Dowon (David) Baek

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Education

Massachusetts Institute of Technology (MIT) — Cambridge, MA, USA
Ph.D. in Electrical Engineering & Computer Science — *Sep 2023 – Present*

Seoul National University (SNU) — Seoul, Korea
B.S. in Physics and Computer Science, Summa Cum Laude — *Mar 2017 – Aug 2023*

- Presidential Award (Ranked 1st among graduating cohort in College of Natural Sciences)
- Includes two years on leave for compulsory military service (Job: Cyber Security Specialist)

Research Interest

- AI/ML for Physics and Molecular Dynamics (MD) Simulations
- Physics–inspired problem–solving methodologies

Publications

1. S. H. Park, D. Baek, I. Park, and S. Hahn, "Design of Scalable Superconducting Quantum Circuits using Flip-chip Assembly," *IEEE Transactions on Applied Superconductivity*, 33(5), pp.1-6, 2023 [Link].

2. D. Baek, S. H. Park, S. Choi, C. Yoo, and S. Hahn, "Gate Error Analysis of Tunable Coupling Architecture in the Large-scale Superconducting Quantum System," *arXiv:2212.04239*, [arXiv].

Experience

SNU Applied Superconductivity Laboratory — Feb 2022 – Feb 2023
Undergraduate Research Assistant — *Seoul, Korea*

- Designed and analyzed the performance of wide-bandwidth Purcell filter of novel topology using Qiskit Metal
- Studied surface loss mechanisms of superconducting qubits using COMSOL
- Analyzed 3D stacked layers of superconducting qubits using Qiskit Metal and HFSS
- Studied optimal pulse scheduling for two–qubit gate in 1D superconducting qubit chain using QuTiP and Qiskit

Honors & Awards

International

- Silver Medal, University Physics Competition, 2018
- Silver Medal, International Junior Science Olympiad (IJSO), 2014

Domestic

- Kwanjeong Overseas PhD Scholarship, 2023–2028
- Finalist, Samsung Collegiate Programming Cup (SCPC), 2018
- Presidential Science Scholarship, Korea Student Aid Foundation, 2017–2023
- Hanseong Nobel Scholarship, Hanseong Sonjaehan Scholarships Foundation, 2016

Technical Skills

Programming: Python, C/C++, Java, Matlab, Mathematica, LaTeX, HTML, Javascript
Libraries: PyTorch, Tensorflow, Numpy, Scipy, QuTiP, etc.
Modeling: Autocad, Solidworks, COMSOL
Languages: English, Korean

Teaching Experience

Seoul National University

- Teaching Assistant, Basic Mathematics and Programming Practice for Machine Learning, Spring 2023
- Undergraduate Tutor, Foundation of Physics I, Spring 2023