

EDUCATION

B.S. in Life Science Handong Global University	2023 – present Pohang, South Korea
B.E. in AI Interdisciplinary Studies Handong Global University	2023 – present Pohang, South Korea
B.A. in Psychology National Institute for Lifelong Education	2021 – 2023 Seoul, South Korea

RESEARCH EXPERIENCE

Handong Global University, DeMUXly: Demultiplexing scRNA-seq Project Sep 2025 – present
Research Capstone under Prof. Jaeyoung Chun

- Developing a computational algorithm to demultiplex cell-hashed scRNA-seq data, accurately assigning pooled cells back to their original sample identities.
- Designing a conditional deep generative model to denoise HTO counts by leveraging Gene Expression (GEX) profiles as a condition, aiming to outperform current threshold-based baselines and publish findings in a peer-reviewed journal.

University of Nevada, Las Vegas, DataX Lab Jun 2025 – Jul 2025
Short-Term Experiential Learning Program under Prof. Mignon Kang

- Led a tumor classification project leveraging a foundational Vision Transformer (ViT) *Prov-GigaPath* on 234 Whole Slide Images (128 GB) from the TCIA Biobank.
- Designed a lightweight patch tiling and tissue-filtering algorithm for model training.
- Developed hybrid deep learning frameworks by integrating ViT embeddings with sequential and convolutional classifiers.
- Achieved nearly 0.99 of AUC, validating the efficacy of ViT in capturing complex morphological features.
- Recognized with Overseas Research Excellence Scholarship for outstanding research performance; received a follow-up research collaboration offer.

Handong Global University, 5Bilion Mar 2025 – May 2025
Research Unit Collaborated with Startup (Giftshed) under Prof. Jaeyoung Chun

- Worked on a computer vision project to segment Circulating Tumor Cells (CTCs) from unstained blood microscopy images.
- Processed high-resolution dataset of microscopy images, utilizing Roboflow for annotation to construct a robust training set.
- Developed a lightweight Super-Resolution (SR) framework to enable the use of downsampled images for real-time processing, significantly reducing data volume while preserving the clarity of critical features.
- Conducted extensive literature reviews on CTC morphology to ensure biological accuracy in data annotation.

Seoul National University, Center for Convergence Approaches in Drug Development Jan 2025 – Apr 2025
Student Researcher under Prof. Howard Lee

- Designed a Korean–English sentence-alignment algorithm for a ₩1B (≈\$700K) Ministry-funded project, integrating multilingual BERT semantic scoring and length-based heuristics with dynamic programming.
- Defined metadata schema and proposed MongoDB to standardize parallel corpus management and ensure data integrity.
- Established rigorous data collection criteria and cleaning workflows to construct a gold-standard parallel corpus for developing document-level machine translation models.
- Facilitated interdisciplinary collaboration with Seoul National University SKI-ML Lab and Korea Regulatory Science Center, ensuring methodological consistency through weekly cross-functional meetings.

Handong Global University, Nabi Aug 2024 – Dec 2024
Research Unit under Prof. Jaeyoung Chun

- Spearheaded a research group for the *JUMP AI 2024: Drug Discovery Competition*, developing a QSAR model to predict IC50 values of candidate compounds in SMILES representation against the IRAK4 kinase target.
- Developed traditional ML pipeline, engineered RDKit descriptors selected via PSO and trained an SVR model, tuned by Optuna employing MLflow for efficient experiment tracking.
- Placed 3rd (Daewoong Pharmaceutical President’s Award) out of 990 teams, distinguishing the team as the only undergraduate-led team among the winners, and presented the methodology at the AI Pharma Korea Conference 2024.

Handong Global University, Biodata Lab Mar 2024 – Nov 2024
Research Intern and Research Capstone under Prof. Taejin Ahn

- Analyzed clinical platelet RNA-seq datasets from Seoul National University Hospital to identify cancer biomarkers, addressing data sparsity and heterogeneity through rigorous statistical hypothesis testing.
- Implemented feature selection strategies using Particle Swarm Optimization (PSO) and hierarchical clustering to reduce dimensionality while preserving critical signals for classification models.
- Conducted wet-lab protocols with graduate researchers, including platelet isolation and PCR, and curated literature on Tumor-Educated Platelets (TEP) to bridge the gap between biological experiments and computational analysis.
- Developed a novel sequence-based RNA-seq preprocessing framework as an independent capstone project: tokenizing raw nucleotide sequences by ORFs, translating them to amino acid sequences, and encoding them with ProtBERT.
- Classified embeddings of TEP RNA-seq data from ovarian cancer patients and normal individuals, achieving AUC=0.7067.

HONORS AND AWARDS

Overseas Research Excellence Scholarship	Summer 2025
Awarded by the Big Data Consortium to the top 20% of participants for outstanding research performance at UNLV	
3rd place, Daewoong Pharmaceutical President's Award	Oct 2024
Ranked 3rd out of 990 teams in <i>JUMP AI 2024: AI Drug Discovery Competition</i> ; distinguished as the only undergraduate-led team among winners	
Big Data Seagull Scholarship	Spring 2024, Fall 2024
Merit-based scholarship for outstanding academic performance in the curriculum certified by Handong Global University School of Applied Artificial Intelligence	

CONFERENCES AND PRESENTATIONS

6. Demultiplexing Single Cell Samples	Dec 2025
Handong Global University Bio-AI Capstone Design Fair	Oral Presentation
5. Diagnosing Cancer with Genomic Context	Nov 2024
Handong Global University Capstone Design in Life Science Fair	Oral Presentation
4. IRAK4 IC50 Inhibition Prediction	Oct 2024
AI Pharma Korea Conference 2024	Poster Presentation
3. Impact of Prenatal IL-6 Elevation on Synaptic Development and Hippocampal Connectivity	Apr 2024
Handong Global University Life Science Seminar	Internal Seminar
2. Epigenetic Mechanisms Linking Maternal Microbiota to Offspring Neurodevelopment	Nov 2023
Handong Global University Life Science Seminar	Internal Seminar
1. Antioxidant Defense of Plant-Rhizosphere Microbial Interaction Against Necrotrophic Fungi	Aug 2023
62nd National Undergraduate Symposium on Biology, Seoul National University	Oral Presentation

TEACHING EXPERIENCE

Introduction to AI and Machine Learning , Teaching Assistant	Aug 2025
Addis Ababa Science and Technology University (Handong UNESCO-UNITWIN Program)	Addis Ababa, Ethiopia
<u>Instructor</u> : Prof. Dai Yon Cho	
Big Data Modeling and Platforms , Teaching Assistant	Mar 2025 – Jun 2025
Handong Global University, School of Applied Artificial Intelligence	Pohang, South Korea
<u>Instructor</u> : Prof. Jaeyoung Chun	
AI Application Programming , Teaching Assistant	Mar 2025 – Jun 2025
Handong Global University, School of Mechanical and Control Engineering	Pohang, South Korea
<u>Instructor</u> : Prof. Sangsan Lee	

COMMUNITY INVOLVEMENT

Handong Office of International Affairs, Exchange Student Mentor	Aug 2024 – Dec 2024
Assisted exchange students with adaptation to Korean culture and Residential College (RC) life	Pohang, South Korea
62nd National Undergraduate Symposium on Biology, Participant, Presenter	Jul 2023 – Aug 2023
Engaged in weekly literature review seminars and delivered a presentation on recent bioengineering trends	Seoul, South Korea
Incheon Beauty and Art High School Python Programming Camp, TA	Aug 2023
Provided assistance for elementary to high school students through hands-on Python programming	Incheon, South Korea