

# JAEWOO PARK

Ulsan National Institute of Science and Technology (UNIST)  
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## EDUCATION

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**Ulsan National Institute of Science and Technology (UNIST)** Mar 2021 - present  
Undergraduate, Department of Physics

## EXPERIENCE

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**Intelligent Computing and Codesign Lab, UNIST** Dec 2020 - Present  
Researcher *Ulsan, Korea*

- Published papers on DNN quantization, Domain-Specific-Architectures and Processing-In-Memory.

**Kurdahi's Lab, UC Irvine** Jan 2023 - Mar 2023  
Visiting Researcher *Irvine, CA*

- Worked on VLSI design of ReRAM based DNN accelerators.

**Extragalactic Astrophysics Laboratory** Aug 2021 - Feb 2022  
Undergraduate Researcher *Ulsan, Korea*

- Performed research about large scale cosmological simulations with data from the JWST.

## PROJECTS

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**Mixed signal VLSI design of ReRAM based DNN Accelerators** May 2022 - present

- VLSI design of ReRAM based accelerators using the sky130 technology.
- Verilog-A modeling and characterization of analog ReRAM programming.

**In-Memory Processing for Fully Homomorphic Encryption** May 2022 - Nov 2022

- Novel DRAM Processing-In-Memory architecture for FHE applications.
- Row-locality aware computation mapping of NTT.

**Optimizing accumulators in Neural Network Accelerators** Oct 2021 - May 2022

- Novel accumulator architecture and quantization methods for BNN accelerators.
- Optimized pytorch CUDA extension for BNN training and inference.

**Redshift Frontier using the James Webb Space Telescope** Aug 2021 - Feb 2022

- Cosmological simulations using large scale clusters.
- Bayesian inference of high redshift galaxy images from JWST telescope.

**Ultra-low-bit quantization of Convolutional Neural Networks** Apr 2021 - Apr 2022

- Quantization methods for sub-4-bit quantization aware DNN training.
- In depth analysis of ultra-low bit quantization on commodity GPU/CPU hardware.

## PUBLICATIONS

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1. **Jaewoo Park**, Sugil Lee and Jongeun Lee, "NTT-PIM: Row-Centric Architecture and Mapping for Efficient Number-Theoretic Transform on PIM", Proceedings of the 60th ACM/IEEE Design Automation Conference, July 2023. (accepted to DAC 2023)
2. Faaiz Asim\*, **Jaewoo Park\***, Azat Azamat and Jongeun Lee, "Centered Symmetric Quantization for Hardware-Efficient Low-Bit Neural Networks", Proc. of British Machine Vision Conference (BMVC), November, 2022.

3. Azat Azamat, **Jaewoo Park** and Jongeun Lee, "Squeezing Accumulators in Binary Neural Networks for Extremely Resource-Constrained Applications", Proc. of International Conference on Computer-Aided Design (ICCAD), October, 2022.

**TEACHING**

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**Instructor of EEE326: Tensor Processor Design** Spring 2022  
Course for master and undergraduate students to make a working example of a DNN accelerator in HLS.

**HONORS AND AWARDS**

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- **Winner of Competition of Computational Relativity and Gravitational Waves** Jan 2022  
Hosted by National Institute for Mathematical Sciences & Korea Astronomy and Space Science Institute
- **International Olympiad on Astronomy and Astrophysics** Oct 2020  
Honorable Mention, National Team of South Korea
- **Regeneron International Science and Engineering Fair** May 2020  
Finalist, National Team of South Korea

**JOURNAL REVIEWER**

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**Elsvier Expert Systems with Applications (ESWA)** 2023

**SKILLS**

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<b>Programming Languages</b>	C, Fortran (F90), Python, Haskell, Verilog, HLS, Chisel
<b>Libraries</b>	numpy, pytorch, XLA, IntelMPI, CUDA
<b>Tools</b>	Design Compiler, Virtuoso, SPICE
<b>Languages</b>	Korean (native), English (fluent)
<b>Research Interests</b>	PIM, HPC, CGRA