Hyeongmin Choe

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OVERVIEW

I am an Integrated PhD student at Department of Mathematical Sciences, Seoul National University (SNU), Republic of Korea. My advisor is Prof. Jung Hee, Cheon. I work on cryptography, currently focusing on homomorphic encryption and lattice-based post-quantum cryptography.

EDUCATION

Seoul National University, Seoul, Republic of Korea

- Integrated Ph.D. in Mathematical Sciences — Sep 2019 – Present
  - Consists of a two-year M.S. course and a three-year Ph.D. course.
  - Adviser: Prof. Jung Hee, Cheon
  - Focus: Cryptography (Homomorphic Encryption, Lattice-based Post Quantum Cryptography)
- B.S. in Mathematical Sciences — Mar 2013 – Aug 2019

Seoul Science High School, Seoul, Republic of Korea — Mar 2010 – Feb 2013

PUBLICATIONS

JOURNALS

Authors are listed in alphabetical order by last name, unless an asterisk(*) is indicated.

[J04] Seungwan Hong*, Jai Hyun Park, Wonhee Cho, Hyeongmin Choe and Jung Hee Cheon, "Secure tumor classification by shallow neural network using homomorphic encryption," *BMC Genomics*, vol. 23, no. 284, Apr 2022.

[J03] Jung Hee Cheon, Hyeongmin Choe, Donghwan Lee and Yongha Son, "Faster Linear Transformations in HElib, revisited," *IEEE Access*, vol. 7, pp. 50595–50604, Apr 2019.

[J02] Siyul Lee* and Hyeongmin Choe, "On Fourth-order Iterative Methods for Multiple Roots of Nonlinear Equations with High Efficiency," *Journal of Computational Analysis and Applications*, vol. 18(1), pp. 109–120, Jan 2015.

[J01] Siyul Lee* and Hyeongmin Choe, "Multiplicational Combinations and A General Scheme of Single-step Iterative Methods for Multiple Roots," *Journal of Computational Analysis and Applications*, vol. 15(6), pp. 1138–1149, Oct 2013.

AWARDS & HONORS

Awards

- First Place Prize, iDASH Secure Genome Analysis Competition — Dec 2020
  Track I: Secure multi-label Tumor classification using Homomorphic Encryption
  IDASH Privacy & Security Workshop 2020
  National Institutes of Health (NIH)
- Excellence Award (Top 21), Final Korean Mathematical Olympiad — Apr 2012
  Korean Mathematical Society
- Gold Medal (Top 28), Korean Mathematical Olympiad — Sep 2011
  Korean Mathematical Society

Honors

- BK 21+ Scholarship — Sep 2019 – Present
  $7,500/year for M.S. and $12, 000/year for Ph.D.
  Ministry of Education of Korea
- Presidential Science Scholarship — Mar 2013 – Dec 2018
  Academic Grant: Tuition + $5, 000/year for 4 years
  Korea Student Aid Foundation

CONFERENCE PRESENTATIONS

- Efficient, Round-optimal Blind Signatures from Standard Assumptions — Apr 2022
  2022 KMS Spring Meeting, virtual
  Korean Mathematical Society
- Security Analysis on NIST PQC Lattice-based Finalists — Nov 2021
  3rd KpqC Workshop, PyeongChang, South Korea
  National Security Research Institute (NSRI), National Intelligence Service (NIS)

- Conversion between Two RLWE-based FHE Schemes and its Application — Oct 2020
  2020 KMS Fall Meeting, virtual
  Korean Mathematical Society

EXPERIENCES

TEACHING

- Seoul National University, Math Courses TA
  - Differential & Integral Calculus Practice 1 — 2022
  - Differential & Integral Calculus Practice 1, Number Theory, Honor Calculus Practice 2 — 2021
  - Calculus Practice 1, Honor Calculus Practice 2, Calculus TA Seminar — 2020
- Korean Mathematical Olympiad (KMO) Winter/Summer School TA — Jan 2013 – Aug 2014
  - 2013 Winter & Summer Schools
  - 2014 Winter & Summer Schools

MILITARY

- Republic of Korea Air Force (ROKAF) — Jul 2015 – Jul 2017
  Intelligence System Management Group, Gyeryong
  Mandatory military service
  Discharged as a Sergeant

INTERNSHIPS

- Undergraduate Research Internships
  - Stochastic Representations of the Hyperbolic PDEs — 2019
    Seoul National University, advised by Prof. Seung Yeal Ha
  - Homomorphic Signature Schemes and Threshold Cryptosystems — 2018 – 2019
    Sejong University, advised by Prof. Ji Sun Shin
  - Lattice Reductions and Homomorphic Encryption with C++ — 2018 – 2019
    Seoul National University, advised by Prof. Jung Hee Cheon
  - Machine Learning (Image Processing) with Python, Matlab — 2017
    Seoul National University, advised by Prof. Myungjoo Kang

LANGUAGES

- Korean: Native language.
- English: Fluent.

SKILLS

- LaTeX, Matlab, Python: Proficient
- C/C++, HEaaN, HElib, Mathematica, HTML, SageMath: Working Knowledge
- HTML, R, PyTorch, TensorFlow: Basic

Last updated on 2022-09-26