SeokHyeon (Lucas) Kong

Contact Information

Moore 1st floor
University of Pennsylvania
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Research Interests

My research interests lie in *Quantum Computer Architecture*, currently focusing on Quantum Error Correction.

Education

University of Pennsylvania, Philadelphia, PA — Aug 2026
- Ph.D. in Computer and Information Science
- Advisor: Prof. Gushu Li

Sungkyunkwan University (SKKU), Suwon, Korea — Mar 2020 – Feb 2026
- B.S. in Electronic and Electrical Engineering
- B.S. in Advanced Semiconductor Engineering – System Architecture Track
- *Graduated with Summa Cum Laude* (GPA: 4.36/4.5)

The Pennsylvania State University, University Park, PA — Fall 2024
- Exchange Student in Computer Engineering
- *Dean's List* (Grade: 4.0/4.0)

Publications

[1] Characterizing the System Overhead of Discrete Gaussian Noise Generation for Differential Privacy
SeokHyeon Kong, Donghwan Kim, Euiseong Seo, and Kiwan Maeng
CAL 2025 – IEEE Computer Architecture Letters

[2] Predicting Key Regional Real Estate Prices Using Machine Learning Technique: with an emphasis on Jeonsae system
SeokHyeon Kong and Hayoung Oh
JKIICE 2023 – Journal of the Korean Institute of Information and Communication Engineering

Poster Presentation

[3] Solving Constraint Satisfaction Problems with Variational Quantum Algorithm on NISQ Devices
SeokHyeon Kong, Chanhee Park, Jang-il Moon, and Denny Dahl
Qcenter – Quantum Information Research Support Center, Korea

Experience

Hanwha Systems, Seongnam, Korea — Jan 2026 – Jul 2026
Software Engineer in the Avionics System R&D Team
- Collaborated with The Boeing Company on ELAD (Eagle Large Area Display) for F-15 aircraft.

IonQ, Remote — Aug 2025 – Sep 2025
Research Mentee with Dr. Denny Dahl
- Addressed the Instant Insanity problem by employing a graph-theoretic encoding and a divide-and-conquer approach with two distinct post-processing methods [3].
- Solved the Four Corners Map Coloring problem using a Quantum Approximate Optimization Algorithm (QAOA) with two different encoding schemes [3].

The Pennsylvania State University, University Park, PA — Aug 2024 – Sep 2025
Undergraduate Researcher with Prof. Kiwan Maeng

- Conducted GPU profiling with Nsight Compute and Nsight Systems to analyze performance bottlenecks and system-level overhead in differential privacy [1].
- Proposed an optimization that resolved the dominant Geometric operation overhead, reducing it from 50% to 19% while preserving Gaussian noise quality [1].

Technical Project

SoC Design and Practice, SKKU — Fall 2025
Graduate Level Coursework

- Designed and implemented a multi-channel, pipelined DMAC engine and cache controller in SystemVerilog with AMBA APB-based configuration and AXI-based data transfer.
- Synthesized and verified the design using Synopsys Design Compiler, optimizing area and timing to meet target performance specifications.

Teaching Experience

Academic Tutor, SKKU — Fall 2023
Intro to Electromagnetism

- Led weekly Q&A sessions and problem-solving discussions.

Teaching Assistant, SKKU — Summer 2023
Engineering Mathematics 2

- Prepared and organized class materials, including exams.

Honors and Awards

Graduate Fellowship and Research Stipend Award, UPenn — 2026
Summa Cum Laude, SKKU — 2026
Director's Award – Quantum Hackathon, QCenter — 2025
President's List, SKKU — 2024, 2025
Dean's List, SKKU — SP2023, FA2023, SP2024, FA2024, SP2025
Korea–U.S. Student Exchange Scholarship — FA2024
in the field of high-tech industry ($9,000), KIAT
Student Success Scholarship, SKKU — FA2023

Skills

Software: Qiskit, CUDA, C, Python, MATLAB, LaTeX
Hardware: System Verilog, Verdi, Virtuoso, Nsight Systems, Nsight Compute

Leadership and Service

Executive Board, President's List (Honor Society at SKKU) — 2025
Qiskit Advocate, IBM Quantum — 2025
Squad Leader, Republic of Korea Army (Military Service) — Apr 2021 – Oct 2022

References

Gushu Li, Ph.D. — Email: gushuli@seas.upenn.edu
Assistant Professor of Computer and Information Science
University of Pennsylvania

Kiwan Maeng, Ph.D. — Email: kvm6242@psu.edu
Assistant Professor of Computer Science and Engineering
The Pennsylvania State University

Denny Dahl, Ph.D. — Email: denny.dahl@ionq.co
Senior Director of Field Engineering
IonQ