Curriculum Vitae

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1 Education

Yonsei University   **Sep. 2022 – Present**
Master of Arts in Statistics and Data Science in progress   Seoul, South Korea

- Thesis: "Make HIstory"
- Total GPA of —/4.30

Yonsei University   **Feb. 2021 – Aug. 2022**
Bachelor of Arts in Mathematics(Minor in Statistics)   Seoul, South Korea

- Thesis: "Quantum Algorithms for the Hidden Shift Problem"
- Math and Statistics GPA of 4.03/4.30

Yonsei University   **Feb. 2016 – Aug. 2022**
Bachelor of Arts in Economics   Seoul, South Korea

- Thesis: "Heterogeneous Responses to Monetary Policy Shock in Industry Levels and Responses of Equity Market : Case of Korea"
- Economics GPA of 4.03/4.30, Total GPA of 3.97/4.30

University of California, Berkeley   **Jan. 2019 – Dec. 2019**
Undergraduate Exchange Program   Berkeley, California, USA
(*Grades are not included in the Undergraduate GPA in the transcript.)

Leave of Absence   **2017**

2 Fields of Interests

Robustness of Machine Learning, Theoretical Computer Science, Spline Theory, Functional Analysis, Harmonic Analysis, Microeconomics, Applications to machine learning, inverse problem in medical imaging, and finance.

3 Honors / Awards

Honorable Mention, Qiskit Hackerton Korea 2022   **2022**
- Proved the Quantum Algorithm for the Hidden Shift Problem of bent functions works with significant time speed up

Honors, Yonsei University   **2016**

Deputy Prime Minister's Award   **2014**
- Conducted the ODA policy, which was selected as the best proposal in the Economic Policy Proposal Contest
held by the Korean Ministry of Economy and Finance

Math Award, Waterloo University   **2010**
- Best Grade(1st Place) in Canada

4 Scholarships

Brain Korea 21 Scholarships, National Research Foundation of Korea   **2022 – present**
(Merit-based)

National Merit Scholarship, Republic of Korea   **2016 – 2020**
(Merit-based) Full Tuition Scholarship for four years of University

5 Research Experience

[1] Quantum Algorithms for the Hidden Shift Problem   **2022**
(Co-authored with Boseong Kim, Sekang Kwon, Sehoon Bahng, Inhyuk Oh, Adel Sohbi, Hyukjoon Kwon)

- Abstract : The hidden shift problem is defined over an unknown function f and a hidden element s that shifts the input of the function. Provided an oracle that can compute the function with and without the shift, the problem asks to recover s. One of the most remarkable cases is when f is highly nonlinear, whereas best known classical algorithms take exponentially many oracle queries to retrieves. In particular, the hidden shift problem over maximally nonlinear Boolean functions (bent functions) reduces to the abelian hidden subgroup problem, or equivalently, the factorization problem. In this talk, we walk through two examples of quantum algorithms on the hidden shift problem over bent functions, namely the Roetteler's and the Gavinsky's algorithms which provide an exponential speedup compared to known classical algorithms. We show their implementation on quantum computers and address their impacts and limitations in the noisy-intermediate scale quantum era.

[2] Best Strategy for Malaria Eradication   **2021**
(Written in Korean, Co-authored with Minhyuk Seo, Sangwon Choi)

- Abstract : In this paper, we conduct both deterministic model and stochastic model of malaria infection. The former represents where the disease is pervasive, whereas the latter depicts where it newly prevails. We found that in the deterministic model, using both drug control and vector control with mid-intensity is economically optimal strategy to eradicate malaria infection. In stochastic model, there is no one absolute optimal strategy and therefore, additional case studies should be accompanied to find the best strategy.

[3] Heterogeneous Responses to Monetary Policy Shock in Industry Levels   **2020**
and Responses of Equity Market : Case in Korea

- Abstract: This paper empirically studies the dynamic amongst monetary policy, output, and equity market in Korea. More specifically, it shows the heterogeneous responses of output in industry level to monetary policy shocks using Structural Vector Autoregression model. The study further examines whether equity market responds to monetary policy shock with respect to output changes. I find that industry sectors have different responses to monetary policy shocks in Korea, to which equity market does not react with respect to expected output changes.

6 Other Academic Experience

Yonsei Statistics Basic Research Laboratory   Jan. 2022 – Present
National funded laboratory focused on statistical backgrounds of Deep Learning   Yonsei University
Director : Prof. Yongho Jeon, Prof. Jongho Im, Prof. Ilmun Kim, Prof. Kibok Lee

- Presented at the seminar on "Banach Space Representer Theorems for Neural Networks and Ridge Splines" (Parhi & Nowak, 2020)

Microeconomics Reading Group   Mar. 2023 – June.2023
An Honor society at Yonsei University for Graduate students interested in Microeconomics   Yonsei University

Director : Prof. Jaypil Choi, Jong-Hee Hahn, Chang-Koo Chi, Jaeok Park, Jihwan Do, Jinyeop Kim, Semin Kim, Sang-Hyun Kim

- Presented at the weekly seminar on "Public Information for Markov Game" (Kloosterma, 2014)
- https://cafe.naver.com/redxc1kj

Junior Scholar Club, Economics Chapter   Sep. 2018 – June. 2022
An honor society at Yonsei University for undergraduate students seeking a doctoral degree   Yonsei University
Advisor:Prof. Youngse Kim, Jaeok Park, Semin Kim, Sangyup Choi, MyungKyu Shim, JinYeub Kim
Leader of Microeconomics reading group *(Jan. 2021 – Jun. 2021, Jan.2022 – Jun.2022)*

- Presented at the weekly discussion on "Homotopy Methods to compute Equilibriums" (P. Jean-Jacques Herings · Ronald Peeters, 2010, Econ Theory)
- Presented at the weekly discussion on "Two-sided markets" (Rochet, Tirole, 2003, Oxford Journals)
- Presented at the weekly discussion on "Bayesian Persuasion" (Kamenica, Gentzkow, 2011, AER) and 'Beeps'(Ely, 2017)

Knowledge Fusion and Artificial Intelligence Lab   Dec. 2021 – Aug.2022
A laboratory in department of industrial engineering researching in statistical machine learning.   Yonsei University
Advisor: Prof. Hyunsoo Yoon

- Led a project to integrate high-fidelity medical simulated EEG data using finite element method and low-fidelity medical simulated EEG data using finite difference method based on "Ko and Kim(2022)"
- Presented on "Kernel and Gaussian Process" at the weekly seminar
- Presented on "Gaussian Process & Variational Inference Deep Gaussian Process & Stochastic Variational Inference" at the weekly seminar

Study and Conference for Creative research   Aug.2021–June.2022
Society at Yonsei University for students interested in Physics   Yonsei University
Advisor: Prof. Kwon, Young Joon

- Presented at the weekly discussion on Quantum walk, Quantum Game Theory and Black-Scholes Equations.
- Participated in Quantum Mechanics study

Junior Scholar Club, Preparatory Chapter   Mar. 2016 – Dec.2016
A Book Club at Yonsei University for freshman students with academic pursuits   Yonsei University
Advisor: Prof. BongHwan Han, Prof. Doh

- Participated and organized weekly reading discussions

7 Teaching Experiences

Regression Analysis, Teaching Assistant (Undergraduate)   **Spring 2023**

Mathematical Statistics 1, Teaching Assistant (Undergraduate)   **Fall 2022**

Introduction to Statistics, Teaching Assistant   **Fall 2022**

Real Analysis 1 Tutoring   **Summer 2022**

8 Skills and Other Info

8.1 Languages

Korean (*native*)
English (*fluent*)

- IBT TOEFL(August 27, 2022) : Total 108 (Reading: 30, Listening: 30, Speaking: 22, Writing: 26)
- GRE(August 26, 2022) Verbal : 157/170 (74%), Quantitative : 170/170(96%), Analytical Writing : 4.0/6.0(54%)

Deutsch (*elementary*)

8.2 Programming Skills

MATLAB, R, Python, Julia, LaTeX

9 Community Service

Journal Reviewer   2022
IEEE Transactions on Automation Science and Engineering
English and Math Tutoring for high school students   2017

Basketball Club   2018

10 References

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