

# Sunghwan Kim

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## Research Interests

My research interests are in computer vision, especially efficient algorithms for visual perceptions. Currently, I am exploring methods to leverage pre-trained Foundation Models (FMs) in vision to enhance downstream tasks. Additionally, I am passionate about optimizing vision models with hardware efficiency.

## Education

**Korea Advanced Institute of Science and Technology (KAIST)** Feb 2017-Feb 2021  
B.S. in Electrical Engineering and Mathematics (double major) Advisor: Steven E. Whang  
GPA: overall 3.62/4.3; major 3.67/4.3

**Korea Science Academy of KAIST** Mar 2014-Feb 2017  
High school for gifted students in mathematics and science

## Publications

2. Texture Learning Domain Randomization for Domain Generalized Segmentation [[paper](#)]  
**Sunghwan Kim**, Dae-hwan Kim, and Hoseong Kim  
International Conference on Computer Vision (ICCV), 2023
1. Data Gathering Trials for the Development of Military Imaging Systems  
Maria Niebla, Duncan L. Hickman, Eunjin Koh, Chanyong Lee, Hoseong Kim, Chaehyoen Lim, **Sunghwan Kim**  
Proc. SPIE Vol. 12737, 2023

## Patent

1. Method and System for Detecting Target Using Time Series Images  
Chaehyeon Lim, **Sunghwan Kim**, Hoseong Kim, and Eunjin Koh  
KR Patent, 2023 (Reg. Num. 10-2023-0031087)

## Work Experience

**Agency for Defense Development (ADD)** Jun 2021-Present  
First Lieutenant and Machine Learning Research Engineer Daejeon, Republic of Korea

- Selected as one of the exclusive 25 military officers in Korea who conduct military service as research engineer at the ADD, Korea's counterpart to DARPA.
- Developed real-time object detection algorithms for defense systems, including the construction and processing of infrared imagery datasets, and establishment of the learning pipeline.
- Implemented the acceleration of deep learning models on edge devices like FPGAs and Nvidia Orin boards, and their seamless integration into the system.

**Bluepoint Partners** Aug 2020-Mar 2021  
Research Assistant Seoul, Republic of Korea

- Bluepoint Partners is an early stage venture capital firm targeting tech sector, such as AI and robotics.
- Supported investments in tech-based startups and conducted market research for these investments.

**Paple** Jun 2019-May 2020  
Co-founder and Software Engineer Seoul, Republic of Korea

- Paple is a software platform equipped with a community feature that allows for the meta-review of AI papers and the exchange of insights on them.
- Developed the backend using Django and built the database system with MySQL.

**Neosapience** Dec 2017-Feb 2018  
Machine Learning Engineer Seoul, Republic of Korea

- Neosapience is a Series B startup that operates deep learning-based audio and video synthesis technology and has launched an AI-powered virtual actor service.
- Conducted data processing for the development of a Korean text-to-speech system.

## Research Experience

### Agency for Defense Development (ADD)

Researcher in missile IR seeker team

Jun 2022-Mar 2023

Daejeon, Republic of Korea

- Domain generalization in object recognition: Explored methods for training robust models that learn from synthetically generated source images and perform effectively on diverse real-world images.

### Korea Advanced Institute of Science and Technology (KAIST)

Undergraduate researcher in Intelligent Network Architecture (INA) lab

Oct 2018-Apr 2019

Daejeon, Republic of Korea

- Super-resolution on edge devices: Implemented an algorithm that combines neural super resolution with traditional video codecs to enhance streaming quality on edge devices.

### Korea Advanced Institute of Science and Technology (KAIST)

Invited researcher in Center for Axion and Precision Physics Center

Jun 2016-Aug 2016

Daejeon, Republic of Korea

- Researched on the detection of axion using resonant frequency measurements in a cylindrical cavity.

## Honor

Korea Army Startup Challenge Gold Prize (\$3000)

Korea Student Aid Foundation (KOSAF) Scholarship (\$1500)

Korea National Scholarship of Science and Technology (\$10000)

KAIST scholarship (\$5000)

## Community Involvement

KAIST Freshman Coach Senior

Feb 2020-Feb 2021

Samsung Semiconductor Education Program and Scholarship

Jun 2019-Present

Research Officers for National Defense (ROND) cadat

Dec 2018-May 2021

KAIST Electrical Engineering Department Student Council

Mar 2018-Feb 2019

KAIST Cyber Tutoring Program

Feb 2018-Jun 2018

KAIST Foreign Buddy Program

Sep 2017-Dec 2017

KAIST Automobile Maker Club

Mar 2017-Aug 2018

## Skills

**Electrical Engineering Courses:** Deep Learning, Database and Bigdata System, Signal Processing, Computer Architecture, Operating System, Computer Network, Digital System, Electrical Circuits

**Mathematics Courses:** Linear Algebra, Mathematical Analysis, Probability theory, Statistics, Convex optimization, Numerical Analysis, Discrete Mathematics, Mathematical Modeling, Differential Geometry, Algebra

**Programming Languages:** Python, C/C++, MATLAB

**Frameworks & Tools:** Pytorch, NumPy, OpenCV, Docker, Git

## References

### Dr. Hoseong Kim

Senior Reseacher at Agency for Defense Development (ADD), **Email:** hoseongkim@add.re.kr.

### Dr. Dae-hwan Kim

Senior Reseacher at Agency for Defense Development (ADD), **Email:** dhkim7@add.re.kr.

### Dr. Steven E. Whang

Professor of Electrical Engineering at KAIST, **Email:** swhang@kaist.ac.kr.