

EDUCATION

- **University of North Carolina Chapel Hill** NC, USA
Master of Science in Computer Science 08/2024 - 05/2026
 - Coursework: Video Recognition, Image Processing and Analysis, Introduction to Robotics, Visual Computing Systems, Mobile Computing System, XR and Spatial Computing
- **Chung-Ang University** Seoul, South Korea
Bachelor of Science in Applied Statistics 03/2020 - 08/2023
 - Total GPA of 4.40 / 4.50 (98.86 / 100), Summa Cum Laude
 - Coursework: Applied Probability, Regression Analysis, Multivariate Statistical Analysis, Statistical Mathematics, Deep Learning for Image Data Analysis, Data Structure, Algorithm, Data Mining
 - Honors: Department Secondary Honor Scholarship (2022), Specialized Academic Scholarship (2022), Department Secondary Honor Scholarship (2021), Department Honor Scholarship (2020)

WORK EXPERIENCE

- **LG AI Research** Seoul, South Korea
Bio Intelligence Lab Research Scientist Intern 06/2025 - 08/2025
 - Engineered a multimodal data processing pipeline (MRI, SNPs, and tabular biomarkers) and integrated it into a multi-omics model, boosting Alzheimer's Disease classification accuracy by 20% over SOTA accepted to NeurIPS ImageOmics workshop 2025 [\[pdf\]](#)
 - Architecting a modular Plan-Act-Memory AI agent to automate biomedical tasks such as DEG identification and survival analysis on colorectal cancer data

RESEARCH EXPERIENCE

- **UNC ViVE Lab** NC, USA
Research Assistant (Adviser: Professor Saif Khairat) 09/2025 - Present
 - Building a healthcare chatbot powered by Llama 3 with vLLM-optimized inference, few-shot prompt engineering, and RAG system leveraging LangChain and ChromaDB to generate context-aware dialogues
 - Developed a speech-to-speech conversational system using gpt-realtime-mini, WebRTC, and TypeScript, achieving seamless bi-directional voice interaction with sub-second latency
- **UNC Yap Lab** NC, USA
Research Assistant (Adviser: Professor Pew-Thian Yap) 01/2025 - 05/2025
 - Created a framework to analyze structural connectivity gradients in the developing brain, integrating tractography with cortical features and presented at the ISMRM conference 2025
- **UNC Data Driven EnviroLab** NC, USA
Research Assistant (Adviser: Professor Angel Hsu) 08/2024 - 12/2024
 - Implemented [ChatNDC](#), an AI-powered RAG chatbot using LangChain, FAISS, and LLM APIs, processing 500+ policy documents (PDF/CSV) to deliver fast, accurate, and policy-relevant insights on climate action
- **CAU ET Laboratory** Seoul, South Korea
Undergraduate Research Assistant (Adviser: Professor Ilyoup Kwak) 03/2022 - 06/2023
 - **Gene Expression Value Prediction:** Preprocessed data and contributed building a novel Transformer model with TensorFlow to predict gene expression value using millions of DNA sequence data, achieving **3rd** place among 100+ teams in Dream Challenge 2022
 - **Sound Event Detection:** Participated in DCASE (Detection and Classification of Acoustic Scenes and Events) Task4 Sound Event Detection in 2023 and applied an attention network optimized for extracting frequency information
 - **Medical Data Analysis:** Performed multivariate logistic regression on structured data using Python libraries including SciPy, Pandas, and Matplotlib to identify key factors influencing taste and olfactory abnormalities, as well as discrepancies between patients' subjective perceptions and objective test results
- **CAU Intelligent Multimodal Reasoning Lab** Seoul, South Korea
Undergraduate Research Assistant (Adviser: Professor Junyeong Kim) 01/2023 - 06/2023
 - Conducted weekly paper reviews on mitigating bias in AI systems and participated in monthly seminars with the KAIST U-AIM laboratory

TEACHING

- **UNC PRIMES Summer School** Chapel Hill, NC
Instructor 04/2025 – 06/2025
 - **Teaching:** Designed and recorded a 5-hour video course on Computer Vision and Medical Image Processing for high school students, crafted hands-on coding exercises, and led weekly office hours sections

PROJECTS

- **Brain Tumor Segmentation** Chapel Hill, NC
Engineer 09/2024 – 11/2024
 - **Model Building:** Implemented and trained 3D U-Net and 3D Attention U-Net models using Pytorch for brain tumor segmentation, achieving metrics within 5% of state-of-the-art benchmarks [\[technical report\]](#)
 - **Data Engineering:** Preprocessed MRI data and implemented diverse data augmentations, building an efficient end-to-end data pipeline for model training using Pytorch
- **Samsung Software Academy for Youth** Gwangju, South Korea
Developer 07/2023 – 06/2024
 - **Full-stack Web Development:** Engineered and deployed full-stack web applications using Vue.js, Spring Boot, and MySQL, implementing a microservices architecture to ensure scalability and efficient performance. Leveraged GitLab for version control and optimized project tracking using Agile methodologies in Jira.

PUBLICATIONS

- Rafi, A.M., Nogina, D., Penzar, D. et al. A community effort to optimize sequence-based deep learning models of gene regulation. Nat Biotechnol (2024). <https://doi.org/10.1038/s41587-024-02414-w>
- Kwak, IY., Kim, BC., Lee, J. et al. Proformer: a hybrid macaron transformer model predicts expression values from promoter sequences. BMC Bioinformatics 25, 81 (2024). <https://doi.org/10.1186/s12859-024-05645-5>

SKILLS

- **Programming languages:** Python, R, Java, SQL, MATLAB, HTML, CSS, Javascript
- **Frameworks:** Pytorch, TensorFlow, scikit-learn, SpringBoot, FastAPI, VueJS, React, SwiftUI

REFERENCES

- **Iain Carmichael** Email : iain@unc.edu
School of Data Science and Society at UNC Chapel Hill *Assistant Professor*
- **Pew-thian Yap** Email : ptyap@med.unc.edu
Department of Radiology at UNC Chapel Hill *Professor*