JOON KIM

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EDUCATION

University of California, Berkeley May 2027 (Expected)
B.S. Electrical Engineering & Computer Science, GPA: 4.00/4.00
TCS: CS270(Graduate Algorithms), CS294-180(Partition Functions, **A+**), CS174(Randomized Algorithms), CS170(Algorithms, **A+**), CS177(Algorithmic Economics), CS294-284(Constraint Satisfaction Problems)
Computational: CS194-302(Comp. Immunology, **A+**), EECS249B(CPS), CS176(Comp. Bio), CS188(AI/RL)
Fundamentals: CS61A/B(SCIP, Data Structures, **A+**), CS70(Discrete Math & Probability, **A+**), EECS16A/B (Circuits, Control Theory & Linear Algebra, **A+**)

SKILLS AND INTERESTS

Interests	Approximation, Statistical, and Sublinear Algorithms; Computational Bio; ML-Physics
Technical Skills	LaTeX, Python, Java, C, PyTorch, TensorFlow, Flower, Docker, AWS

PUBLICATIONS

J. Kim, C. Duan, S. Ray. "Bit-Flipping Attack Exploration and Countermeasure in 5G Network." *MASS 2025.*

J. Kim, H. Lee, W. Ryu, et al. "In-Silo Federated Learning vs. Centralized Learning for Segmenting Ischemic Brain Lesions." *Intelligence-Based Medicine.*

J. Kim, S. Park. "Random Gradient Masking as a Defensive Measure to Deep Leakage in Federated Learning." *ArXiv.*

C. Duan, **J. Kim**, S. Ray. "Network-Level Bit-Flipping Attacks on CACC in 5G." *Submitted to VTC2026-Spring.*

RESEARCH & PRESENTATIONS

[**Foundational Theory**]

Independent Theoretical CS Research Dec. 2025 - Current
Undergraduate Researcher, advised by Prof. Satish Rao *Berkeley, CA*

· Investigating approximate Maximum Weighted Matching (MWM) and its dynamic matching variant
· Extending Multiplicative Auction to fully dynamic matching; identified monotonicity as a barrier to improvement

Sampling Spanning Trees via Entropic Independence Oct. 2025 - Dec. 2025
CS294-180 Final Report & Student Lecture

· Synthesized a 6-page report for sublinear time sampling of spanning trees in $O(k\,log^2 n)$ time, based on [ALV22]
· Delivered half of a 70-minute technical lecture to a graduate-level audience, motivating and explaining techniques such as marginal overestimates, isotropic transformation, MCMC, and connections to Up-Down walks

Greedy, ILP, and Hybrid Methods for Phylogeny Apr. 2025
CS176 Literature Review

· Synthesized a 5-page technical review on Casasiopeia, a phylogeny framework with ILP and Greedy heuristics
· Identified motivation for the study, its main technical contributions, potential applications, and limitations.

[**Interdisciplinary Studies**]

Lawrence Berkeley Laboratory - Perlmutter Group Sep. 2025 - Current
Undergraduate Researcher, advised by Prof. Xiaosheng Huang *Berkeley, CA*

· Modeling the Carousel Lens using the multi-GPU GIGA-Lens ML pipeline to constrain cosmology
· Implemented and experimenting Stochastic Variational Inference with Gaussian Mixtures in high dimensions

Stochastic Modeling of Drug-Induced Resistance Sep. 2025 - Dec. 2025
CS194-302 Final Report & Presentation

- Designed an explainable computational model for cancer drug resistance using Hill-function modulated CTMC
- Worked closely with teammates with expertise in immunology and Bio-ML; motivated the use of simple methods
- Delivered half of a 15-minute conference-style presentation to a graduate-level audience

Cohort Studies and MrVI Nov. 2025
CS194-302 Student Lecture

- Delivered a third of a 3-hour lecture on cohort studies in immunology and MrVI as one emerging solution
- Focused on building mathematical intuition of MrVI, how it differs from scVI, and its philosophical implications

Runtime Verification for Safety-Critical Systems Sep. 2025 - Dec. 2025
EECS249B Final Report & Presentation

- Investigated distribution-free probabilistic guarantees in stochastic environments for contract-based design
- Applied Scenario Optimization (SO) to a simple autonomous vehicle example for static and runtime verification
- Delivered half of a 15-minute conference-style presentation to a graduate-level audience

Berkeley AI Research - C.H.E.N. Lab Jul. 2024 - Feb. 2025
Undergraduate Researcher, advised by Prof. Irene Chen *Berkeley, CA*

- Designed zero-shot LLM pseudo-label pipeline to improve semi-supervised learning accuracy
- Investigated LLM agents for image labeling such as CLIP and VIT, showed results on CIFAR-100
- Worked on RadQA dataset; implemented FixMatch and a new method on a non-inference task for comparison

JLK Group Feb. 2024 - May 2024
Research Intern, advised by Dr. Wi-Sun Ryu *Seoul, South Korea*

- Developed Federated Learning models reaching near identical performance to commercially deployed U-Net models
- Collaborated with four M.D. professionals to investigate the use of Federated Learning in medicine

[**Security & Safety**]

University of Florida REU May 2025 - Aug. 2025
Undergraduate Researcher, advised by Prof. Sandip Ray *Gainesville, FL*

- Explored network-level bit flipping attacks on 5G Connected and Automated Vehicles (CAV)
- Verified feasibility of bit-flipping; proposed a keystream-based shuffling that drastically lowers attack success rate
- Simulated CAV in OpenAirInterface (OAI) and proposed an error correction based defense

Keimyung University Feb. 2023 - Jul. 2024
Independent Researcher, advised by Prof. Sejin Park *Daegu, South Korea*

- Proposed a randomized masking Federated Learning algorithm as an obfuscation against Deep Leakage for images
- Designed experiments to compare performance-privacy trade-offs amongst SOTA defense algorithms

TEACHING EXPERIENCE

CS70 Course Staff Jan. 2026 - Current
8-hour UCS1 *Berkeley, CA*

- 4 hours of grading and 4 hours of discussion section assistance and OH for CS70 (Discrete Math and Probability)

Computer Science Mentors Aug. 2025 - Dec. 2025
Junior Mentor *Berkeley, CA*

- Led a group of three undergrads in biweekly hour-long review sessions for CS70 (Discrete Math and Probability)