JI YOUNG BYUN

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RESEARCH INTEREST

- Developing deep-learning frameworks for computer-aided diagnosis system.
- Efficient fine-tuning of foundation models using real-world data.
- Implementing effective techniques for integrating multimodal data sources.
- Addressing domain shift challenges in translational research.

EDUCATION

THE JOHNS HOPKINS UNIVERSITY — MD, U.S.
Ph.D. candidate at Biomedical Engineering program (GPA: 3.85/4.0) — 2022 - Present
- Supervisor: Rama Chellappa (rchella4@jhu.edu)
- Developing AI/ML frameworks for diagnosing ocular and age-related conditions. The project involves gathering eye images via smartphones and using them for accurate classification on mobile devices.

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST) — Daejeon, Korea
M.S. in Department of Bio and Brain Engineering (Converted GPA: 4.0/4.0) — 2021
- Supervisor: Yong Jeong (yong@kaist.ac.kr)
- Thesis: Graph Neural Network (GNN) for Predicting Alzheimer's Disease (AD)
  Developed a GNN approach, utilizing approximate personalized propagation of neural predictions, to predict AD by incorporating resting-state functional MRI (rs-fMRI) and demographic measures.

KOREA ADVANCED INSTITUTE OF SCIENCE AND TECHNOLOGY (KAIST) — Daejeon, Korea
B.S. in Department of Bio and Brain Engineering (Converted advanced GPA: 3.7/4.0) — 2018

PUBLICATIONS

1. **Byun, J.**, Shuff, J., Shekhawat, N., Parikh, K., Chellappa, R. (2024) Projection Tuning for Efficient Adaptation to Data Shifts in Small Datasets. *Submitted to NeurIPS'24 workshop*
2. **Byun, J.**, & Jeong, Y. (2021) Graph neural network-based heterogeneous propagation scheme for classifying Alzheimer's disease using resting-state fMRI and demographic measures. In Asian Society of Magnetic Resonance in Medicine & International Congress on MRI 2020. Virtual. **(Best Poster Award)**
3. Park, H., Kam, T. I., Peng, H., Mehrabani-Tabari, A. A., Chou, S. C., Karuppagounder, S. S., Umanah, G. K., Chang, S., Kim. H., **Byun, J.**, Liu, J. O., Dawson, T. M., & Dawson, V. L. (2022) Therapeutic potential of PAAN inhibition for Parkinson's disease. *Cell*. 185(11), 1943-1959. **[Impact Factor: 66.85]**
4. Kang, Y. T., Doh, I., **Byun, J.**, Chang, H. J., & Cho, Y. H. (2017). Label-free rapid viable enrichment of circulating tumor cell by photosensitive polymer-based microfilter device. *Theranostics*, 7(13), 3179. **[Impact Factor: 8.54]**

PRESENTATIONS

1. **Byun, J.**, Shuff, J., Shekhawat, N., Parikh, K., Chellappa, R. (2024, August 28). AI Integration in Eye Care: From Smartphone Imaging to Cataract Diagnosis. Virtual (**Invited Talk)**
2. **Byun, J.**, & Jeong, Y. (2020, November 14). The impact of SNPs on Alzheimer's disease classification based on resting-state fMRI. Korea Dementia Association. Virtual.
3. **Byun, J.**, & Jeong, Y. (2020, November 6). Classification of Alzheimer's disease based on resting-state functional MRI and SNPs. Korean Human Brain Mapping Conference. Virtual.
4. **Byun, J.**, & Jeong, Y. (2020, November 3-4). Graph neural network approach for classification of Alzheimer's disease using resting-state fMRI. Asian Society of Magnetic Resonance in Medicine & International Congress on MRI 2020. Virtual. **(Best Poster Award)**

5. **Byun, J.**, & Jeong, Y. (2020, June 23-July 3). Automated multi-class classification of Alzheimer's disease with attributed network embedding. Organization for Human Brain Mapping Conference. Virtual.
6. **Byun, J.**, & Jeong, Y. (2019, November 1). Automated multi-class classification of Alzheimer's disease with attributed network embedding. Korean Human Brain Mapping Conference.

HONORS & AWARDS

KAIST-KT Joint Research Project — $85,000 a year research grant 2021 - 2022
Best Poster Award — ASMRM & ICMRI 2020 2020
National Scholarship — 4 semesters 2019 - 2021
Best Tutor Awards — Global Institute for Gifted Education 2018
KAIST Scholarship — 8 semesters 2013 - 2017
National Science & Technology Scholarship — 4 semesters 2015 - 2017
Nationwide Nobel Prize Essay Contest — 3rd Place 2016
KAIST Scholarship for Research Internship 2016

RESEARCH EXPERIENCE

LABORATORY FOR COGNITIVE NEUROSCIENCE & NEUROIMAGE Daejeon, Korea
Researcher—Supervisor: Yong Jeong, MD, Ph.D. Feb 2019 – Apr 2022
- Implementing knowledge distillation to predict amyloid positivity with incomplete data.
- Developed GNN framework to classify AD with rs-fMRI and demographic measures.
- Analyzed rs-fMRI of Parkinson's disease patients to verify the Donepezil's effects on memory loss.

INSTITUTE FOR BASIC SCIENCE FOR COGNITION AND SOCIALITY Daejeon, Korea
Researcher—Supervisor: Do-yun Lee, Ph.D. Sep 2016 - Feb 2018
- Implemented in vivo two-photon calcium imaging to research social information processes.
- Programmed through MATLAB to interpret neuronal patterns at the network and cellular levels.

JOHNS HOPKINS UNIVERSITY Baltimore, MD
Research Intern—Supervisor: Valina Dawson, Ph.D. Jun 2016 - Aug 2016
- Characterized the effects of the inhibition of AIMP2 phosphorylation on Parkinson's disease symptoms.
- Conducted cellular analysis of dopamine neurons and behavioral tests on mice injected with PFF.

NANOSENTUATING SYSTEMS LABORATORY, KAIST Daejeon, Korea
Research Assistant—Supervisor: Young-ho Cho, Ph.D. Sep 2015 - Jun 2016
- Examined the genetic expression of captured circulating tumor cells (CTCs) in human blood samples.
- Isolated CTCs and rare cell RT-qPCR with fabricated filters to identify genetic markers expressed.

TRANSLATIONAL NEUROGENETICS LABORATORY, KAIST Daejeon, Korea
Research Assistant—Supervisor: Jung-ho Lee, MD, Ph.D. Jun 2015 - Aug 2015
- Investigated the role of primary cilia in neuronal cells of Joubert syndrome patients.
- Created a Tmem138 knockout mouse model using Cre-loxP recombination and in utero electroporation.

CELL SIGNALING AND BIO IMAGING LABORATORY, KAIST Daejeon, Korea
Research Assistant—Supervisor: Chul-hee Choi, MD, Ph.D. Mar 2015 - Jun 2015
- Identified which optimized *ginsenoside* substance for treating breast cancer in mouse models.
- Employed Doxorubicin as a control to compare its medicinal effects with the *ginsenoside* substances.

POSTECH-CATHOLIC UNIVERSITY BIOMEDICAL ENGINEERING INSTITUTE Daejeon, Korea
Research Intern Dec 2014 - Feb 2015
- Organized methods to treat brain tumors by using mesenchymal stem cells.

NANOENTEK Seoul, Korea
Research Intern Jan 2014 - Feb 2014
- Developed lab-on-a-chip diagnostic tool for AD with various metrics including TSH level.