

# Jinheon Baek

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**RESEARCH INTEREST** My research interest is mainly on developing novel machine learning models and algorithms for graphs, and their real-world applications to natural language and computer vision domains.

**EDUCATION**

**KAIST** Daejeon, Korea  
Ph.D. in Artificial Intelligence Mar 2022 – Present  
Advisor: Professor Sung Ju Hwang

M.S. in Artificial Intelligence Mar 2020 – Feb 2022  
Thesis: Toward Accurate Learning of Graph Representations  
Advisor: Professor Sung Ju Hwang  
GPA: 4.22/4.30

**Korea University** Seoul, Korea  
B.S. in Computer Science and Engineering Mar 2016 – Feb 2020  
B.E. in Software Technology and Enterprise Program (Interdisciplinary Program)  
Advisor: Professor Jaewoo Kang  
GPA: 4.40/4.50, GPA of Computer Science and Engineering: 4.48/4.50

- PUBLICATIONS** *International Papers* (\* equal contribution)
- [17] Personalized Subgraph Federated Learning  
[Jinheon Baek\\*](#), Wonyong Jeong\*, Jiongdoo Jin, Jaehong Yoon, and Sung Ju Hwang  
Under Review
  - [16] Graph Self-supervised Learning with Accurate Discrepancy Learning  
Dongki Kim\*, [Jinheon Baek\\*](#), and Sung Ju Hwang  
Under Review
  - [15] Knowledge-Consistent Dialogue Generation with Knowledge Graphs  
Minki Kang\*, Jin Myung Kwak\*, [Jinheon Baek\\*](#), and Sung Ju Hwang  
Knowledge Retrieval and Language Models Workshop at International Conference on Machine Learning (**KRLM@ICML**), 2022.
  - [14] KALA: Knowledge-Augmented Language Model Adaptation  
Minki Kang\*, [Jinheon Baek\\*](#), and Sung Ju Hwang  
Annual Conference of the North American Chapter of the Association for Computational Linguistics (**NAACL**), 2022 (**Oral**)
  - [13] Augmenting Document Representations for Dense Retrieval with Interpolation and Perturbation  
Soyeong Jeong, [Jinheon Baek](#), Sukmin Cho, Sung Ju Hwang, and Jong C. Park  
Annual Meeting of the Association for Computational Linguistics (**ACL**), 2022 (**Oral**)
  - [12] Edge Representation Learning with Hypergraphs  
Jaehyeong Jo\*, [Jinheon Baek\\*](#), Seul Lee\*, Dongki Kim, Minki Kang, and Sung Ju Hwang  
Conference on Neural Information Processing Systems (**NeurIPS**), 2021
  - [11] Task-Adaptive Neural Network Retrieval with Meta-Contrastive Learning  
Wonyong Jeong\*, Hayeon Lee\*, Geon Park\*,  
Eunyoung Hyung, [Jinheon Baek](#), and Sung Ju Hwang  
Conference on Neural Information Processing Systems (**NeurIPS**), 2021 (**Spotlight**)
  - [10] Unsupervised Document Expansion for Information Retrieval with Stochastic Text Generation  
Soyeong Jeong, [Jinheon Baek](#), ChaeHun Park, and Jong C. Park  
Scholarly Document Processing at Annual Conference of the North American Chapter of the Association for Computational Linguistics (**SDP@NAACL**), 2021 (**Oral**)

- [9] Accurate Learning of Graph Representations with Graph Multiset Pooling  
[Jinheon Baek\\*](#), Minki Kang\*, and Sung Ju Hwang  
International Conference on Learning Representations (**ICLR**), 2021
- [8] Exploring The Spatial Reasoning Ability of Neural Models in Human IQ Tests  
Hyunjae Kim\*, Yookyung Koh\*, [Jinheon Baek](#), and Jaewoo Kang  
**Neural Networks**, 2021
- [7] Learning to Extrapolate Knowledge: Transductive Few-shot Out-of-Graph Link Prediction  
[Jinheon Baek](#), Dong Bok Lee, and Sung Ju Hwang  
Conference on Neural Information Processing Systems (**NeurIPS**), 2020

*Domestic Papers*, mostly written in Korean

- [6] Artificial Intelligence-Based High School Course and University Major Recommendation System for Course-Related Career Exploration  
[Jinheon Baek](#), Hayeon Kim, and Kiwon Kwon  
KIPS Transactions on Software and Data Engineering (KTSDE), 2021
- [5] Graph Representation Learning with Attention-based Set Pooling  
[Jinheon Baek](#), Minki Kang, and Sung Ju Hwang  
Conference of Korean Artificial Intelligence Association (CKAIA), 2020 (**Best Paper**)
- [4] Embedding Academic Majors and Lectures for Analyzing Departments in University  
[Jinheon Baek](#), Gwanghoon Jang, Soyeong Jeong, Donghyeon Park, Kiwon Kwon, and Jaewoo Kang  
Korea Computer Congress (KCC), 2019 (**Oral**)
- [3] Embedding Food Ingredients Based on Chemical Combination in Dense Vector Space  
Donghyeon Park, Yonggyu Park, Buru Chang, [Jinheon Baek](#), and Jaewoo Kang  
Korea Computer Congress (KCC), 2018 (**Best Paper**)
- [2] Multimodal Approach for Blocking Obscene and Violent Contents  
[Jinheon Baek](#), Dakyeong Lee, Chaeyeon Hong, and Byeongtae Ahn  
Journal of Convergence for Information Technology (JCIT), 7(6), 2017

*Thesis*

- [1] Toward Accurate Learning of Graph Representations  
[Jinheon Baek](#)  
Master's Thesis, KAIST, 2022

#### PATENTS

- [2] Method for Building an Artificial Intelligence based Research Topics Database  
Kiwon Kwon, and [Jinheon Baek](#)  
Korean patent number: 10-2021-0017765, filed on Feb 08, 2021, and registered on Apr 19, 2022
- [1] Method for Consulting on Exploration Activities  
based on Target Departments and Curriculum Achievement Standards  
Kiwon Kwon, and [Jinheon Baek](#)  
Korean patent number: 10-2021-0017764, filed on Feb 08, 2021, and registered on Mar 23, 2022

#### HONORS AND AWARDS

- Selected as One of the Highlighted Reviewers (Top < 10%) of ICLR 2022 2022
- Selected as One of the Best Reviewers (Top 10%) of ICML 2021 2021
- Received the Best Paper Award at CKAIA 2020 2020
- Awarded the Samsung Dream Scholarship 2016-2020
- Received the First Prize in the Graduation Project Competition Among Around 20 Teams, Computer Science and Engineering Department at Korea University 2019
- Received the Academic Excellence Award (highest on GPA) at Korea University 2019
- Received the Second Prize for Excellence in the Microsoft Student Partners Activities Among Around 10 Teams As a Team Leader, Microsoft Student Partners 2018

Nominated as a Representative of Korean for Excellence in Microsoft Student Partners Activities Among Around 50 Members on the Global Summit Program, Microsoft Student Partners 2017

ACADEMIC  
SERVICES

**Conference Reviewers**

Learning on Graphs Conference (**LoG**) 2022  
Conference on Neural Information Processing Systems (**NeurIPS**) 2021-2022  
International Conference on Machine Learning (**ICML**) 2021-2022  
International Conference on Learning Representations (**ICLR**) 2022

**Journal Reviewer**

Transactions on Machine Learning Research (**TMLR**) 2022

RESEARCH  
EXPERIENCE

**MLAI (Machine Learning & Artificial Intelligence) Lab, KAIST** Daejeon, Korea  
*Research Assistant* (Advisor: Professor Sung Ju Hwang) Jul 2019 - Present

- Conducting research on graphs (node/graph representation, reconstruction, generation and retrieval) with applications to natural language (knowledge graphs); computer vision (object graphs).

**DMIS (Data Mining & Information System) Lab, Korea University** Seoul, Korea  
*Undergraduate Research Assistant* (Advisor: Professor Jaewoo Kang) Mar 2018 - Jun 2019

- Conducted research on embedding particular knowledge (food ingredients and academic majors) for recommendation, and research on investigating the spatial reasoning ability of neural models.

**ETRI (Electronics and Telecommunications Research Institute)** Daejeon, Korea  
*Trainee of Research at Smart Data Research Group* Jan 2019 - Feb 2019

- Researched and developed an open data distribution platform based on the international standard (DCAT): researched Hyperledger for blockchain identification and open-sourced PaaS for cloud engineering; applied DevOps tools (Ansible, AWX, and Traefik) to manage nodes on a cloud.

INDUSTRIAL  
EXPERIENCE

**Jobshopper** Seoul, Korea  
*Technical Lead* Jul 2018 - Feb 2020

- Co-founded an education-technology startup mainly focusing on career for secondary students.
- Led the development and research groups of more than 10 people, in which planning businesses, developing server systems, managing cloud services and developing AI models.
- Successfully exit big-data based university information platform, namely majormap, at May 2020.
- Now only advising important decisions, especially about technical directions.

VOLUNTEERING  
EXPERIENCE

**Oxford Covid-19 Government Response Tracker (OxCGRT)**  
*Data Contributor* Jan 2022 - Present

- Collecting systematic information on policy measures that governments have taken to tackle COVID-19, which can help decision-makers and citizens understand governmental responses in a consistent way, aiding efforts to fight the pandemic; taking charge of recording South Korea.

**WoonWha - Education Volunteer Club, Korea University**  
*Mathematics and Homeroom Teacher* Jul 2016 - Jul 2017

- Volunteered for children (around 10 students) vulnerable to education due to family circumstances, almost every twice a week that ranks approximately 300 hours.

**Do-Dream - 5th Volunteering Program, Samsung Dream Scholarship Foundation**  
*Volunteer* Jan 2017

- Volunteered for children in the Cambodian countryside namely Ankorborei, by teaching students, building a school and sharing cultures for two weeks.

TALKS AND  
SEMINARS

Edge Representation Learning with Hypergraphs  
KAIST AI Workshop Jan 2022

Accurate Learning of Graph Representations with Graph Multiset Pooling	KAIST AI Workshop	Jan 2022
	ICLR Social - ML in Korea	May 2021
Introduction of Graph Neural Networks	Modulabs	Jan 2022
Special Talk in Artificial Intelligence as an Alumnus	Korea University	Aug 2021
Learning to Extrapolate Knowledge: Transductive Few-shot Out-of-Graph Link Prediction	Korean Conference on Computer Vision (KCCV)	Aug 2021
	NeurIPS Social - ML in Korea	Dec 2020
Basic Algorithms of Machine Learning and Deep Learning with Python Code Challenges	Microsoft Coding Education Volunteer Group Seminar	Jul 2018
	Microsoft Student Partner Newcomer Tech Seminar	May 2018
IaaS (Infrastructure as a Service) in Microsoft Azure	Microsoft Student Partner Newcomer Tech Seminar	Apr 2018
Phishing Website Detection with Microsoft Azure Machine Learning Studio	KUSISWALL: Joint Seminar of Korea, Sookmyung and Hanyang Universities	Feb 2018
Basic Algorithms of Machine Learning with Azure Machine Learning Studio	Microsoft Student Partner Evangelism	Nov 2017
	Microsoft Student Partner Evangelism	Nov 2016
Azure Cognitive Services with Serverless Cloud Computing using JavaScript and Python	Microsoft Student Partner Evangelism	Nov 2017
Windows Hello: Microsoft Face Recognition System in Windows 10	Microsoft Student Partner Inner Tech Seminar	Oct 2016
Security Issues in Hash Encryption and Linux Password	KUSISWALL: Joint Seminar of Korea, Sookmyung and Hanyang Universities	Jun 2016

EXTRA-  
CURRICULAR  
ACTIVITIES

**Microsoft Student Partner**

*Developer / Lead / Representative of Korean in Global Summit* Jul 2016 - Jul 2020

- As a developer, educated Microsoft Cloud Platform Azure and Machine Learning to developers.
- As a community leader in South Korea, recruited the new members, planned the community programs, and reviewed the technical contents of each team with Microsoft employees.
- As a representative of Korean on the global summit program, conducted a role as a technical ambassador by attending Microsoft Build that is the biggest annual conference held by Microsoft.

**Inc0gnito Hacking Conference**

*Chairman* Mar 2018 - Feb 2019

- Organized the conference – information security conference in South Korea held by undergraduate students over more than 10 universities – that covers various techs, news, and trends on information security areas, which also aims to be a meeting place for future security specialists.

**SW Maestro**

*8th Trainee* Jul 2017 - Dec 2017

- Developed systems that automatically block obscene and violent movie contents with machine learning in the program that aims to train talented students on software in South Korea.

SKILLS

Languages: Korean (mother tongue), English (fluent)

Programming: Python, JavaScript, Java, and C