Hyeonbum Lee

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CONTACT INFORMATION

Room 355B, Fitzpatric Hall of Engineering,
University of Notre Dame, IN, 46556, United States
Linkedin:https://www.linkedin.com/in/hyeonbum-lee-a176b120a/
Tel: +82 10-7137-0381, +1 574-229-3805

Homepage:https://hyeonbumlee.github.io
✉ E-mail:leehb3706@hanyang.ac.kr

RESEARCH BACKGROUND

- **Cryptography**: Zero-Knowledge Proofs, Verifiable Computing, Secure Multi-Party Computation

EDUCATION

Hanyang University, Seoul — Mar 2020 - Present

- Ph.D. Department of Mathematics
- Advisor: Prof. Jae Hong Seo.

Hanyang University, Seoul. — Mar 2014 - Feb 2018

- B.S. Department of Mathematics

RESEARCH PROJECTS

Zero-Knowledge Proofs & Verifiable Computing

- **Research on the design technology of a cryptographic proof system suitable for Proof-Carrying Data**
  Supported by National Security Research Institute (NSR), Researcher, Apr 2022 - Oct 2022.
- **A Study on Cryptographic Primitives for SNARK**
  Supported by Institute of Information & Communications Technology Planning & Evaluation (IITP), Research Associate, Apr 2021 - Dec 2026.
- **Research on Incrementally Verifiable Computation Design Technique and Application Method**
  Supported by National Security Research Institute (NSR), Researcher, Apr 2021 - Oct 2021.
- **Research on Post-Quantum Non-Interactive Zero-Knowledge Proofs**
  Supported by National Research Foundation of Korea (NRF), Researcher, Mar 2020 - Feb 2025.
- **Research on Post-Quantum Zero-Knowledge Proofs Design Technique and Application Method**
  Supported by National Security Research Institute (NSR), Researcher, Apr 2020 - Oct 2020.

Others

- **Secure Multi-party Approximate Computation**
  Supported by Samsung Science & Technology Foundation, Researcher, Sep 2021 - Aug 2024.
- **A Study of Functional Encryption and Its Core Techniques**
  Supported by Institute of Information & Communications Technology Planning & Evaluation (IITP) & National Research Foundation of Korea (NRF), Researcher, Mar 2020 - Jul 2021.

SELECTED PUBLICATIONS

Journal

1. Chanyang Ju, **Hyeonbum Lee**, Heewon Chung, Jae Hong Seo, and Sungwook Kim,
   Efficient Sum-Check Protocol for Convolution
   IEEE Access, vol. 9, pp. 164047-164059, 2021, doi:10.1109/ACCESS.2021.3133442.
2. Chanyang Ju, **Hyeonbum Lee**, Heewon Chung, and Jae Hong Seo,
   Analysis of Zero-Knowledge Protocols for Verifiable Computation and Its Applications
   Journal of The Korea Institute of Information Security & Cryptology VOL.31, NO.4, Aug. 2020

Conference

1. Sungwook Kim, **Hyeonbum Lee**, Jae Hong Seo, [alphabetical order]
   Efficient Zero-Knowledge Arguments in Discrete Logarithm Setting: Sublogarithmic Proof or Sublinear Verifier
   Accepted in Asiacrypt 2022

Experience

Work Experience

- **Visiting Scholar**
  - Host : Taeho Jung
    Institute : University of Notre Dame, IN
    Period : Sep 1, 2022 - Mar 1, 2023
- **Teaching Assistant**
  - Spring 2022: Calculus I
  - Spring 2021: Calculus I
  - Fall 2020: Modern Algebra II
  - Spring 2020: Modern Algebra I

Others

Technical Skills

- *Technical Softwares*: MATLAB, LaTeX.

Talks & Presentations

Presentations

- *Efficient zero-knowledge arguments in discrete logarithm setting without pairing: Sublinear verifier*
  2022 KMS Spring Meeting, Virtual, 28 Apr. 2022
- *Transparent and efficient zero-knowledge arguments from discrete log with better complexity*
  2021 KMS Spring Meeting, Virtual, 30 Apr. 2021

Honors & Awards

Awards

- ***Grand Prize***, National Cryptographic Technology Contest. Oct 2022
  Korea Cryptography Forum
- ***Special Prize***, National Cryptographic Technology Contest. Oct 2021
  Korea Cryptography Forum
- ***SUMMA CUM LAUDE***, Graduate Honors. Feb 2018
  Hanyang University
- ***Dean's list*** 2016 (Fall)
  College of Natural Science, Hanyang University

Scholarships

- **Teaching Assistant Scholarship** Sep 2020 - Present
  Hanyang University
  $6000/year
- **Master and Ph.D Program Scholarship** Mar 2020 - Present
  Hanyang University
  Full tuition for 3 years (≈ $12000/year)
- **Hanyang Excellent Scientist Scholarship** Mar 2014 - Feb 2018
  Hanyang University
  Full tuition for 4 years (≈ $8000/year)

Services

External Reviewer

- TCS 2022; ICISC 2021; ASIACRYPT 2021; PQCrypto 2021; APKC 2021; ProvSec 2020;