Yejin Lee

CONTACT INFORMATION

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EDUCATION

Seoul National University, Seoul, Republic of Korea **Feb. 2018 - Present**
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 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

[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≈ 20%

[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≈ 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 ≈ 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 2021 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] PeRSonAl workshop @ MLSys - Virtual** (April 2021)
  MERCI: Efficient Embedding Reduction on Commodity Hardware via Sub-Query Memoization
- **[Talk, Poster] SNU Artificial Intelligence Institute Workshop - Seoul, South Korea** (April 2021)
  MERCI: Efficient Embedding Reduction on Commodity Hardware via Sub-Query Memoization

Patents

- **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
- **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. 17/118.085)**
  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

- **MERCI**, https://github.com/SNU-ARC/MERCI

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