

# Jihyeon Je

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## Education

**Duke University** | GPA: 3.83/4.0

Durham, NC

BSE in Biomedical Engineering and Electrical & Computer Engineering,

May 2023

BS in Computer Science with a concentration in Artificial Intelligence and Machine Learning

Coursework in BME (Medical Instrumentation, Materials and Synthetic Biology), ECE (Microelectronics, Quantum

Engineering/Information Theory), Computer Science (Computer Security, Algorithms, Neurosymbolic Machine Learning)

## Research Experience

**Duke University, Lafata Lab**

Durham, NC

Undergraduate Researcher

May 2020 – present

- Developing an automatized feature extraction tool for the analysis of next generation pathomic signatures of inflammation from renal biopsy data
- Generation of synthetic time series image data using Fokker-Planck dynamics to create prediction models for head-and-neck cancer

**Schrodinger, Machine Learning Team**

New York, NY

Machine Learning Intern

May 2022 – Aug 2022

- Implemented diffusion-based generative model for ligand conformation generation to improve conformer quality
- Introduced new features and Gaussian processes to supervised regression and classification models and improved small molecule property prediction
- Devised and implemented automated routine for benchmarking and backtesting

**Broad Institute of MIT and Harvard, Imaging Platform, Cimini Lab**

Cambridge, MA

Research Intern

May 2021 – Aug 2021

- Built ML-based image analysis tools and workflows for 2D and 3D image segmentation and reconstruction
- Devised optimized strategies and network architectures to efficiently utilize sparse and limited bioimage data

**Duke University, Caron Lab**

Durham, NC

Undergraduate Intern

Sep 2019 – Mar 2020

- Worked on 3D reconstruction and statistical analysis of dendritic spines from EM images

**NCMIR (National Center for Microscopy and Imaging Research), Mark Ellisman Lab**

San Diego, CA

Research Intern

May 2017 – Mar 2020

- Worked on 3D computational reconstruction and segmentation of electron microscope images
- Contributed to CDeep3M-Preview by building the augmentation pipeline and wrote additional image analysis scripts for feature extraction from large-scale biological data

**UNIST (Ulsan National Institute of Science and Technology), Protein Nanobio Lab**

Ulsan, South Korea

Research Intern

Mar 2015 – Jul 2016

- Developed a fusion nano probe using affibody molecules for targeted cancer therapy

## Additional Experience and Teaching

**Wolfram Alpha**

Remote

2018 Wolfram Summer School Alumni, Student Ambassador

May 2018 – present

- Research focus on mathematical and computational analysis of the structure of viral capsids
- Developed the Protein Data Bank importer function for the Mathematica functionality repository

**Duke University Department of Electrical and Computer Engineering**

Durham, NC

Teaching Assistant

Jan 2021 – Jan 2022

- Held lab sessions, office hours, and provide tutoring for ~50 students in Electrical & Computer Engineering 280: Signals and Systems

## Leadership & Activities

### Duke Undergraduate Machine Learning

Co-President

Durham, NC

Sep 2019 - present

- Organize the annual Duke Datathon and Machine Learning Day events
- Host guest speaker sessions, manage funding, and plan monthly activities.

### Duke iGEM (international Genetically Engineered Machine)

Subteam Lead

Durham, NC

Jan 2020 - present

- Developing a microfluidics-based organoid-tumor coculture platform for high throughput drug screening
- Creating automatized computational tools to quantify organoid growth and drug efficiency

### Duke ARAC (America Reads America Counts)

Volunteer

Durham, NC

Sep 2020 - present

- Volunteered at Durham Public Schools tutoring ~20 children to help enhance primary level reading and math skills

## Publications

Matthias G. Haberl, Willy Wong, Sean Penticoff, **Jihyeon Je**, Matthew Madany, Adrian Borchardt, Daniela Boassa, Steven T. Peltier, Mark H. Ellisman. "CDeep3M-preview: Online segmentation using the deep neural network model zoo." **Preprint**, March 2020.

## Abstracts and Conference Proceedings

Jack Stevens, **Jihyeon Je**, Yuan Gao, Chunhao Wang, Yvonne Mowery, David Brizel, Fang-Fang Yin, Jian-Guo Liu, Kyle Lafata. "Radiomics on spatial-temporal manifolds via Fokker-Planck dynamics." *American Association of Physicists in Medicine 2022 (poster presentation)*.

Gina Sotolongo, **Jihyeon Je**, Xiang Li, Jarcy Zee, Bangchen Wang, Yijiang Chen, Tasneem Talawalla, Jeffrey Hodgins, Anant Madabhushi, Takaya Ozeki, Laura Mariani, Lawrence Holzman, Andrew Janowczyk, Laura Barisoni, Kyle Lafata. "Segmentation and Classification of Lymphocytes in the NEPTUNE Digital Kidney Biopsies via PatchSorter." *United States and Canadian Academy of Pathology Annual Meeting 2022 (poster presentation)*.

**Jihyeon Je**, Alice Lucas, David Sterling, Beth Cimini. "Network Optimization with Limited Bioimage Data for Robust Semantic Segmentation." *Society of Biomolecular Imaging and Informatics High Content Meeting 2021 (best poster award, one of 3 recipients)*.

Gina Sotolongo, **Jihyeon Je**, Jarcy Zee, Yijiang Chen, Xiang Li, Yuqi Wang, Jeffrey Hodgins, Anant Madabhushi, Andrew Janowczyk, Kyle Lafata, Laura Barisoni. "Cortical Tubulointerstitial Mononuclear Inflammation in Renal Biopsies is a Quantitative Biomarker of Clinical Outcomes in NEPTUNE Glomerular Diseases." *United States and Canadian Academy of Pathology Annual Meeting 2021 (poster presentation)*.

## Awards and Honors

Silver Medal – iGEM (international Genetically Engineered Machine) competition	2022
Best Poster Award - Society of Biomolecular Imaging and Informatics High Content meeting	2021
Duke Bass Connections Fellow	2021
Duke Technology Scholar	2021, 2022
Woo Fellow – Duke University, Woo Center for Big Data and Precision Health	2020
Dean's List Honor– Duke University	2019, 2022

## Technical Skills

### Programming

**Advanced:** Python, Java, Pytorch, TensorFlow, MATLAB, Scikit-learn, RDKit

**Intermediate:** CSS, JavaScript, HTML, SQL

### Chemical

QSAR, ADMET prediction, conformer generation

### Biological

CellProfiler, Fiji/ImageJ, IMod, QuPath