Seewoo Lee

Ph. D. student in Mathematics
University of California Berkeley, USA
seewoo5@berkeley.edu

⌂ https://sites.google.com/berkeley.edu/seewoolee/home
 https://github.com/seewoo5
 https://www.linkedin.com/in/lee-seewoo-857062171/

Education

University of California Berkeley   Berkeley
Ph.D in Mathematics   2018 – Present
- On leave for military service (2019 Fall - 2022 Summer)
- Advisor: Sug Woo Shin

Pohang University of Science and Technology (POSTECH)   Pohang
M.S in Mathematics   2017 – 2018
- Thesis: *Maass wave forms, quantum modular forms and Hecke operators*
- Advisor: YoungJu Choie

Pohang University of Science and Technology (POSTECH)   Pohang
B.S. in Mathematics   2013 – 2017
- *Summa Cum Laude* with top honours in mathematics
- Honor's thesis: *Quantum modular forms and Hecke operators*

Experiences

CryptoLab   Seoul
Researcher   2021.05 – Present
- Research on Homomorphic Encryption and application in Machine Learning

Riiid!   Seoul
Research Scientist   2019.07 – 2021.05
- Research on Knowlege Tracing, Score Prediction, Student Dropout Prediction, Item Recommendation

Research Interests

- Number theory, Automorphic Forms and Representations, Analytic Number Theory, Algebraic Number Theory

- Deep learning, Natural Language Processing, Knowledge Tracing, Topological Data Analysis

Publications

1. D. Choi, **S. Lee**, *Non-archimedean Sendov's conjecture*, *p-adic numbers, Ultrametric Analysis and Applications* 14, 77-80 (2022).

2. **S. Lee**, K. Kim, J. Shin, J. Park, *Tracing Knowledge for Tracing Dropouts: Multi-Task Training for Study Session Dropout Prediction*, Educational Data Mining 2021.

3. M. Kim, Y. Shim, **S. Lee**, H. Loh, J. Park, *Behavioral Testing of Deep Knowledge Tracing Models*, Educational Data Mining 2021.

4. H. Loh, D. Shin, **S. Lee**, J. Baek, C. Hwang, Y. Lee, Y. Cha, S. Kwon, J. Park and Y. Choi, *Recommendation for Effective Standardized Exam Preparation*, LAK21: 11th International Learning Analytics and Knowledge Conference. 2021.

5. D. Shin, Y. Shim, H. Yu, **S. Lee**, B. Kim, Y. Choi, *SAINT+: Integrating Temporal Features for EdNet Correctness Prediction*, LAK21: 11th International Learning Analytics and Knowledge Conference. 2021.

6. Y. Choi, Y. Lee, D. Shin, J. Cho, S. Park, **S. Lee**, J. Baek, B. Kim, Y. Jang, *EdNet: A Large-Scale Hierarchical Dataset in Education*, International Conference on Artificial Intelligence in Education (2021), 69-73

7. J. Kim, **S. Lee**, *Joint Liability and Stochastic Shapley Value*, International Review of Law & Economics 60 (2019), 1-8

8. **S. Lee**, *Maass wave forms, Quantum Modular Forms and Hecke Operators*, Res. Mathematical Science 6, 7 (2018), Modular Forms are Everywhere: Celebration of Don Zagier's 65th Birthday.

9. **S. Lee**, *Quantum Modular Forms and Hecke Operators*, Res. Number Theory 4, 18 (2018).

10. Y. Chen, R. Chernov, M. Flores, M. F. Bourque, **S. Lee**, B. Yang, *Toy Teichmüller spaces of real dimension 2: the pentagon and the punctured triangle*, Geom. Dedicata 197 (2018), 193-227.

Preprints

1. **S. Lee**, Y. Choi, J. Park, B. Kim, J. Shin, *Consistency and Monotonicity Regularization for Neural Knowledge Tracing*.

2. Y. Choi, Y. Lee, J. Cho, J. Baek, D. Shin, **S. Lee**, Y. Cha, B. Kim, J. Heo, *Assessment Modeling: Fundamental Pre-training Tasks for Interactive Educational Systems*.

Awards, Grants & Honours

Kwanjeong Educational Foundation Scholarship, KEF 2017–2018
Excellency Award, Dept. of Mathematics, POSTECH 2017
POSTECH Outstanding Talent Development Scholarship, POSTECH 2013–2016
National Science and Technology Scholarship, KOSAF 2013–2016
Silver medals, Undergraduate Mathematical Competition, KMS 2013, 2015, 2016
31st place, ACM-ICPC Daejeon Regional, ACM 2015
Grand prize, POSTECH Programming Contest, Dept. of Computer Science, POSTECH 2015
Honorable mention, Korean Olympiad of Informatics, NIA 2012

Teaching Experience

Graduate Student Instructor (T.A.)   Berkeley
UC Berkeley   2019
 – (2019 Spring) Methods of Mathematics: Calculus, Statistics, and Combinatorics

Graduate Student Reader (Grader)   Berkeley
UC Berkeley   2018
 – (2018 Fall) Introduction to Abstract Algebra

Grader & T.A.   Pohang
POSTECH   2015 – 2018
 – (2018 Spring) Differential Manifolds and Lie groups (Graduate course)
 – (2017 Fall) Modern Algebra II
 – (2017 Spring) Calculus
 – (2016 Fall) Applied Linear Algebra (Undergraduate T.A.)
 – (2015 Winter) POSTECH Potential Development Camp for High School Students

Tutoring   Pohang
POSTECH   2014 – 2015
 – (2015 Spring) Calculus
 – (2015 Spring) Modern Algebra I
 – (2014 Fall) Analysis II
 – (2014 Spring) Analysis I

Talks

- 1st FHE.org workshop, Trondheim, Norway, May 2022.
  Encrypted Multinomial Logistic Regression Training with Softmax Approximation

- Workshop for Young Mathematicians in Korea, Online, January 2022
  Hitchhiker's guide to non-archimedean world

- Graduate student seminar, Sogang University, July 2018
  Maass wave forms, quantum modular forms and Hecke operators

- Sungkyunkwan University, June 2018
  Maass wave forms, quantum modular forms and Hecke operators

- Instructional Workshop on Class Field Theory, KIAS, January 2018
  Proof of the main theorem of local class field theory

- NCTS-POSTECH Number Theory Workshop, December 2017
  Quantum modular forms and Hecke operators

Languages

- Korean (native), English (intermediate)

- Python (PyTorch, Numpy, Pandas), C/C++, LATEX, MATLAB, SAGE Math, Haskell

Miscelleneous (click the icons)

- Blogs

    – Number Theory (EN, Wordpress): *Expanding the Margin* ✒

    – Machine Learning (KR, Tistory): *Anti Math Math Club* ✒

- Math Stackexchange ≣ & Math Overflow ✍

- Speedcuber ▣

- Bedroom DJ (Techno, House) ☁ ▶