Kyeong Joo, Jung

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The Ohio State University
Department of Computer Science & Engineering
Email: jung.759@osu.edu
Homepage: https://iamkj03.github.io/about/
LinkedIn: http://www.linkedin.com/in/KJJung-
Github: https://github.com/iamkj03

EDUCATION

2019 – 2026 (Expected) *PhD in Computer Science*, The Ohio State University
Co-Advisor: Raghu Machiraju (Computer Science & Engineering)
Dongjun Chung (Biomedical Informatics & Biostatistics)
Dissertation title: From Cells to Clinical Outcomes: Building a Domain-Specific Foundation Model through AI/ML-Enriched Spatial Proteomics
Ohio, USA

2025 *MS in Computer Science*, The Ohio State University
Ohio, USA

2017 – 2018 *MS in Computer Science*, Stony Brook University-State University of New York (SUNY) Korea
Advisor: Bong Jun Choi (Distributed Intelligence Lab)
Republic of Korea

2014 - 2015 *Exchange Student in Computer Science (BS)*, Angelo State University
Texas, USA

2011 - 2017 *BS in Computer Engineering*, Yonsei University
Republic of Korea

RESEARCH INTERESTS

AI/ML for Precision Oncology & Computational Pathology, Foundation Models & Big Data, Spatial Bioinformatics, Privacy-Preserving Healthcare AI

PEER-REVIEWED PUBLICATIONS

* : Equal contribution

Methodology paper

1. **Jung KJ**, Ghose S, Cho S, McDonough E, Chadwick C, West R, Brooks JD, Chung D, Ginty F, Machiraju R, Mallick P (2026). Annotation-Free Prediction of Cancer Cells and Glands and Spatial Analysis of Immune Cells. *PLOS Computational Biology*. (Under Review). [bioRxiv]

2. Xie J*, **Jung KJ***, Allen C*, Chang Y, Paul S, Li Z, Ma Q, Chung D (2024). Analysis of community connectivity in spatial transcriptomics data. *Frontiers in Applied Mathematics and Statistics*, 10, 1378370. doi.org/10.3389/fams.2024.1403901. [link]

3. Karageorgos GM, Cho S, McDonough E, Chadwick C, Ghose S, Owens J, **Jung KJ**, Machiraju R, West R, Brooks JD, Mallick P, Ginty F (2024). Deep learning-based automated pipeline for blood vessel detection and distribution analysis in multiplexed prostate cancer images. Frontiers in Bioinformatics, 3. doi:10.3389/fbinf.2023.1296667. [link]

4. Jeon H, Xie J, Jeon Y, **Jung KJ**, Gupta A, Chang W, Chung D (2023). Statistical power analysis for designing bulk, single-cell, and spatial transcriptomics experiments: Review, tutorial, and perspectives. *Biomolecules*, 13(2), 221. doi.org/10.3390/biom13020221. [link]

In preparation

1. **Jung KJ**, Rout S, Qiu J, Ghose S, Cho S, McDonough E, Chadwick C, Brooks JD, West R, Ginty F, Chung D, Jadhav K, Machiraju R, Mallick P (2026). A Multi-Task Foundation Representation for Immune–Gland Architecture in Prostate Cancer Histology. (In Preparation).

2. **Jung KJ**, Rout S, Jianwei, Ghose S, Cho S, McDonough E, Chadwick C, Brooks JD, West R, Ginty F, Chung D, Jadhav K, Machiraju R, Mallick P (2026). A Multi-Modal, Immune- and Morphology-Aware Prostate Cancer Histology Dataset with Text Captions, Tissue Maps, and Clinical Outcomes. (In Preparation).

Collaboration paper

1. Schafer JM*, Song NJ*, Xiao T, Gauntner TD, **Jung KJ**, Fitts EG, Kumar K, Jeon HS, Elaoud RA, Reynolds K, Caruso VM, Levin TG, McConkey D, Lee CT, Pohar KS, Clinton SK, Carson WE, Chung DJ, Li Z, Sundi D (2025). T cell subsets of urine-derived lymphocytes (UDLs) serve as an indicator of TILs and reflect immunological sex differences in bladder cancer. *Journal for ImmunoTherapy of Cancer*, 13(10), e012050. doi.org/10.1136/jitc-2025-012050. [link]

2. Song NJ, Xie J, **Jung KJ**, Wang Y, Pozniak J, Roda N, Marine JC, Riesenberg BP, Jeon H, Ma A, Cox N, Wethington D,

Reynolds K, Xiao T, Li A, Kronen P, Denko N, Carbone DP, Ma Q, Carson WE, Mundy-Bosse BL, Burd CE, Das J, Chung D, Li Z (2025). Tumor-Associated NK Cells Regulate Distinct CD8+ T-cell Differentiation Program in Cancer and Contribute to Resistance against Immune Checkpoint Blockers. Cancer Discovery 15(9):1835-1857. doi.org/10.1158/2159-8290.CD-24-1232. [link]

3. Schwarz E, Benner B, Wesolowski R, Quiroga D, Good L, Sun SH, Savardekar H, Li J, **Jung KJ**, Duggan MC, Lapurga G, Shaffer J, Scarberry L, Konda B, Verschraegen C, Kendra K, Shah M, Rupert R, Monk P, Shah HA, Noonan AM, Bixel K, Hays J, Wei L, Pan X, Behbehani G, Hu Y, Elemento O, Chung D, Xin G, Blaser BW, Carson WE (2024). Inhibition of Bruton's tyrosine kinase with PD-1 blockade modulates T cell activation in solid tumors. *JCI Insight*, 9(21), e169927. doi.org/10.1172/jci.insight.169927. [link]

4. Deffenbaugh JL, **Jung KJ**, Murphy SP, Liu Y, Rau CN, Petersen-Cherubini CL, Collins PL, Chung D, Lovett-Racke AE (2024). Novel model of multiple sclerosis induced by EBV-like virus generates a unique B cell population. *Journal of Neuroimmunology*, 394, 578408. doi.org/10.1016/j.jneuroim.2024.578408. [link]

5. Wen RM, Qiu Z, Marti GEW, Peterson EE, Garcia Marques FJ, Bermudez A, Wei Y, Nolley R, Lam N, Polasko AL, Chiu CL, Zhang D, Cho S, Karageorgos GM, McDonough E, Chadwick C, Ginty F, **Jung KJ**, Machiraju R, Mallick P, Crowley L, Pollack JR, Zhao H, Pitteri SJ, Brooks JD (2024). AZGP1 deficiency promotes angiogenesis in prostate cancer. *Journal of Translational Medicine*, 22(1), 383.doi.org/10.1186/s12967-024-05183-x. [link]

Security related paper

1. **Jung KJ**, Woo S (2018). SECURITY Comparison on KOREAN Password / Authentication Policy and Other Countries. *International Journal of Protection, Security & Investigation (J-Institute)*, 3(2), 6-13. doi.org/10.22471/protective.2018.3.2.06. [link]

2. **Jung KJ**, Choi SH, Lee BH, Nam Gung Y, Kim JS, Kim HS, Han JS, Kim T, Choi BJ (2018). POSTER: Undetectable Task Bypassing OS Scheduler via Hardware Task Switching. *Proceedings of the 2018 on Asia Conference on Computer and Communications Security (ASIACCS)*, 801–803. doi.org/10.1145/3196494.3201582. [link]

3. **Jung KJ**, Lee BH, Gung YN, Kim JS, Kim HS, Han JS, Choi BJ (2018). Under Cover of Darkness: Hiding Tasks via Hardware. *HITBSecConf (Hack In The Box Security Conference)*, Amsterdam, Netherlands. (Technical Paper) [ ]

4. Woo S, **Jung KJ**, Choi BJ (2018). Survey on Current Password Composition Policies. *Journal of the Korea Institute of Information Security & Cryptology*, 28(1), 43-47. [ ]

BOOK CHAPTER

1. Gillespie J, Xie J, **Jung KJ**, Hardiman G, Pietrzak M, and Chung D (2025), "A gentle introduction to spatial transcriptomic analysis with 10X Visium data," To appear in *Methods in Molecular Biology*.

OPEN-SOURCE SOFTWARE & LAB INFRASTRUCTURE

Development of Bioinformatics Tools:

R Shiny App development

TOPAZ: Cell / gland type classification using spatial proteomics

URL: https://chunglab.bmi.osumc.edu/TOPAZ/

(In preparation)

Multi-Task Foundation Representation tool for immune-tumor gland architecture in prostate cancer histology. (Python/PyTorch)

Lab Infrastructure

Server Administration**:** Managed research lab server - resource allocation, and environment update/isolation (EPEL, SCL/Compile Tool/renv) to ensure reproducibility of experiments from different machines.

Deployment: Experience in deploying web applications on Linux-based server.
Ex) https://chunglab.bmi.osumc.edu/VeteranST/, https://chunglab.bmi.osumc.edu/spaDesign/, https://chunglab.bmi.osumc.edu/SCOPE/

PRESENTATION

2025	Multi-modal Domain-specific Foundation Model for Prostate Cancer Explanation: Utilizing H&E Image and Spatial Proteomics SSACB 2025, NIH (Bethesda), Maryland, August 2025 (Talk, and poster)
2025	Multi-modal Domain-specific Foundation Model for Prostate Cancer Explanation: Utilizing H&E Image and Spatial Proteomics ICIBM 2025, Columbus, Ohio, August 2025 (Talk, and poster)
2024	Prostate Cancer Diagnosis and Prognosis Prediction Using Spatial Proteomics

AIMACCS 2024, Columbus, Ohio, May 2025 (Poster)

2023 Analysis of Community Connectivity in Spatial Transcriptomics Data,
KSEA UKC, Dallas, Texas, August 2023(Poster)
Best poster award

2018 Undetectable Task Bypassing OS Scheduler via Hardware Task Switching
ASIACCS 2018, Songdo, Korea, June

2018 Under Cover of Darkness: Hiding Tasks via Hardware,
HITBSecConf, CommSec, Amsterdam, Netherlands, April 2018.

RESEARCH GROUP

2021 ~ present Prostate Cancer Spatial Proteomics Research Group
The Ohio State University, Stanford University, GE Healthcare
Grant No.: R01CA249899
Role: Development of methods for computational pathology (classification, dataset, foundation model)
Collaborated with researchers from industry and pathologists

2024 ~ present Center for AI & Bioinformatics in Immuno-Oncology (CATION) - https://u.osu.edu/cation/
The Ohio State University
Pelotonia Institute for Immuno-Oncology (PIIO)
Role: Bioinformatician –single cell RNA/TCR/FlowCytometry/
Spatial Transcriptomics/Proteomics/CITEseq analysis
Collaborated with Immuno-oncologists

2025 ~ present Biomedical Informatics Shared Resources (BISR)
https://medicine.osu.edu/departments/biomedical-informatics/resources-and-services/bisr
The Ohio State University Comprehensive Cancer Center (CCC)
Role: Support BISR in AI training - tutorials / implementation support on neural networks
Consisted of Statisticians, Bioinformatician researchers

2021 ~ present Chung lab meeting
The Ohio State University
Role: Presentation hosting, scheduling, and presenting
Consisted of Statistics, Computer Science, Bioinformatics graduate researchers

PATENT

2018(expired) Software Code Dynamic Distributing Method and Apparatus
Choi DH, Kim JK, Park JH, Lim SM, Choi J, Hwang TW, Han JS, **Jung KJ**

2017(expired) Detection method and device of hidden task using hardware task switching
Lee BH, Choi SH, Kim JS, **Jung KJ**, Nam Gung Y, Kim HS, Han JS

AWARDS & HONORS

2023 *2023 KSEA-KUSCO Graduate Scholarship*
KSEA-KUSCO ($2,000)

2015 *Dean's List for Excellent Academic Achieve*
Angelo State University, San Angelo, Texas

TEACHING EXPERIENCE

Teaching Assistant at The Ohio State University
2021 CSE1223: Java Programming

2020 CSE1223: Java Programming
CSE3461: Computer Networking

2019 CSE3461: Computer Networking

Teaching Assistant at Stony Brook University-State University of New York (SUNY) Korea
2018 BUS215: Intro to Business Statistics

2017 CSE101: Introduction to Computational and Algorithmic Thinking

CSE114: Computer Science I
CSE220: System Fundamentals I
MEC101: Freshman Design Innovation

COURSEWORK

Computer Science and Engineering

CSE6431 Advanced Operating Systems
CSE6331 Algorithms
CSE5479 Intermediate Studies in Computer Security
CSE6341 Foundations of Programming Languages
CSE5523 Machine learning and Statistical Patterns Recognition
CSE5526 Introduction to Neural Networks
CSE5524 Computer Vision for Human-Computer Interaction
CSE5243 Introduction to Data Mining
CSE6521 Advanced Survey of Artificial Intelligence

Statistics

STAT6301 Probability for Statistical Inference
STAT6570 Applied Bayesian Analysis
STAT6450 Applied Regression Analysis
STAT6530 Introduction to Spatial Statistics
STAT6410 Design and Analysis of Experiments
STAT8750.03 Research Group in Statistical Genetics and Bioinformatics

Biomedical Informatics

BMI8310 Genome-Scale Data

SKILLS

- Python, R, Java, C, C++
- Deep Learning (Tensorflow, Keras, Pytorch)
- Database (MySQL, JDBC, XAMPP, TOMCAT)

ACADEMIC LEADERSHIP & SERVICE

2022-2024 *President* of Korean Graduate Student Association
The Ohio State University
Role: Led a team to organize large-scale academic seminars, recruiting events, and networking events for over 250 graduate students.
Managed the association's annual budget and secured funding from external sponsors and the university, resulting in a significant financial surplus for the next administration.
Helped incoming students and their families to adapt to life at OSU.

2021-2022 *President* of Korean Engineering Graduate Student Association
The Ohio State University
Role: Facilitated research exchanges and networking among engineering graduate students.
Participated in the NET program (Korean Federation of Science and Technology Societies (KOFST)) to support and fund small research groups.

2011 *Representative of freshmen* in Computer Engineering department
Yonsei University, Republic of Korea

INDUSTRY EXPERIENCE

2018- 2019 *IT employee* at Korea International School IT Team
Server/Network maintenance, Web page management, development,
Privacy management, IT asset management
Republic of Korea

2016 *Internship* at The Korean Association for Industrial Technology Security
Security Operation Service
Equipment check-up on small and medium industrial companies
Republic of Korea

CERTIFICATES

2017 – 2018 Certificate of *Best of the Best member (Digital Forensics Track)*
Program training the Next Generation of Top Security Leaders
Korea Information Technology Research Institute (KITRI),
Republic of Korea

2017 Certificate of *Study & Training*
Crime Scene Investigation & Forensic Science Program
National Forensic Service,
Republic of Korea