

Junhyuk Heo

✉ E-mail  Github  LinkedIn  Google Scholar  Homepage

Introduction

I'm an AI researcher in [TelePIX](#) . My work focuses on machine learning for Earth observation, aiming to derive real-world value from satellite imagery for environmental monitoring and climate change. My interests include learning methods for extracting meaningful information from remote sensing data (e.g., target detection and semantic segmentation), as well as representation learning and foundation models. I also work on satellite data preprocessing, including atmospheric and radiometric correction, and I am increasingly interested in onboard processing and compression for more efficient use of satellite observations.

Education

Konkuk University
Major in Civil Engineering
Minor in Computer Science

Mar 2018 – Feb 2024
Seoul, Republic of Korea

Publications

- FLAME: Physics-Guided Neural Operators for Onboard Satellite Methane Detection in Hyperspectral Imagery** *Under Review, 2026*
Junhyuk Heo, Junghwan Park, Sangcheol Sim, Beomkyu Choi, and Woojin Cho
[Paper](#)  [Code](#) 
- MANGO: A Global Single-Date Paired Dataset For Mangrove Segmentation** *IGARSS (Oral), 2026*
Junhyuk Heo, Beomkyu Choi, Hyunjin Shin, and Darongsae Kwon
[Paper](#)  [Code](#) 
- ELMZip: Onboard Satellite Image Compression via Extreme Learning Machines for Efficient Downlink** *IGARSS, 2026*
Woojin Cho, Junghwan Park, Sangcheol Sim, Steve Andreas Immanuel, *Junhyuk Heo*, and Darongsae Kwon
- Basis-Oriented Low-rank Transfer for Few-Shot and Test-Time Adaptation** *CVPR, 2026*
Junghwan Park, Woojin Cho, *Junhyuk Heo*, and Darongsae Kwon
[Paper](#) 
- Self-Supervised Score-Based Despeckling for SAR Imagery via Log-Domain Transformation** *Preprint, 2026*
Junhyuk Heo
[Paper](#)  [Code](#) 
- Fourier-Modulated Implicit Neural Representation for Multispectral Satellite Image Compression** *IGARSS (Oral), 2025*
Woojin Cho*, Steve Andreas Immanuel*, *Junhyuk Heo*, and Darongsae Kwon
[Paper](#)  [Code](#)  [Poster](#) 
- Tackling Few-Shot Segmentation in Remote Sensing via Inpainting Diffusion Model** *ICLRw (Best Paper Award), 2025*
Steve Andreas Immanuel, Woojin Cho, *Junhyuk Heo*, and Darongsae Kwon
[Paper](#)  [Code](#)  [Poster](#) 
- SAR-to-optical image translation with UNSB-FFC considering shadow area pixels** *KSCE Journal of Civil Engineering, 2025*
Su Min Jo, *Junhyuk Heo*, and Yang Dam Eo
[Paper](#) 
- Neural Compression for Multispectral Satellite Images** *NeurIPS, 2024*
Woojin Cho*, Steve Andreas Immanuel*, *Junhyuk Heo*, and Darongsae Kwon
[Paper](#)  [Code](#)  [Poster](#) 

Research Experiences

- TelePIX**  *May 2024 – Present*
Republic of Korea
AI Researcher
- Satellite image enhancement (denoising, pansharpening, super-resolution)
 - Image segmentation and few-shot learning for satellite analysis (environmental & industrial monitoring)

- Satellite image compression using modulated INR
- Satellite image corrections(radiometric correction, atmospheric correction, geometric correction, orthorectification)

Geomatics Lab [🔗](#)

Research Intern

Jun 2023 – Feb 2024
Konkuk Univ., Republic of Korea

- Satellite image analysis using QGIS, ArcGIS
- SAR(Synthetic Aperture Radar) to Optical image translation using generative models

Projects

Hyperspectral Images Pansharpening (1st author) [🔗](#)

Dec 2024 – Jan 2025

ESA-NASA Workshop on AI Foundation Model for Earth Observation [🔗](#)

- Proposal for a PAN-conditioned INR enabling continuous, resolution-independent pansharpening.
- Aims to mitigate color distortion on real data by overcoming the resolution gap inherent in supervised models.
- Designed for fast inference with a single forward pass, in contrast to slow per-image optimization methods.
- Accepted for presentation at the ESA-NASA International Workshop on AI Foundation Models for Earth Observation.

Deep Learning Projects [🔗](#)

Jul 2022 – Jan 2024

deep daiv. [🔗](#)

- Deployment of a Golf Swing Analysis Web Service with YOLO-Based 3D Pose Estimation
- Novel Model Development and Web Pipeline for Change Detection
- Text-Based Meme Recommendation and Face Synthesis Web Service
- Object-to-Hanjii Stylization via Image-to-Image Generation

Research Interests

Generative Model: Diffusion Based Model, Score Based Model

Implicit Neural Network: Coordinate Based INR, Local Implicit Image Function, Physics Informed Neural Network

Vision Language Models: Referring Segmentation, Visual Question Answering, Visual Reasoning, Large Vision Language Models

Training Strategy: Self-Supervised Learning, Representation Learning, Few-shot Learning, Meta Learning

Skills

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

Deep Learning: PyTorch, TensorFlow, Keras, DDP

Remote Sensing: ArcGIS, QGIS, Google Earth Engine

Tools & Platforms: Git, Docker, Linux, AWS, Latex

Language: Korean(native), English