

## 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

#### Riidx!

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

1. **S. Lee**, J. Kim, *Revisiting the Convergence Theorem for Competitive Bidding in Common Value Actions*, To appear in Economic Theory Bulletin.
2. D. Choi, **S. Lee**, *Non-archimedean Sendov's conjecture, p-adic numbers, Ultrametric Analysis and Applications* 14, 77-80 (2022).
3. **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.
4. M. Kim, Y. Shim, **S. Lee**, H. Loh, J. Park, *Behavioral Testing of Deep Knowledge Tracing Models*, Educational Data Mining 2021.
5. 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.
6. 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.
7. 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
8. J. Kim, **S. Lee**, *Joint Liability and Stochastic Shapley Value*, International Review of Law & Economics 60 (2019), 1-8
9. **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.
10. **S. Lee**, *Quantum Modular Forms and Hecke Operators*, Res. Number Theory 4, 18 (2018).
11. 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

<b>Graduate Student Instructor (T.A.)</b>	Berkeley
UC Berkeley	2019
– (2022 Fall) Multivariable Calculus	
– (2019 Spring) Methods of Mathematics: Calculus, Statistics, and Combinatorics	
<b>Graduate Student Reader (Grader)</b>	Berkeley
UC Berkeley	2018
– (2018 Fall) Introduction to Abstract Algebra	
<b>Grader &amp; T.A.</b>	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	
<b>Tutoring</b>	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++,  $\text{\LaTeX}$ , MATLAB, SAGE Math, Haskell

## Miscellaneous (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) 