YUNSOO KIM | University College London

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EDUCATION

University College London, *London, UK*

PhD in Health Informatics   Sep. 2023 - Present

Thesis: "Foundation Model for Collating Clinical Expert Knowledge: Facilitating Histopathology and Radiology with Multimodal LLMs"

Supervisors: Professor Honghan Wu, Dr Adam Levine, Professor Robert Stewart, Dr Nikolas Pontikos

Imperial College London, *London, UK*

M.Sc. in Bioinformatics and Theoretical Systems Biology   Oct. 2015 - Sep. 2016

Thesis: "A Clustering-based Short Time Series Analysis Methodology in Omics"

Supervisors: Professor Tim Ebbels, Dr John Pinney, Dr Virginia Fairclough

- Developed methodology to analyze omics time-series data
- Developed a novel methodology to infer OTU (Operational Taxonomic Unit) co-occurrence and differential networks
- Outperformed 8 other inference methods for co-occurrence networks (the best precision)

Case Western Reserve University, *Cleveland, OH*

B.S. with Honors in Systems Biology (Concentration in Bioinformatics, Pre-Health Plan)   Sep. 2012 - May. 2015

Honors Thesis: "Assembly of Marama chloroplast from Next-gen sequencing reads"

Supervisor: Professor Christopher Cullis

RESEARCH INTEREST

Deep Learning in computational biology and health informatics, specifically in applications of multimodal models for neurodiseases such as dementia and multiple sclerosis.

EMPLOYMENT

LG CHEM, Seoul, South Korea

CTO Platform Technology Artificial Intelligence PJT   Apr. 2020 – Sep. 2023

Specialist. NLP Group Leader. Work Description: Leading natural language processing (NLP) group   Apr. 2020 – Feb. 2022

Professional. NLP Group Leader. Work Description: Leading NLP group   Mar. 2022 – Sep. 2023

- Developed an artificial reading system using language model (BERT variants) to recommend research candidates for researchers
    - Successful cases on different research topics (battery, petrochemical, biopolymer, etc).

LG AI Master Program Pilot at LG AI Research   Sep. 2019 – Jan. 2020

LG Chem representative researcher. Program Description: Solving the challenges using AI and becoming a leader in AI project

- Improved BERT model in biotechnology, especially in Agricultural Biology – Reached SOTA in 7 BioNLP benchmark datasets

CTO Green Bio GBT1 PJT at LG Chem   Mar. 2019 – Mar. 2020

Specialist. Work Description: Developing deep learning models to accelerate biotechnology research

- Developed plant disease recognition and plant disease severity diagnosis with ResNext, EfficientNet ensemble models

CTO Corporate R&D Future Technology GBT PJT at LG Chem   Jul. 2017 – Feb. 2019

Associate. Work Description: Analyzing -omics data to accelerate biotechnology research

- Developed an early allergen and toxin assessment system for the candidate gene
    - Developed a neural network model for the prediction of protein allergenicity and toxicity with improved performance

Alternative military service, South Korea

Alternative military service at LG Chem, Military Manpower Administration   Aug. 2017 – Aug. 2020

Technical Research Personnel. Description: Alternative military service for the Korean compulsory military service

- Worked both a full-time employee and technical research personnel at LG Chem for the advancement of science in Korea

Torrey Pines Co., Ltd., Cheonan, Korea

Co-Founder (~2023) and CEO. Work Description: Planning a New Brand with microbiome science cosmetics   Oct. 2016 – Jul. 2017

- *Bota nouveau* Microbiome science hair care cosmetics brand
    - One of the pioneers in hair care cosmetics that introduced microbiome science for hair loss care shampoo

PUBLICATIONS

Enhancing Human-Computer Interaction in Chest X-ray Analysis using Vision and Language Model with Eye Gaze Patterns
First Author   Conference: MICCAI 2024

MedExQA: Medical Question Answering Benchmark with Multiple Explanations
First Author   Conference: ACL 2024 BioNLP Workshop

All you need is continued pretraining of chemistry texts even for molecule captioning
First Author   Conference: ACL 2024 Language Plus Molecule Workshop

Foundation Model for Biomedical Graphs: Integrating Knowledge Graphs and Protein Structures to Large Language Models
First Author   Conference: ACL 2024 Student Research Workshop

Human-in-the-Loop Chest X-Ray Diagnosis: Enhancing Large Multimodal Models with Eye Fixation Inputs
First Author   Conference: IJCAI 2024 TAI4H Workshop

Hallucination Benchmark in Medical Visual Question Answering   2024
Co-first Author   Conference: ICLR 2024 Tiny Paper (Notable Accept)

Exploring Multimodal Large Language Models for Radiology Report Error-checking   2023
Co-first Author   Preprint

Chemical Language Understanding Benchmark   2023
First Author   Conference: ACL2023 Industry Track

A novel inversion in the chloroplast genome of marama (Tylosema *esculentum*)   2016
First Author   Journal: Journal of Experimental Botany

PATENTS

Chemical entity name recognition system and method using artificial intelligence   2023
Main Inventor   Patents Priority : KR 10-2023-007009

Method and system for recognizing chemical entities through sentence length adjustment of the training data   2023
Main Inventor   Patents Priority : KR 10-2023-0070096

Document classification method and system using named entity recognition score   2022
Main Inventor   Patents Priority : KR 10-2023-006571

Method to build chemical language model and NLP document analysis system and method applying it   2021
Main Inventor   Patents: KR20230037335A

Chemical Named Entity Recognition Method and System through Data Preprocessing   2021
Main Inventor   Patents: KR20230030337A

Crop protection products virtual library construction and browsing system   2021
Co-Inventor   Patents: KR20230029084A

Protein Toxicity Prediction System and Method Using Artificial Neural Network   2019
Main Inventor   Patents: KR20200126715A

HONORS AND AWARDS

LG Chem On-Spot Incentive	2022
LG Chem DX Good Practice	2021
LG Chem AIT Organization Manager Discretionary Award	2020 - 2021
LG AI IDEAthon Digital Transformation Frontier (Applications 1st place; Overall 2nd place)	2021
LG Chem CTO Digital Transformation Best Practice	2021
LG Chem Seoul National University AI Hackathon 1st place	2021
LG Chem DX Best Practice	2020
LG AI Advanced problem solving Best Practice mentor	2020

LG Chem CEO Excellent R&D Project Award	2020
LG Chem Platform Technology On-Spot Incentive	2020
LG Chem Platform Technology Best Memorandum (Research Report)	2020
LG AWARDS (Best Award given by LG Group Chairman)	2020
LG AI Master Best Practice	2019
LG Chem Green Biology Best Memorandum (Research Report)	2019
LG Chem Green Biology On-Spot Incentive	2019
Case Western Reserve University Scholarship	2012 – 2015
Ogelbay Summer Research Grant	2014
Case Western Reserve University Dean's Honor List, 3 semesters	2012 – 2014
Case Western Reserve University Dean's High Honor List, 1 semester	2013
Victor Ridder Scholarship	2012

OTHER EXPERIENCE

Teaching Experience, Workshops, Seminars

MICCAI2024 Tutorial Main Organizer and Speaker	2024
HealTac2024 Tutorial Main Organizer and Speaker	2024
UCL MSc student co-supervisor for research project	2023 - Present
LG Chem Community of Practice for ChatGPT lead organizer	2023
LG Chem graph neural network model study group lead organizer	2022 – 2023
LG Chem transformer model (NLP) study group lead organizer	2021 – 2023
LG Chem Community of Practice for Systems Metabolic Engineering AI lead organizer	2022
LG AI Advanced problem solving grader, mentor	2020
LG Chem Platform Technology Python Instructor	2020
LG AI weekly study group member, organizer	2019 – 2022
LG Chem Bio Big Data and AI Community of Technology member, organizer	2017 – 2019
Case Western Reserve University Volunteer Peer Tutoring in Biology	2013 – 2014

- Taught two students for biology classes at university-level

Invited Talks, Presentation

ACL BioNLP Workshop Poster Presentation	2024
ACL LPM Workshop Poster Presentation	2024
ACL Poster Presentation	2024
IJCAI TAI4H Oral Presentation	2024
Lightening Talk at AI in Pathology: Research Meets Reality at the Alan Turing Institute	2024
UCL Computational Pathology Meetings Invited Talk	2024
HealTac PhD Thesis Oral Presentation and Extended Abstract Poster Presentation	2024
ICLR Tiny Paper Poster Presentation	2024
University College London Institute of Health Informatics Talk on Large Language Model Research in Medicine	2024
University of Edinburgh Clinical NLP Group Talk on Large Language Model Research in Medicine	2023
ACL2023 Industry Track Poster Presentation	2023
LG Chem CTO Digital Transformer talks	2022
LG Chem Platform Technology Workshop talks	2022
LG Chem Platform Technology Artificial Intelligence annual meeting speaker	2021
LG Chem Tech Fair talks	2021
LG DX Fair 2021 speaker	2021
LG Chem Digital Transformation talks	2021
LG Chem CTO Digital Transformer talks speaker	2021
LG Chem Platform Technology Workshop talks speaker	2021
LG Chem Digital Transformation Best Practice talks	2020
LG Academy Digital Transformation talks panelist	2020
LG Housys AI Master talks speaker	2019
LG AI Master talks speaker	2019
LG Chem Green Biology quarterly meeting speaker	2019

Journal Reviewing
BMC Medical Informatics and Decision Making