DONG-HA SHIN

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Areas of interest: Optics, Computational Imaging, Machine Learning

EDUCATION

03/2020~02/2024 **Kyungpook National University**, Daegu, Korea
B.S. in Electronics Engineering & Minor in Computer Science
- 4.12/4.5 GPA (Total Credits Earned: 151)

PUBLICATIONS

Open-source

1. "PADO: PyTorch Automatic Differentiable Optics", POSTECH Computational Imaging Group, 2025, [Code] [Document] – as Lead developer and main maintainer

Journals

1. "Complex-Valued Holographic Radiance Fields", Yicheng Zhan, **Dong-Ha Shin**, Seung-Hwan Baek and Kaan Akşit, arXiv, 2025, *under-review* [paper]
2. "Hologram Upscaling for Viewing Angle Expansion Using Light Field Extrapolation with Object Detection Algorithm", **Dong-Ha Shin**, Chee-Hyeok Song, and Seung-Yeol Lee, Current Optics and Photonics Vol. 9 Issue 1, pp. 55-64, 2025 [paper]
3. "A Technique for Interpreting and Adjusting Depth Information of each Plane by Applying an Object Detection Algorithm to Multi-plane Light-field Image Converted from Hologram Image", Young-Gyu Bae, **Dong-Ha Shin** and Seung-Yeol Lee, Journal of Broadcast Engineering Vol.28, No.1, January 2023 [paper]

Conference

1. "Controlling depth information of objects by plane through light field transformation and manipulation of multi plane holographic images", Young-Gyu Bae, **Dong-Ha Shin** and Seung-Yeol Lee, the 34th Optical Society of Korea (OSK) Winter meeting 2023, BEXCO, Busan, Korea
2. "Enhanced Light Field Image Resolution and Viewing Angle for Multi plane Holographic Images", **Dong-Ha Shin** and Seung-Yeol Lee, the 23rd International Meeting on Information Display (IMID 2023), BEXCO, Busan, Korea
3. "Design and Implementation of a Port Cargo Handling Communication System Using AR Glasses", **Dong-ha Shin**, Hyeonji Kim, Bosung Baek, Dayoung Lee, Kim Inkwon and Seung-yeol Lee, Annual Conference of Korea Information Processing Society (2023), PKNU, Busan, Korea

Invited Talk

1. "Digital Hologram: New AI Domains Coming Up", **Dong-Ha Shin**, Samsung Software Developer Conference 2022, Samsung Electronics Co., Ltd. Seocho Headquarters, Seoul, Korea

RESEARCH EXPERIENCE

09/2021~02/2024 **IPOD Lab,** Kyungpook National University, Daegu, Korea Undergraduate research student

- Advisor: Prof. Seung-Yeol Lee
- Participate in research project on **Holo-TV, ETRI** (using MATLAB, PyTorch)
  - CGH (Computer Generated Holography) optimization based on the Machine Learning
- Analysis of nano-scale optical device such as metasurface with RCWA, Lumerical FDTD
- Experience on various optical table experimental setup

01/2023~09/2023 **Computer Graphics Lab, POSTECH**, Pohang, Korea Internship

- Advisor: Prof. Seung-Hwan Beak
- Developed a Differentiable Light-wave Simulation
- Developed a computational photography that cloaks obstructions using DOE and deep learning

07/2023~08/2023 **Video Intelligence Lab,** Kyungpook National University, Daegu, Korea Internship

- Advisor: Prof. Sang-hyo Park
- research on light-weighting MotionBERT(3d pose estimation) deep learning model

WORK EXPERIENCE

02/2024~present **Dareesoft,** Seongnam, Korea Assistant Manager (Early Promotion) / Software Engineer

- *Industrial Personnel on Military Service in the IT Sector*
- Spearheaded the end-to-end development of an on-device Voice AI agent (STT-LLM-TTS) on **Android**
  - Showcased at **CES 2025 in Qualcomm's** booth
  - Deployed in SK's robotics brand NAMUHX. [web] [showcase]
  - Achieved ~1.5s latency by porting the LLM runtime to **DSP/NPU** on Qualcomm's entry-level SoC..
- Developing a VLM-powered digital twin system for real-time road hazard detection
- Optimizing Android **camera ISP** for on-device AI perception

01/2025~ present **Computer Graphics Lab, POSTECH**, Pohang, Korea Research Engineer

- Advisor: Prof. Seung-Hwan Beak in Computational Imaging Group
- Conducting collaborative research with NVIDIA and University College London (UCL)
  - Physically-accurate 3D scene modeling using Gaussian Splatting,
  - Focused on representing light wave properties such as phase and polarization
- Continued open-source development of PADO : PyTorch Automatic Differentiable Optics

12/2020~02/2024 **BITDOL & 하늘소,** Hardware Research Group, KNU Club President

- Take a **lead funding 55M KRW**, Community-Based Research Activities Support Project, 2022,Daegu , government grant, a **development project on Plastic Waste Disposal Automation AI Solution**
- Project Leader of **Tracking Selfie-robot using SLAM**(2022), **Self-Driving Drug Delivery Robot**(2022)
- Individual project: **Interactive Digital Aqua Curtain Display**(2021), **STT AR glass for deaf**(2023)
- Experiences on Designing and prototyping Various embedded systems based on Atmel AVR MCU
- Host a weekly club seminar to share project progress.

09/2022~08/2023 **GDSC KNU,** Google Developer Student Club, Google AI Core Member

- 2023 **Google Solution Challenge**: **Global Top 100**
  - **Eywa**: Invasive species detection and education application (Github Link)

PATENTS

1. **Dong-ha Shin**, Yong-hoon Kim, "Image Processing Apparatus and Method for Analyzing Hazardous Objects on Road", Korea - Application No. 10-2024-0265893
2. **Dong-ha Shin**, Gyu-jin Kyung, Chul-woo Park, Kang-min Kim, Tae-kyung Kim, "Self-Driving Drug Delivery Robot System", Korea - Application No. 10-2022-0152452
3. In-kwon Kim, Hyun-ji Kim, **Dong-ha Shin**, Dayoung Lee, Min-joo Cho, Gyem-bi Park, Bosung Baek, "Communication System Using Extended Reality, And Its Communication Method", Korea - Application No. 10-2023-0186048

AWARDS AND HONORS

2024	Daree Rookie Award, DareeSoft, outstanding new hire and **promoted early to Assistant Manager**
2023	CES 2023 Hackathon, Winning work, KNU
2022	DAEGU METAVERSE CONTEST, 3rd Prize, DIP
2022	Career Exploration Capstone Project, Grand Prize, Kyungpook National University President's Award, KNU
2022	Haninum Contest 2022, Winning work, Federation of Korean Information Industries
2021	National University Student Creative Design-Engineering Contest, Grand Prize, UNIST
2021	CLUTCH THE ENERGY CAMP, Grand Prize, Korea Gas Corporation
2021	KNU EE Research Congress, Winning work, KNU
2021	KNU Robot Idea Contest, Winning work, KNU

TEACHING Assistant

[1] Electromagnetics II, Kyungpook National University, 2022 Fall

[2] Electromagnetics I, Kyungpook National University, 2022 Spring

[3] C programming, Kyungpook National University, 2021 Fall