

Jihyung Kook

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Seoul, South Korea

RESEARCH INTERESTS

My research focuses on **privacy-preserving machine learning and cryptography**, applying cryptographic techniques such as homomorphic encryption to enable secure and efficient training. I aim to advance practical methods that protect **data privacy** in both learning and unlearning systems, ensuring the **trustworthiness and usability** of future AI technologies.

Keywords: Privacy-Preserving Machine Learning (PPML), Cryptography, Data Privacy

EDUCATION

- **Georgia Institute of Technology** Jan. 2021 - Dec. 2024
M.S. in Computer Science (OMSCS) GA, USA
 - Specialization: Computational Perception & Robotics
- **Sookmyung Women's University** Mar. 2014 - Feb. 2017
B.S in Statistics and Computer Science (Double Major) Seoul, South Korea

PUBLICATIONS

C=CONFERENCE, J=JOURNAL, P=PATENT, S=IN SUBMISSION, T=THESIS

- [J.1] Tae-jung Oh, **Ji-hyung Kook**, Se Young Jung, et al. (2021). **A standardized glucose-insulin-potassium infusion protocol in surgical patients: Use of real clinical data from a clinical data warehouse.** *Diabetes Research and Clinical Practice*, 174, 108756. DOI: 10.1016/j.diabres.2021.108756
- [C.1] Hyesung Yoon, **Jihyung Kook**, Junho Shim. (2015). **IOT-based Mailbox system using Android and Arduino.** In *Proceedings of the 2015 Spring Conference of KIPS (Korea Information Processing Society)*, pp. 1080–1081. Korea Information Processing Society. April 22, 2015, Seoul, South Korea.

RESEARCH EXPERIENCE

- **Privacy-Preserving Machine Learning and Cryptography Lab** Jul. 2025 - Present
Researcher Seoul, South Korea
 - Benchmarked 3 CKKS-based Homomorphic Encryption (HE) Federated Learning (FL) settings (plaintext, sparsified plaintext, and encrypted+sparsified) on MNIST and CIFAR datasets, analyzing differences in communication cost, runtime, and accuracy.
 - Presented 5+ research papers on HE and FL in lab seminars, contributing to discussions on selective encryption strategies for reducing overhead in FL.
 - Organized and led weekly cryptography study sessions (avg. 3 members), maintaining a shared archive of outcomes to support ongoing PPML research.
 - Supervisor: [Prof. Eunsang Lee](#)
- **DS@GT Research Club** Sep. 2025 - Present
Georgia Institute of Technology Atlanta, GA, USA
 - Prepared 3 seminar slide decks on LifeCLEF-related research; attended weekly meetings with 40–50 participants and contributed to Q&A discussions to build collaborative research and presentation skills.
- **Research Project** May. 2025 - Jul. 2025
Georgia Institute of Technology Atlanta, GA, USA
 - Authored a research proposal, "A Systematic Review of Practical Challenges in Applying Homomorphic Encryption to PPML", outlining barriers such as computational overhead, integration, and regulatory constraints.
 - Co-authored a group SLR on Automated Speech Recognition(ASR)-based pronunciation training; applied inclusion/exclusion criteria to curate 20+ studies and synthesized findings to identify challenges (accent variability, limited L1-personalization).
 - Contributed structured peer review feedback on 20+ individual and group research proposals, improving clarity, feasibility, and academic rigor across multiple review rounds.
- **Seoul National University Bundang Hospital** Mar. 2018 - Mar. 2021
Part-time Research Assistant Gyeonggi-do, South Korea
 - Contributed to a publication in *Diabetes Research and Clinical Practice* on a standardized glucose-insulin-potassium infusion protocol by preprocessing and analyzing large-scale clinical datasets (7,000+ patients).
 - Performed an exploratory analysis of continuous glucose monitoring (CGM) data from 55 patients, evaluating data quality and patterns as a preliminary step toward identifying predictors of glycemic control.
 - Supervisor: [Prof. Tae-jung Oh](#)

PROFESSIONAL EXPERIENCE

- **Seoul National University Bundang Hospital** Jul. 2025 - Present
Part-time Research Administrative Assistant Gyeonggi-do, South Korea
 - Managed research administration tasks including payroll processing, publication fees, IRB review fees, and training expenses, ensuring accurate budgeting and compliance with institutional guidelines.
 - Provided on-demand data support for clinical research, including dataset cleaning, merging, and extraction from Electronic Medical Records (EMR), enabling timely analyses and manuscript preparation.
- **KB Kookmin Bank (concurrent with KB Financial Group)** Jul. 2020 - Sep. 2023
Data Analyst, Department of Data Planning Seoul, South Korea
 - Standardized customer data across 7 subsidiaries, organizing records into 8 domains and implementing retention/deletion rules, which improved cross-subsidiary integration and ensured full regulatory compliance.
 - Coordinated bi-monthly cross-subsidiary meetings with data managers to resolve data quality and integration issues, resulting in the cleanup of 20% legacy records and the refresh of 10% high-value datasets, improving reliability of the group database.
 - Delivered group-wide training (7 subsidiaries) and one-on-one coaching on data visualization and automation, improving digital adoption and reporting efficiency.
- **Croquis Inc. (Kakao Style / Zigzag)** Mar. 2018 - Apr. 2020
Junior Data Analyst, Department of Data Seoul, South Korea
 - Automated 17 ETL workflows on PySpark using Python and PySQL to standardize customer analysis criteria across teams, increasing data accuracy by 15% and improving reporting reliability.
 - Analyzed user and transaction data after launching an in-app payment system; improved recommendation algorithms and automated promotion reports, resulting in 23% higher sales (GMV) for early-adopting sellers compared to others.
 - Collaborated with PMs, designers, and engineers to define KPIs focused on expanding Top-100 seller participation (out of 400+ shops), and built Tableau/R-Shiny dashboards to track adoption and performance, supporting strategies to boost overall sales volume.
 - Delivered cross-team training in SQL and Tableau, enhancing organizational data literacy and enabling non-technical staff to use data in decision-making; this reduced the data team's workload by 7% through increased self-service capabilities.

VOLUNTEER EXPERIENCE

- **ForCatMung Center** Sep. 2025 - Present
Volunteer Ansan, South Korea
 - Contributed to monthly activities such as cleaning the shelter and feeding animals, supporting the care and well-being of rescued animals.
- **2025 Animal Run Seoul** Oct. 2025
Participant Seoul, South Korea
 - Completed a 10 km charity run to raise awareness and donations for endangered animals.

CERTIFICATES & TRAINING

- **Seoul National University 4th Industrial Revolution Academy - Big Data Platform Technology** Jun. 2017 - Feb. 2018
Seoul National University Big Data Institute Seoul, South Korea
 - Completed intensive coursework in Python, SQL/DBMS, distributed systems, data mining, and machine learning/deep learning.
 - Conducted an exploratory study at Seoul National University Bundang Hospital on predictive factors from Continuous Glucose Monitoring (CGM) data, receiving weekly one-on-one mentorship from a professor in endocrinology as well as guidance from a computer science professor and PhD students, gaining early interdisciplinary research training.

SKILLS

- **Programming & Tools:** Python, PyTorch, R, SQL, PySpark, C/C++, Git, Docker, LaTeX
- **Machine Learning & Security:** Privacy-Preserving Machine Learning (Federated Learning, Homomorphic Encryption), Deep Learning, Statistical Modeling
- **Data Visualization:** Matplotlib, ggplot2, R-Shiny, Tableau