

## Seewoo Lee

Ph. D. student in Mathematics

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### Education

#### University of California Berkeley

Ph.D in Mathematics

Berkeley

2018 – Present

- On leave for military service (2019 Fall - 2022 Summer)
- Advisor: Sug Woo Shin

#### Pohang University of Science and Technology (POSTECH)

M.S in Mathematics

Pohang

2017 – 2018

- Thesis: *Maass wave forms, quantum modular forms and Hecke operators*
- Advisor: YoungJu Choie

#### Pohang University of Science and Technology (POSTECH)

B.S. in Mathematics

Pohang

2013 – 2017

- *Summa Cum Laude* with top honours in mathematics
- Honor's thesis: *Quantum modular forms and Hecke operators*

### Experiences

#### CryptoLab

Researcher

Seoul

2021.05 – Present

- Research on Homomorphic Encryption and application in Machine Learning

#### Riid!

Research Scientist

Seoul

2019.07 – 2021.05

- Research on Knowledge 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
- Homomorphic Encryption

## Publications

### • Math

1. D. Choi, **S. Lee**, *Non-archimedean Sendov's conjecture, p-adic numbers*, *Ultrametric Analysis and Applications* 14, 77-80 (2022).
2. **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.
3. **S. Lee**, *Quantum Modular Forms and Hecke Operators*, Res. Number Theory 4, 18 (2018).
4. 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.

### • Others

1. **S. Lee**, J. Kim, *Revisiting the Convergence Theorem for Competitive Bidding in Common Value Actions*, To appear in *Economic Theory Bulletin*.
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

## 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.)**

UC Berkeley

Berkeley

2019

- (2022 Fall) Multivariable Calculus
- (2019 Spring) Methods of Mathematics: Calculus, Statistics, and Combinatorics

**Graduate Student Reader (Grader)**

UC Berkeley

Berkeley

2018

- (2018 Fall) Introduction to Abstract Algebra

**Grader & T.A.**

POSTECH

Pohang  
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**

POSTECH

Pohang  
2014 – 2015

- (2015 Spring) Calculus
- (2015 Spring) Modern Algebra I
- (2014 Fall) Analysis II
- (2014 Spring) Analysis I






**Talks**

- 1st FHE.org workshop, Trondheim, 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

## Miscellaneous (click the icons)

- Working as a reviewer for Mathematical Reviews (2022~)
- 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) 