

SEUNGWAN HONG

Curriculum Vitae

CONTACT INFORMATION

Affiliation New York Genome Center
Address 101 6th Ave, New York, NY, United States, 10013
Website <https://swanhong.github.io>
E-mail shong@nygenome.org

POSITION

New York Genome Center, New York, NY, United States

Postdoctoral Research Assistant Mar 2022 - Present

Columbia University, New York, NY, United States

Postdoctoral Researcher Mar 2022 - Present

EDUCATION

Seoul National University, Seoul, Republic of Korea

Integrated M.S./Ph.D. in Mathematical Sciences Sep 2016 - Feb 2022
Advisor: Prof. Jung Hee Cheon

B.S. in Mathematical Sciences Mar 2010 - Aug 2016
Honors: *Cum Laude* (Major GPA: 3.92/4.3)

RESEARCH INTERESTS

- Homomorphic Encryption (HE)
 - Construction of new HE schemes and algorithms
 - Implementation of applications using CKKS scheme
 - non-arithmetic operation algorithm construction using HE
- Privacy-preserving Machine Learning (ML) based on HE
 - Transformation of ML algorithms into HE-friendly forms
- Functional Encryption
 - Construction of functional encryption scheme

PUBLICATIONS

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

Conference

1. *Kyoohyung Han, **Seungwan Hong**, Jung Hee Cheon, and Daejun Park. "Logistic Regression on Homomorphic Encrypted Data at Scale." In Innovative Applications of Artificial Intelligence (IAAI), 2019.

Journal

6. ***Seungwan Hong**, Jai Hyun Park, Wonhee Cho, Hyeongmin Choe, and Jung Hee Cheon, “Secure Tumor Classification by Shallow Neural Network Using Homomorphic Encryption.” In BMC Medical Genomics, 2022.
5. *Miran Kim, *Arif Harmanaci, Jean-Philippe Bossuat, Sergiu Carpov, Jung Hee Cheon, Ilaria Chillotti, Wonhee Cho, David Froelicher, Nicolas Gama, Mariya Georgieva, **Seungwan Hong**, Jean-Pierre Hubaux, Duhyeong Kim, Kristin Lauter, Yiping Ma, Lucila Ohno-Machado, Heidi Sofia, Yongha Son, Yongsoo Song, Juan Troncoso-Pastoriza, and Xiaoqian Jiang. “Ultra-Fast Homomorphic Encryption Models enable Secure Outsourcing of Genotype Imputation.” In Cell Systems, 2021.
4. ***Seungwan Hong**, Seunghong Kim, Jiheon Choi, Younho Lee, and Jung Hee Cheon, “Efficient Sorting of Homomorphic Encrypted Data with k -way Sorting Network.” In IEEE Transactions on Information Forensics and Security, 2021.
3. *Duhyeong Kim, Yongha Son, Dongwoo Kim, Andrey Kim, **Seungwan Hong**, and Jung Hee Cheon, “Privacy-preserving Approximate GWAS computation based on Homomorphic Encryption.” In BMC Medical Genomics, 2020.
2. Jung Hee Cheon, Minki Hhan, **Seungwan Hong**, and Yongha Son, “A Hybrid of Dual and Meet-in-the-Middle Attack on Sparse and Ternary Secret LWE.” In IEEE Access, 2019.
1. *Sungjoon Park, Minsu Kim, Seokjun Seo, **Seungwan Hong**, KyooHyung Han, Keewoo Lee, Jung Hee Cheon, and Sun Kim, “A secure SNP panel scheme using homomorphically encrypted K-mers without SNP calling on the user side.” In BMC Genomics, 2019.

Preprint

1. Jung Hee Cheon, **Seungwan Hong**, and Duhyeong Kim, “Remark on the Security of CKKS Scheme in Practice.” In IACR Cryptol. ePrint Arch.

TALKS

International

Secure multi-label Tumor Classification using HEaaN Dec 2020
IDASH PRIVACY & SECURITY WORKSHOP 2020, Online ([see here](#))

Domestic

Introduction to HEaaN and its Applications July 2020
National Tax Service, Saejong, Republic of Korea

TEACHING EXPERIENCE

Introduction to Cryptography	Mar 2019 - Jun 2019
Introduction to Combinatorics	Mar 2019 - Jun 2019
Differential and Integral Calculus	Sep 2016 - Jun 2019

GRANT & AWARDS

International

iDASH 2020 Dec 2020
First Winner of Track 1 *National institutes of Health (NIH)*

iDASH 2019
Second Winner of Track 2

Oct 2019
National institutes of Health (NIH)

Domestic

Korea Cryptography Contest Nov 2019
Excellent Award (\$1,500) *Korea Institute of Information Security and Cryptology*

Awards for Excellence in Teaching Sep 2017
For teaching Differential and Integral Calculus *Seoul National University*

University Students Contest for Mathematics Nov 2015
Bronze Medal *Korean Mathematical Society*

Korean Mathematical Olympiad Nov 2009
Silver Medal *Korean Mathematical Society*

INTERNSHIP & WORK EXPERIENCES

NCSoft, Republic of Korea Jun 2017 - Aug 2017
Game AI Development

Republic of Korea Army, Republic of Korea Jan 2013 - Oct 2014
Sergeant

GITHUB REPOSITORIES

<https://github.com/snucrypto/HEAAN> Code Maintenance (Mar 2021 - Jan 2022)

<https://github.com/idashSNU/Imputation> iDASH 2019 Solution (team SNU)

<https://github.com/swanhong/HybridLWEAttack> Bit-security estimation of hybrid MITM attack

DOCKER REPOSITORIES

[swanhong/k_way_sort_enc](#) Secure Sorting Algorithm using CKKS scheme

[swanhong/idash2020](#) iDASH 2020 Solution (team SNU)

LANGUAGES AND SKILLS

Languages Korean (native), English (Fluent)
Skills C/C++, Python, L^AT_EX