

## Research Interests

**Multimodal Learning:** Vision Language Model, Self-Supervised Learning  
**AI for healthcare:** Computational Pathology, Medical Image Analysis

## Education

**The University of North Carolina at Chapel Hill**  
*Master's in Computer Science*

NC, United States  
Aug. 2024 – May. 2026

**Chung-Ang University**  
*B.S. in Applied Statistics & B.A. in French Literature*

Seoul, South Korea  
Mar. 2020 – Aug. 2023

## Publications

### **Structural MRI-Informed Multimodal Fusion for Robust Alzheimer's Disease Prediction**

**Juhyun Lee**, Sungjoon Park, Kyungwook Lee, Soorin Yim, Doyeong Hwang, Dongyun Kim, Kiwoong Yoo, Soonyoung Lee, Kiyoung Kim  
*NeurIPS Imageomics Workshop, 2025*

### **Proformer: a hybrid macaron transformer model predicts expression values from promoter sequences**

Il-Youp Kwak, Byeong-Chan Kim, **Juhyun Lee**, Taein Kang, Daniel J Garry, Jianyi Zhang, Wuming Gong  
*BMC Informatics, 2024*

## Research Experiences

### **UNC Carmichael Lab**

*Research Assistant (Advisor: Iain Carmichael)*

NC, United States  
Jan. 2026 – Current

- Probed bladder cancer Whole Slide Images using pathology foundation model and Multiple Instance Learning

### **UNC ViVE Lab**

*Research Assistant (Advisor: Saif Khairat)*

NC, United States  
Aug. 2025 – Dec. 2025

- Built a healthcare chatbot using Llama-3-8B with few-shot prompting and LoRA fine-tuning; deployed with vLLM and Flask
- Developed a speech-to-speech system using OpenAI API, WebRTC, and TypeScript, achieving seamless voice interaction

### **LG AI Research**

*Research Intern (Mentor: Sungjoon Park, Kiyoung Kim)*

Seoul, South Korea  
May 2025 – Aug. 2025

- Engineered a multimodal data processing pipeline and integrated it into a multimodal model, boosting Alzheimer's Disease classification accuracy by 20% over SOTA
- Architected a modular Plan-Act-Memory AI agent to automate biomedical tasks using LangChain

### **UNC Yap Lab**

*Research Assistant (Advisor: Pew-Thian Yap)*

NC, United States  
Jan. 2025 – May. 2025

- Developed an Implicit Neural Representation framework in PyTorch to map brain spherical coordinates to fMRI-based functional connectivity matrix, enabling efficient data compression and reconstruction of large-scale brain networks

### **UNC Data Driven EnviroLab**

*Research Assistant (Advisor: Angel Hsu)*

NC, United States  
Aug. 2024 – Dec. 2024

- Implemented ChatNDC, a RAG chatbot using LangChain, FAISS, and LLM APIs to deliver accurate and relevant responses on climate policy

### **Chung-Ang University**

*Research Intern (Advisor: Il-youp Kwak)*

Seoul, South Korea  
Mar. 2022 – June. 2023

## Conference Presentations

---

- **UNC Innovate Cancer Data Science Symposium** Jan. 2026  
*Poster Presentation*
- **NeurIPS Imageomics Workshop** Dec. 2025  
*Poster Presentation*
- **UNC Graduate Research Symposium** Oct. 2025  
*Poster Presentation*
- **UNC Data Science Day** Sep. 2025  
*Poster Presentation*
- **International Society for Magnetic Resonance in Medicine (ISMRM) Annual Meeting** May 2025  
*Oral Presentation*

## Academic Services

---

### Reviewer

ICML 2026

### Mentorship

UNC Graduate Women in CS Mentor

### Teaching

- Instructor for *Medical Image Analysis and Computer Vision* for UNC PRIMES Summer School 2025

## Awards/Honors

---

**Summa Cum Laude**, Chung-Ang University Aug. 2023  
**Department Honor Scholarship**, Chung-Ang University Aug. 2020

## Skills

---

**Programming Languages:** Python, MATLAB, Java, JavaScript, SQL, R

**ML & Data Science:** Pytorch, TensorFlow, LangChain, Scikit-Learn, NumPy, Pandas, Matplotlib, SAS

**Web Development:** SpringBoot, Git, VueJS

**Languages:** Fluent in Korean and English. Beginner in French.

## References

---

### Iain Carmichael

Professor at UNC Chapel Hill

[iain@unc.edu](mailto:iain@unc.edu)

### Kiyoung Kim

Senior Research Scientist at LG AI Research

[elgee.kim@lgresearch.ai](mailto:elgee.kim@lgresearch.ai)

### Pew-Thian Yap

Professor at UNC Chapel Hill

[ptyap@med.unc.edu](mailto:ptyap@med.unc.edu)

### Il-youp Kwak

Professor at Chung-Ang University

[ikwak2@cau.ac.kr](mailto:ikwak2@cau.ac.kr)