

JIHYUNG KOOK

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RESEARCH INTERESTS

Trustworthy ML, Privacy-Preserving and Verifiable Machine Learning, Applied Cryptography (HE, MPC, ZKP)

EDUCATION

Georgia Institute of Technology

Online M.S. in Computer Science

Atlanta, GA

Dec. 2024

- Specialization: Computational Perception & Robotics

Sookmyung Women's University

B.S. in Statistics and Computer Science

Seoul, Korea

Feb. 2017

PUBLICATIONS & PRESENTATIONS

- [1] **Kook, J.**, Kang, D., Lee, E., “Sparsification-Friendly CKKS-Based Federated Learning via RLWE-to-MLWE Conversion,” manuscript in preparation.
- [2] **Kook, J.**, Kim, S., Vakudavathu, P. C. S., “Sensitive Information Leakage from Tool-Call Traces,” manuscript submitted to the *NeurIPS 2026 AIWild and InfPriv Workshops*, Sep. 2026.
- [3] Yoo, S., Oh, T., **Kook, J.**, et al., “Association between Muscle Cramping and Diabetic Peripheral Neuropathy: Findings from a Prospective Cohort Study,” *Diabetes & Metabolism Journal*, under review, Jun. 2026.
- [4] **Kook, J.**, Lee, E., “Efficiency Evaluation of Sparsified Homomorphic Encryption in Federated Learning,” Poster presented at the *Korean Institute of Communications and Information Sciences (KICS) Fall Conference*, Nov. 2025.
- [5] Oh, T., **Kook, J.**, Jung, S., et al., “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*, vol. 174, 108756, Apr. 2021, DOI: 10.1016/j.diabres.2021.108756.
- [6] Yoon, H., **Kook, J.**, Shim, J., “IoT-based Mailbox system using Android and Arduino,” Poster presented at the *Korea Information Processing Society (KIPS) Spring Conference*, Apr. 2015, DOI: 10.3745/PKIPS.y2015m04a.1080.

RESEARCH EXPERIENCE

Sejong University—Privacy-Preserving Machine Learning and Cryptography Lab

Seoul, Korea

Full-time Researcher (Advisor: Prof. Eunsang Lee)

Jul. 2025 – Present

- Contribute to a team developing a communication-efficient encrypted federated learning framework based on threshold CKKS and RLWE-to-MLWE conversion, supporting fine-grained sparse aggregation, full aggregation, and client dropout.
- Design and conduct plaintext and encrypted federated learning experiments using PyTorch and OpenFHE (C++), evaluating how sparsification, cryptographic parameters, and communication-reduction techniques affect model accuracy, communication cost, and computational performance.

Independent Research Collaboration—Privacy Leakage in Agentic AI

Remote

Research Collaborator

Jul. 2026 – Sep. 2026

- Investigated whether AI-agent tool-call metadata can reveal sensitive patient attributes when prompts, arguments, and outputs remain hidden.
- Evaluated LLMs and supervised classifiers on 3,190 simulated healthcare-agent traces, showing that tool identities and usage frequencies retain predictive information without invocation order.

Seoul National University Bundang Hospital (SNUBH)

Seongnam, Korea

Part-time Researcher, Division of Endocrinology & Metabolism (Advisor: Prof. Tae Jung Oh)

Mar. 2018 – Jul. 2020

- Contributed to journal publication on a standardized glucose-insulin-potassium infusion protocol by preprocessing and analyzing large-scale clinical datasets of 7,000+ patients.
- Engineered features from continuous glucose monitoring (CGM) data of 55 patients using Python, extracting clinically meaningful predictors (e.g., peak occurrence, variability metrics).

RESEARCH ACTIVITIES

Independent ZKP Research Study Group—Georgia Tech OMSCS Students

Remote

Co-organizer

Aug. 2026 – Present

- Co-organize a three-member interdisciplinary study group exploring zero-knowledge proofs and their applications to verifiable and fairness-aware machine learning.
- Lead structured discussions on zero-knowledge proofs for fairness certification in machine learning, examining open questions in ethical notions of fairness, data-dependent fairness guarantees, and potential model-structure leakage through public proof relations.

PROFESSIONAL EXPERIENCE

Seoul National University Bundang Hospital

Seongnam, Korea

Part-time Administrative Assistant (Research Support), Division of Endocrinology & Metabolism

Jul. 2025 – Present

- Preprocess, merge, and analyze EMR datasets with Python to support clinical studies and manuscript preparation, including statistical analyses such as Student's t-test and Cohen's d.
- Manage research administration including payroll, publication and IRB review fees, and training expenses, ensuring budgeting accuracy and institutional compliance.
- Support preparation of the SNUBH site for a Korea Disease Control and Prevention Agency (KDCA)-funded multicenter pragmatic randomized clinical trial on personalized risk score-based management for older adults with type 2 diabetes.

KB Kookmin Bank & KB Financial Group

Seoul, Korea

Junior Data Analyst, Department of Data Planning

Jul. 2020 – Sep. 2023

- Standardized customer data across 8 subsidiaries by organizing records into common data domains and implementing retention/deletion rules, improving cross-subsidiary integration and regulatory compliance.
- Coordinated cross-subsidiary data governance and training initiatives, contributing to a 20% cleanup of legacy records and a refresh of 10% of high-value datasets, while improving data quality and reporting.

Croquis Inc. (now Kakao Style)

Seoul, Korea

Junior Data Analyst, Department of Data

Mar. 2018 – Apr. 2020

- Automated 17 ETL workflows using PySpark and SQL, improving the accuracy and reliability of customer analytics pipelines by 25%.
- Analyzed user and transaction data for a newly introduced in-app payment system and developed dashboards and recommendation analyses, contributing to 1.5× higher monthly sales among early-adopting sellers.

ADDITIONAL TRAINING

Big Data Platform Technology Program (Government-funded)

Seoul, Korea

4th Industrial Revolution Academy – Seoul National University Big Data Institute

Jun. 2017 – Feb. 2018

- Completed intensive courses in Python, SQL/DBMS, data mining, and machine/deep learning.

TECHNICAL SKILLS

Programming & Tools: Python, PyTorch, C/C++, SQL, R, PySpark, Git, Docker, Linux, LaTeX

Cryptography & ML: Homomorphic Encryption (OpenFHE, CKKS), Privacy-Preserving ML, Federated Learning, Statistical Modeling

Data Visualization: Matplotlib, ggplot2, R-Shiny, Tableau