

Minsung Kim

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RESEARCH INTERESTS

Wireless Systems and Networks
Quantum Computing and Emerging Computing Systems
High Performance/Parallel Computing
Distributed Systems and Applied Machine Learning

EDUCATION

Princeton University, NJ

Ph.D. Student in the Department of Computer Science

Advisor: Prof. Kyle Jamieson (kylej@cs.princeton.edu)

Sep. 2017 - Present

Korea University, Seoul

B.E. in Electrical Engineering with *Great Honor & Presidential Best Research Award*

Advisor: Prof. Sangheon Pack (shpack@korea.ac.kr)

August. 2016

Stanford University, CA

Visiting Student, Electrical Engineering

Summer. 2016

PROFESSIONAL EXPERIENCE (summer: approx. 3-4 months)

Meta, Ph.D. Software Engineer Intern – Systems and Infrastructure, Menlo Park, CA

Manager: Dr. Terry Lam, Software Engineer (Netwot.AI)

Summer. 2022

InterDigital Communication, Ph.D. Research Intern – R&I Department, Conshohocken, PA

Advisor: John Kaewell, Senior Principal - Advisor to CTO

Summer. 2021

The National Aeronautics and Space Administration (NASA) – Ames Research Center in Silicon Valley, CA

Advisor: Dr. Davide Venturelli, Research Scientist & USRA RIACS Quantum Associate Director

- Affiliated Researcher, *Quantum Artificial Intelligence Laboratory (QuAIL)*

Apr. 2018 – Feb. 2021

- Ph.D. Research Intern, *Quantum Artificial Intelligence Laboratory (QuAIL)*

Summer. 2020

- Ph.D. Research Intern, *Quantum Artificial Intelligence Laboratory (QuAIL)*

Summer. 2019

- Visiting Scholar, *Universities Space Research Association (USRA)*

Summer. 2018

PUBLICATIONS (*: co-first author)

M. Kim, D. Venturelli, J. Kaewell, and K. Jamieson, "Warm-Started Quantum Sphere Decoding via Reverse Annealing for Massive IoT Connectivity," under Review.

M. Kim⁺, S. Kasi⁺, A. Lott, D. Venturelli, J. Kaewell, and K. Jamieson, "Heuristic Quantum Optimization for 6G Wireless Communications," In **IEEE Network Magazine**, July/August 2021, IF:10.693 (**Invited Paper**).

M. Kim, S. Mandra, D. Venturelli, and K. Jamieson, "Physics-Inspired Heuristics for Soft MIMO Detection in 5G New Radio and Beyond," In **ACM MobiCom 2021**, acceptance rate: 16.8% (19/113, summer round).

M. Kim, D. Venturelli, and K. Jamieson, "Towards Hybrid Classical-Quantum Computation Structures in Wirelessly-Networked Systems," In **ACM SIGCOMM HotNets 2020**, acceptance rate: 24.8% (30/121).

M. Kim, D. Venturelli, and K. Jamieson, "Leveraging Quantum Annealing for Large MIMO Processing in Centralized Radio Access Networks," In **ACM SIGCOMM 2019**, acceptance rate:14.5% (32/221).

ACADEMIC HONORS AND AWARDS

Qualcomm Innovation Fellowship, Qualcomm, CA Winner of QIF 2021 (1 of 16 in North America) for Innovative Research [link]	June. 2021
Alumni Scholarship Prize, Korea University Alumni Association (NY) Scholarship for Outstanding KU Alumni in New York Metropolitan Area	March. 2021
Princeton Honorific Fellow Nominee (2021 & 2022), Princeton University Selected Doctoral Student (1 of 4 in CS Dept.) with Outstanding Performance and Professional Promise	February. 2021/22
NASA Student Spotlight, NASA Ames Research Center Outstanding Research Intern introduced in summer Newsletter from NASA Ames Research Center	August. 2020
Graduate School Fellowship, Princeton University Full Fellowship awarded to Incoming Doctoral Students	2017-2018 Academic year
Great Honor, Korea University Graduation with Great Honor, GPA: 3.97 / 4.0 (Original Scale 4.34 / 4.5 and 98.2 / 100)	August. 2016
Korea University Presidential Best Research Award Presidential Award for Best Research at Creative Challenger Program (President. Jaeho Yeom)	March. 2016
Semester High Honors, Korea University Exceptional Grades during All Semesters	8 Times
Qualcomm IT Tour supported by Qualcomm, CA Selected Student (1 of 27 in S. Korea) and Invited Small Conference with Executive Chairman (Dr. Paul Jacobs)	July. 2015
Korea Telecom (KT) Excellence Award Best Project & Outstanding Intern at KT	February. 2016
Creative Challenger Scholarships, Korea University Research Funding for Creative Independent Research & Scholarships for Best Research (Leader at Team TAS)	Jun. 2015 - Mar. 2016
National Science and Engineering Scholarship, Korea Student Aid Foundation Full Scholarships for Academic Honors – Fall'10, Spring'14, Fall'14, Fall'15, Spring'16	5 Times
Best Honors Scholarship, LOTTE Foundation Full Scholarships for Academic Honors – Spring'11, Fall'11	2 Times
Family Scholarships, Korea University KU Admission Scholarship – Spring'10	1 Time

PATENTS

Provisional US Patent Application 62/845,642 filed May 9, 2019. PCT application PCT/US2020/032398. Leveraging Quantum Annealing for Large MIMO Processing in Cloud-Based Radio Access Networks. **M. Kim**, D. Venturelli, K. Jamieson. Assignee: Princeton University.

OTHER RESEARCH OUTPUTS

M. Kim, K. Jamieson, "Transforming MIMO BPSK Maximum Likelihood Detection into QUBO Form," Department of Computer Science Technical Report TR-010-17, Princeton University 2017.

M. Kim, J. Y. Lee, and H. Kim, "Warning and Detection System for Epidemic Disease," In International Conference on ICT Convergence, IEEE ICTC 2016, (undergraduate publication and talk).

GRANTS AND FUNDING

Travel Grant Awards:

- **Princeton Dean's Fund for Scholarly Travel Grant Award**
- **ACM SIGMOBILE Student Travel Grant Award**

Qualcomm Innovation Fellowship 2021 Award (\$100,000)

Award for innovative research "Quantum Computation for Wireless Networks", 2021–2022.
Fellowship mentor: Dr. Naga Bhushan, Vice President of Technology, Qualcomm

National Science Foundation (NSF) Award #1824357 (\$372,667) and Award #1824470 (\$277,206)

“SpecEES: Collaborative Research: Advancing the Wireless Spectral Frontier with Quantum-Enabled Computational Techniques (QENeTs)”, Oct. 2018–Jul. 2022.

- Conducted experiments and prepared the proposal with (PIs) Prof. Kyle Jamieson and Dr. Davide Ventruelli.

Princeton University SEAS Project X Innovation Fund (\$150,000), Feb. 2018–Jan. 2020.

- Conducted experiments and prepared the proposal with (PI) Prof. Kyle Jamieson.

USRA Cycle 3 and Cycle 4 Awards

Research time on a D-Wave Quantum Computer in the USRA-NASA-Google Quantum Artificial Intelligence Laboratory at NASA Ames Research Center, Feb. 2018 (Cycle 3) & Nov. 2020 (Cycle 4).

- Conducted experiments and prepared the proposal with (PI) Prof. Kyle Jamieson.

TALKS

Conference Talks

- ACM MobiCom 21, New Orleans, LA Mar. 2022
“Physics-Inspired Heuristics for Soft MIMO Detection in 5G New Radio and Beyond”
- ACM SIGCOMM HotNets 20, Chicago, IL (virtual due to COVID-19) Nov. 2020
“Towards Hybrid Classical-Quantum Computation Structures in Wirelessly-Networked Systems”
- NASA Symposium 20, NASA Ames Research Center, CA (virtual due to COVID-19) Aug. 2020
“Quantum-Inspired Heuristics for Wireless Networks”
- ACM SIGCOMM 19, Beijing, China Aug. 2019
“Leveraging Quantum Annealing for Large MIMO Processing in Centralized Radio Access Networks”
- IEEE ICTC 16, Jeju, Korea Oct. 2016
“Warning and Detection System for Epidemic Disease”

Invited Talks

- Qualcomm, CA May. 2021
“QIF Summit: Quantum Computation for Wireless Networks”, host: Qualcomm
- Princeton University, NJ Nov. 2020
“Quantum Annealing for MIMO Processing”, host: Princeton Quantum Science and Engineering Group
- Pusan National University, Pusan, Korea May. 2019
“Wireless Systems and Quantum Computing”, host: Prof. Wonjae Shin
- Korea University, Seoul, Korea Feb. 2016
“CCP Winner: Smart Public Transportation”, host: Korea University Center for Teaching and Learning

Special Lectures

- Ajou University, Suwon, Korea May. 2021
“Wireless Communications and MIMO Techniques”, Mobile Communications (ECE 432)

TEACHING EXPERIENCE

Teaching Assistant, Department of Computer Science, Princeton University

- Wireless Networks (COS 463) Spring. 2019
- Mobile Computing Design for Assistive Technology (COS IW 07) Fall. 2018
- Network Measurement, Sensing, and Visualization Across the Princeton Campus (COS IW 08) Fall. 2018

KUCTL Voluntary Peer Tutor - Introduction to Linear Algebra, Korea University Spring. 2016

SERVICE

Technical Program Committee

- ACM S³ Workshop at ACM MobiCom 2022

Reviewer

- IEEE Network Magazine
- IEEE Transactions on Communications
- Elsevier ICT Express

OTHER EXPERIENCE

Undergraduate Internship, Department of Wireless Engineering, Korea Telecom Dec. 2015 - Feb. 2016
Optimized KT's communication systems using wireless network guard system (WING) & antenna tilting.

Intelligence Agent & Translator (Eng), Foreign Affairs Division, National Police Jun. 2012 - Mar. 2014
Covered special requirement intelligence (SRI) for military service in South Korea (Sergeant at R.O.K Army)

End of CV

(latest update: 04/2022)