014 - Feb. 2018**
Department of Computer Science & Engineering
Bachelor of Science in Computer Science and Engineering
Summa Cum Laude
- PUBLICATIONS** **[Under Review][NeurIPS '23] Frugal 3D Point Cloud Model Training via Sample Recycling and Fused Aggregation**
Donghyun Lee, Yejin Lee, Jae W. Lee, Hongil Yoon
The 37th *Conference on Neural Information Processing Systems (NIPS)*, 2023
- [AAAI '23] Not All Neighbors Matter: Point Distribution-Aware Pruning for 3D Point Cloud**
Yejin Lee, Donghyun Lee, JungUk Hong, Hongil Yoon, Jae W. Lee
The 37th *AAAI Conference on Artificial Intelligence (AAAI)*, 2023
Acceptance rate: 1721/8777 \approx 20%
• <https://github.com/SNU-ARC/NotAllNeighborsMatter>
• **Selected as oral presentation**
- [HPCA '22] ANNA: Specialized Architecture for Approximate Nearest Neighbor Search**
Yejin Lee, Hyunji Choi, Sunhong Min, Hyunseung Lee, Sangwon Beak, Dawoon Jeong, Jae W. Lee, Tae Jun Ham
The 27th *IEEE International Symposium on High-Performance Computer Architecture (HPCA)*, 2022
Acceptance rate: 80/262 \approx 31%
- [KCC '21] Large-scale Data Parallel Processing on Many-core Systems**
Yejin Lee, Seung-Jun Cha, Dongwoo Kim
Communications of the Korean Institute of Information Scientists and Engineers 39(11), 77-89(13 pages), Korea Information Science Society
- [ISCA '21] ELSA: Hardware-Software Co-design for Efficient, Lightweight Self-Attention Mechanism in Neural Networks**
Tae Jun Ham*, Yejin Lee*, Seong Hoon Seo, Soosung Kim, Hyunji Choi, Sung Jun Jung, Jae W. Lee
The 48th *ACM/IEEE International Symposium on Computer Architecture (ISCA)*, 2021
Acceptance Rate : 76/406 \approx 19%
• ***These authors contributed equally.**
• ISCA Talk (Youtube): https://www.youtube.com/watch?v=JDH_HeTsECM
- [IEEE Micro '21] Accelerating Genomic Data Analytics with Composable Hardware Acceleration Framework**
Tae Jun Ham, David Bruns-Smith, Brendan Sweeney, Yejin Lee, Seong Hoon Seo, U Gyeong Song, Young H. Oh, Krste Asanovic, Jae W. Lee, Lisa Wu
IEEE Micro, May/June 2021

- **Special Issue on Top Picks from the 2020 Computer Architecture Conferences**

[ASPLOS '21] MERCI: Efficient Embedding Reduction on Commodity Hardware via Sub-Query Memoization

Yejin Lee, Seong Hoon Seo, Hyunji Choi, Hyoung Uk Sul, Soosung Kim, Jae W. Lee, Tae Jun Ham

The 26th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2021

Acceptance rate: 75/398 ≈ 19%

- ASPLOS Talk (Youtube): <https://www.youtube.com/watch?v=5xRIuoPU60M>

- Open-source: <https://github.com/SNU-ARC/MERCI>

Invited for presentation at PeRSoNAl workshop @ MLSys

[ISCA '20] Genesis: A Hardware Acceleration Framework for Genomic Data Analysis

Tae Jun Ham, David Bruns-Smith, Brendan Sweeney, Yejin Lee, Seong Hoon Seo, U Gyeong Song, Young H. Oh, Krste Asanovic, Jae W. Lee, Lisa Wu

The 47th ACM/IEEE International Symposium on Computer Architecture (ISCA), 2020

Acceptance Rate : 77/428 ≈ 18%

- **Selected for inclusion in IEEE Micro - Special Issue on Top Picks from the 2020 Computer Architecture Conferences**

[ASPLOS '20] IIU: Specialized Architecture for Inverted Index Search

Jun Heo, Jaeyeon Won, Yejin Lee, Shivam Bharuka, Jaeyoung Jang, Tae Jun Ham, Jae W. Lee

The 25th ACM International Conference on Architectural Support for Programming Languages and Operating Systems (ASPLOS), 2020

Acceptance Rate : 86/476 ≈ 18%

[MICRO '19] Charon: Specialized Near-Memory Processing Architecture for Clearing Dead Objects in Memory

Jaeyoung Jang, Jun Heo, Yejin Lee, Jaeyeon Won, Seonghak Kim, Sung Jun Jung, Hakbeom Jang, Tae Jun Ham, Jae W. Lee

The 52nd IEEE/ACM International Symposium on Microarchitecture (MICRO), 2019

Acceptance Rate : 79/343 ≈ 23%

[ITC-CSCC '19] Performance Analysis of Convolutional Neural Networks on Manycore Platforms

Jaeyoung Jang, Yejin Lee, Jae W. Lee

The 34th International Technical Conference on Circuits/Systems, Computers and Communications (ITC-CSCC), 2019

[KCC '18] Trends in HW and SW based Memory Management for High-Performance Data Analysis

Yejin Lee, Jun Heo, Jaeyoung Jang, Jae W. Lee

Communications of the Korean Institute of Information Scientists and Engineers 36(10), 45-54(10 pages), Korea Information Science Society

[KCC '17] The development of a spoken lecture summary Application Software using TextRank on Android platform

HeeWoong Jang, Yong June Kim, Yejin Lee, Myoung-Wan Koo

Communications of the Korean Institute of Information Scientists and Engineers 44(02), 1783-1785(3 pages), Korea Information Science Society

HONORS AND AWARDS

- **Selected as Outstanding BK21 Graduate Student @ Seoul National University (2022)** - Awarded to Top 2 outstanding students
- **Google PhD Fellowship Recipient (2021)** - Recipient of Google PhD Fellowship Program that recognize and support outstanding PhD candidates who are doing exceptional and innovative research in computer science
- **IEEE MICRO Top Picks (2021)** - One of my research work is selected as Top 12 computer architecture articles published in 2020
Genesis: A Hardware Acceleration Framework for Genomic Data Analysis (ISCA 2020)
- **Summa Cum Laude, Sogang University (2018)**

- **Academic Achievement Scholarship, Sogang University (2016, 2017)**

- SKILLS
- **Languages:** Python, C, C++, Chisel, JavaScript, SQL, JAVA
 - **Frameworks:** TensorFlow/Keras, Pytorch
 - **Tools:** Docker, GIT, PostgreSQL, MySQL, SQLite
 - **Platforms:** Linux, Windows, AWS, Google Cloud, GPU, TPU
- TALKS AND POSTERS
- **[Talk] Electronics and Telecommunications Research Institute (ETRI) workshop - Daejeon, South Korea (June 2022)**
ANNA: Specialized Architecture for Approximate Nearest Neighbor Search
 - **[Poster] SNU Artificial Intelligence Institute Workshop - Seoul, South Korea (November 2021)**
ELSA: Hardware-Software Co-design for Efficient, Lightweight Self-Attention Mechanism in Neural Networks
 - **[Talk] PeRSONAI workshop @ MLSys - Virtual (April 2021)**
MERC: Efficient Embedding Reduction on Commodity Hardware via Sub-Query Memoization
 - **[Talk, Poster] SNU Artificial Intelligence Institute Workshop - Seoul, South Korea (April 2021)**
MERC: Efficient Embedding Reduction on Commodity Hardware via Sub-Query Memoization

- PATENTS
- INTERNATIONAL
- **Device for accelerating self-attention operation in neural networks (Pending - Application No. 17/864.235)**
with Jae W. Lee, Tae Jun Ham, Seong Hoon Seo, Hyunji Choi, Soosung Kim, Sung Jun Jung
 - **Hardware Accelerator Performing Search using Inverted Index Structure and Search System Including the Hardware Accelerator (Pending - Application No. 17/118.085)**
with Jae W. Lee, Jun Heo, Jaeyeon Won, Tae Jun Ham

DOMESTIC

- **Device for accelerating self-attention operation in neural networks (Pending - Application No. 1020210190300)**
with Jae W. Lee, Tae Jun Ham, Seong Hoon Seo, Hyunji Choi, Soosung Kim, Sung Jun Jung
- **Hardware Accelerator Performing Search using Inverted Index Structure and Search System Including the Hardware Accelerator (Pending - Application No. 1020200066219)**
with Jae W. Lee, Jun Heo, Jaeyeon Won, Tae Jun Ham
- **Garbage Collection Device having Subunit and Memory System having the Same (Pending - Application No. 1020200125740)**
with Jae W. Lee, Jaeyoung Jang, Jun Heo

- SERVICES
- **Student Volunteer**, International Symposium on Code Generation and Optimization (CGO 2021)

- OPEN-SOURCE
- **Not All Neighbors Matter**, <https://github.com/SNU-ARC/NotAllNeighborsMatter>
 - **MERC**, <https://github.com/SNU-ARC/MERC>

- TEACHING EXPERIENCE
- Computer Architecture Course (Instructor: Prof. Jae W. Lee)**, Seoul National University
Teaching Assistant **Sep - Dec, 2018**
Course Summary: Learning computer architecture including ISA, CPU, Pipeline, Memory hierarchy, I/O devices.
- Hardware System Design (Instructor: Prof. Jae W. Lee)**, Seoul National University
Teaching Assistant **Mar - Jun, 2018**
Course Summary: Learning the basic concepts of hardware system design and practicing how to implement hardware systems using Verilog by weekly practice labs.
- Basic Engineering Design (Instructor: Prof. Myungwhan Choi)**, Sogang University
Undergraduate Mentor **Mar - Jun, 2017**

Course Summary: Learning the basic concepts and grammar of C language and fostering the ability to develop and design algorithm through weekly programming practices.

C programming (Instructor: Prof. Ji-Hwan Kim), Sogang University
Undergraduate Mentor

Sep - Dec, 2016

Course Summary: Learning the advanced concepts and grammar of C++ language and fostering the ability to develop and design algorithm through weekly programming practices.

Computational Thinking (Instructor: Prof. Jungyun Seo), Sogang University
Undergraduate Mentor

Mar - Jun, 2016

Course Summary: Learning C++ and Python and problem solving skills with computational thinking by solving various kinds of problems.

RELEVANT
COURSEWORKS

Basic/Advanced Computer Architecture

Embedded Computer Architecture

Operating Systems

Database Systems

Computer Networks

Digital System Design

Programming Languages

Basic/Advanced Compiler

Artificial Intelligence

Artificial Neural Network

Data Mining

Recommender Systems

Speech Recognition