Junghyun Lee

291 Daehak-ro

Yuseong-gu, Daejeon 34141

Phone: (+82)10 5819-2684

Email: jh_lee00 (AT) kaist.ac.kr

Alt: nick.jhlee00 (AT) gmail.com

Github: https://github.com/nick-jhlee

Personal website: https://nick-jhlee.netlify.app/

PARTICULARS

EDUCATION

Korea Advanced Institute of Science and Technology (KAIST)
Daejeon, ROK
BS in Mathematical Sciences, Computer Science(*Double Major*)
August 2021 (expected)

Changwon Science High School (CSHS)
Changwon, ROK
Early graduation
March 2017

CURRENT STATUS

Citizen of Republic of Korea (ROK).

ACADEMIC INTERESTS

- (Theoretical) Machine/Deep Learning
- Related mathematical theories (e.g. Probability Theory, Optimization, Statistics)
- GNN, Graphs
- Various applications of ML/DL
- Fairness, Privacy
- "Other" mathematics (graph theory, discrete geometry, algorithms...etc.)

ACADEMIC HONORS

- Spring Semester Freshmen Dean's List, 2017.

RESEARCH EXPERIENCE

- **[Alone] Undergrad Research: OSI Lab**, Spring 2020 - Present.
  Supervisor: Prof. Se-Young Yun (Graduate School of AI, KAIST)
  Research topic: *Toward a Better Understanding of Dynamics of Deep Neural Networks and SGD*

- **[Alone] Undergrad Research: AIM Lab**, Winter 2019 - Present.
  Supervisor: Prof. Chang Dong Yoo, Prof. Gwangsu Kim (School of Electrical Engineering, KAIST)
  Collaborator: Matt Olfat (UC Berkeley, Citadel)
  Research topic: *Can Fairness in Principal Components be Obtained, Even in High Dimensions?*

- **[With Chani Jung, Yoo Hwa Park, Dongmin Lee] Undergrad Research: COINSE Lab**, Winter 2021 - Present.
  Supervisor: Prof. Shin Yoo (School of Computing, KAIST)
  Research topic: *SWAY for Decision Space of Permutations with Case Study on Test Case Prioritisation*

- **[Alone] Individual Study**, Summer 2019 - Fall 2019.
  Supervisor: Prof. Andreas Holmsen (Dept. of Mathematical Sciences, KAIST)
  ~~Research~~ **Seminar topic 1:** *Asymptotics for the number of C_4's in a graph under certain condition,*
  ~~Research~~ **Seminar topic 2:** *Maximum number of columns in a 0-1 $2n \times n$ matrix with no induced 2×2 identity matrix*

- **[With Seokmin Ha] MAS480(B): Introduction to Mathematical Biology**, Fall 2018.
  Supervisor: Prof. Jaekyung Kim (Dept. of Mathematical Sciences, KAIST)
  Research topic: *Reverse Analysis Problem of Two-gene System in the Perspective of Adaptation*

- **CSHS Mathematics Research and Education Program (R&E)**, Mar 2015 - Feb 2017.
  Supervisor: Mr. Seungkyun Cha (Mathematics Department, CSHS), Prof. Jisoo Byun (Dept. of Mathematics Education, Kyungnam University)
  Research topic: *Some Loci in the Animation of a Sangaku Diagram*

PUBLICATIONS

WORKING/PENDING PAPERS

1. **Junghyun Lee**, Gwangsu Kim, Matt Olfat, Chang D. Yoo. "Can Fairness in Principal Components be Obtained, Even in High Dimensions?" (Under review)

PREPRINTS, TECHNICAL REPORTS

1. (not yet...)

JOURNAL

1. **Junghyun Lee**, Minyoung Hwang, Cheolwon Bae. "Some Loci in the Animation of a Sangaku Diagram", *Forum Geometricorum*, 2016, vol. 16, pp. 187-191.

PEER-REVIEWED CONFERENCE

1. (not yet...)

COURSEWORKS

PROJECTS

- **[With Chani Jung, Yoo Hwa Park, Dongmin Lee] CS454: Artificial Intelligence based Software Engineering**, Fall Semester, 2020.
  Proposes a way to apply SWAY to SBSE problems whose decision space consists of permutations.

- **[With Minyoung Hwang, Junseok Choi] CS492: Deep Learning for Real-Life Problems**, Fall Semester, 2020.
  Proposes deep learning based solution for semi-supervised classification on Naver Fashion Dataset, and Korean Open-Domain QA task on Naver KorQuAD-Open dataset. (2nd, 1st place in leaderboard)

- **[With Youngjin Jin, Minsung Park, Hyunjin Kim] CS376: Machine Learning**, Fall Semester, 2018.
  Built a predictive model for given set of (training) data. (cf. Gotham city's apartment prices)

- **[With Youngjin Jin, Minsung Park] CS470: Introduction to Artificial Intelligence**, Fall Semester, 2019.
  Implemented a model for music genre classification problem.

- **[Alone] CS300: Intro. to Algorithms**, Spring Semester, 2018.
  Implement a solver for the game 'Bloxorz'.

- **[With Seokmin Ha] MAS480(B): Introduction to Mathematical Biology**, Fall Semester, 2018.
  (See below for details)

- **[With Hyunjin Kim] CS330: Operating Systems and Lab**, Spring Semester, 2019.
  Built Pintos: a small operating system.

REPORTS

1. **Junghyun Lee**, Chani Jung, Yoo Hwa Park, Dongmin Lee. "SWAY for Decision Space of Permutations with Case Study on Test Case Prioritisation", *CS454: Artificial Intelligence Based Software Engineering*, 2020 Fall. (Work in progress)

2. Seokmin Ha, **Junghyun Lee**. "Reverse Analysis Problem of Two-gene System in the Perspective of Adaptation", *MAS480(B): Topics in Mathematics <Introduction to Mathematical Biology>*, 2018 Fall.

3. **Junghyun Lee**. "Critical Review on Theoretical Aspects of Binary Decision Diagram, with a Focus in Variable Ordering", *CS402: Introduction to Logic for Computer Science*, 2020 Spring.

4. Junseok Choi, Minyoung Hwang, **Junghyun Lee** "Semi-Supervised Learning Task on Naver Fashion Dataset", *CS492(I): Special Topics in Computer Science <Deep Learning for Real-World Problems>*, 2020 Fall.

5. Minyoung Hwang, Junseok Choi, **Junghyun Lee** "Korean Open-Domain QA Task on Naver KorQuAD-Open Dataset", *CS492(I): Special Topics in Computer Science <Deep Learning for Real-World Problems>*, 2020 Fall.

TEACHING EXPERIENCE

TEACHING ASSISTANT

- **HSS302: Special Lectures on Linguistics <Language Register and English>**, Prof. Seonmin Park, Spring 2018, KAIST.
- **English Camp for Incoming Freshmen**, EFL Office, Jan 2019, KAIST.
- **English Camp for Incoming Freshmen**, EFL Office, Jan 2018, KAIST.

FRESHMEN TUTORING

- **MAS102: Calculus 2**, Fall 2018, KAIST.
- **MAS101: Calculus 1**, Spring 2018, KAIST.

UNOFFICIAL/VOLUNTARY TUTORING

- **MAS102, PH142, MAS109**, Fall 2017, KAIST.
  with 10~15 freshmen taking the courses
- **MAS101, PH141, CH101, MAS109**, Spring 2017, KAIST.
  with 10~15 freshmen taking the courses

SKILLS

Computer Skills

- Languages: **Python,**
- Applications : **Matlab, LaTex**

LANGUAGE

- **Korean**: Native
- **English**: (Almost) Native
  Mock TOEFL iBT 118 (2017)

MISC.

KAIST ORCHESTRA

- First Violinist, Mar 2017 - Present.
- **Principal First Violinist**, Jan 2018 - Dec 2018.

ICISTS

- Division of Global Partnership, Sep 2018 - Aug 2019.
- **TF leader** of *Opening/Gala Night* (ICISTS-2019)
- TF member of *Science in a Nutshell* (ICISTS-2019)
- **Vice President**, Sep 2019 - Jul 2020.

KAIST Mathematical Sciences Student Council

- Member of department student council, Mar 2018 - Present.
- In charge of *Mathematical Sciences Help-Desk* (Mar 2018 - June 2019)
  A short lecture series (given by selected math undergrad.) that takes place a week before the exam period to help all students with Basic Elective courses. (MAS109, MAS201, MAS250)