

Yongsoo Song

📍 Microsoft Building 99, 14820 NE 36th St, Redmond, WA 98052

✉ Yongsoo.Song@microsoft.com

📞 +1 (858) 249-9390

🌐 <https://yongsoosong.github.io/>

POSITIONS

Microsoft Research, Redmond, WA, United States

- Researcher, Cryptography Group

Jan 2019 – Present

University of California, San Diego, CA, United States

- Postdoctoral Researcher, Department of Computer Science and Engineering

Jan 2018 – Dec 2018

EDUCATION

Seoul National University, Seoul, Republic of Korea

- M.S. and Ph.D. in Mathematical Sciences
 - Thesis: Homomorphic Encryption for Approximate Arithmetic
 - Advisor: Prof. Jung Hee Cheon

Sep 2012 – Feb 2018

- B.S. in Mathematical Sciences

Mar 2005 – Aug 2012

PUBLICATIONS

CONFERENCES

- [C09] H. Chen, I. Chillotti and **Y. Song**, “Improved Bootstrapping for Approximate Homomorphic Encryption,” *The 38th Annual International Conference on the Theory and Applications of Cryptographic Techniques (EUROCRYPT 2019)*.
- [C08] D. Kim and **Y. Song**, “Approximate Homomorphic Encryption over the Conjugate-invariant Ring,” *The 21st Annual International Conference on Information Security and Cryptology (ICISC 2018)*.
- [C07] X. Jiang, M. Kim, K. Lauter and **Y. Song**, “Secure Outsourced Matrix Computation and Application to Neural Networks,” *The 25th ACM Conference on Computer and Communications Security (CCS 2018)*.
- [C06] J. H. Cheon, K. Han, A. Kim, M. Kim and **Y. Song**, “A Full RNS Variant of Approximate Homomorphic Encryption,” *The 25th Conference on Selected Areas in Cryptography (SAC 2018)*.
- [C05] J. H. Cheon, D. Kim, J. Lee, and **Y. Song**, “Lizard: Cut off the Tail! Practical Post-Quantum Public-Key Encryption from LWE and LWR,” *The 11th Conference on Security and Cryptography for Networks (SCN 2018)*.
- [C04] J. H. Cheon, K. Han, A. Kim, M. Kim, and **Y. Song**, “Bootstrapping for Approximate Homomorphic Encryption,” *The 37th Annual International Conference on the Theory and Applications of Cryptographic Techniques (EUROCRYPT 2018)*.
- [C03] J. H. Cheon, A. Kim, M. Kim, and **Y. Song**, “Homomorphic Encryption for Arithmetic of Approximate Numbers,” *The 23rd International Conference on the Theory and Applications of Cryptology and Information Security (ASIACRYPT 2017)*.
- [C02] J. Kim, C. Lee, H. Shim, J. H. Cheon, A. Kim, M. Kim, and **Y. Song**, “Encrypting Controller using Fully Homomorphic Encryption for Security of Cyber-Physical Systems,” *The 6th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NECSYS 2016)*.
- [C01] J. H. Cheon, T. Kim, and **Y. Song**, “A Group Action on \mathbb{Z}_p^\times and the Generalized DLP with Auxiliary Inputs,” *The 20th International Conference on Selected Areas in Cryptography (SAC 2013)*.

JOURNALS

- [J06] J. H. Cheon, D. Kim, Y. Kim and **Y. Song**, “Ensemble Method for Privacy-Preserving Logistic Regression based on Homomorphic Encryption,” *IEEE Access* 10.1109/ACCESS.2018.2866697, 2018.
- [J05] A. Kim, **Y. Song**, M. Kim, K. Lee, J. H. Cheon, “Logistic Regression Model Training based on the Approximate Homomorphic Encryption,” *BMC Med. Genomics*, 2018.
- [J04] Y. Jiang, J. Hamer, C. Wang, X. Jiang, M. Kim, **Y. Song**, Y. Xia, N. Mohammed, M. N. Sadat, and S. Wang, “SecureLR: Secure Logistic Regression Model via a Hybrid Cryptographic Protocol,” *IEEE/ACM Transactions on Computational Biology and Bioinformatics*, 2018.
- [J03] J. H. Cheon, K. Han, S. Hong, H. J. Kim, J. Kim, S. Kim, H. Seo, H. Shim, and **Y. Song**, “Toward a Secure Drone System: Flying with Real-time Homomorphic Authenticated Encryption,” *IEEE Access* DOI 10.1109/ACCESS.2018.2819189, 2018.

- [J02] M. Kim, **Y. Song**, S. Wang, Y. Xia, and X. Jiang, “Secure Logistic Regression Based on Homomorphic Encryption: Design and Evaluation,” *JMIR Med Inform* 2018;6(2):e19, 2018.
- [J01] M. Kim, **Y. Song**, and J. H. Cheon, “Secure Searching of Biomarkers Using Hybrid Homomorphic Encryption Scheme,” *BMC Med. Genomics*. 2017;10:42, 2017.

BOOK AND BOOK CHAPTERS

- [B01] J. H. Cheon, T. Kim, and **Y. Song**, “The Discrete Logarithm Problem with Auxiliary Inputs,” In *Algebraic Curves and Finite Fields. Cryptography and Other Applications*, Berlin, Boston: De Gruyter, 2014.

MANUSCRIPTS

- [E07] M. Kim, **Y. Song**, B. Li, and D. Micciancio, “Semi-parallel logistic regression for GWAS on encrypted data,” 2019.
- [E06] H. Chen, I. Chillotti and **Y. Song**, “Multi-Key Homomorphic Encryption from TFHE,” 2019.
- [E05] **Y. Song**, J. Cyranka, D. Kim and S. Gao, “Convergence and Oscillation of Low-Precision Stochastic Gradient Descent,” 2019.
- [E04] J. H. Cheon, D. Kim, J. Lee, J. Shin, and **Y. Song**, “Instant Privacy-Preserving Biometric Authentication for Hamming Distance Matcher,” 2018.
- [E03] D. Archer, L. Chen, J. H. Cheon, R. Gilad-Bachrach, R. A. Hallman, Z. Huang, X. Jiang, R. Kumaresan, B. A. Malin, H. Sofia, and **Y. Song**, “Applications of Homomorphic Encryption,” *Draft Homomorphic Encryption Standard*, available at HomomorphicEncryption.org, 2017.
- [E02] J. H. Cheon and **Y. Song**, “Batch Fully Homomorphic Encryption over the Integers Revisited,” 2016.
- [E01] J. H. Cheon and **Y. Song**, “Secure Sketch for Set Distance on Noisy Data,” 2014.

SOFTWARES

- [S03] J. H. Cheon, K. Han, A. Kim, M. Kim and **Y. Song**, “Full RNS Variant of HEAAN,” <https://github.com/HanKyoohyung/FullRNS-HEAAN>, 2018.
- [S02] J. H. Cheon, K. Han, A. Kim, M. Kim and **Y. Song**, “Bootstrapping of HEAAN,” <https://github.com/kimandrik/HEAANBOOT>, 2018.
- [S01] J. H. Cheon, A. Kim, M. Kim and **Y. Song**, “Implementation of HEAAN,” <https://github.com/kimandrik/HEAAN>, 2016.

PATENTS

- [P04] J. H. Cheon and **Y. Song**, “Homomorphic Encryption Method of a Plurality of Messages Supporting Approximate Arithmetic of Complex Numbers,” 10-2016-0096184 (SNU-2016-0591), 2016.
- [P03] J. H. Cheon and **Y. Song**, “Homomorphic Encryption Method Supporting Floating-Point Arithmetic and Floating-Point Arithmetic Method for Encrypted Message Generated by the Same,” 10-2016-0075859 (SNU-2016-0413), 2016.
- [P02] J. H. Cheon and **Y. Song**, “Homomorphic Encryption Method by Which Ciphertext Size Is Reduced,” 10-2016-0051432 (SNU-2016-0319), 2016.
- [P01] J. H. Cheon, J.W. Kim, E. Kwon, K. Lee, H. Ryu and **Y. Song**, “Fingerprint Enrollment Method and Fingerprint Verification Method,” 10-2015-0067318 (SNU-2015-0692), 2015.

HONORS & AWARDS

- **First Prize**, iDASH Genomic Data Privacy and Security Protection Competition 2018 Oct 2018
<http://www.humangenomeprivacy.org/2018/>
- **First Prize**, iDASH Genomic Data Privacy and Security Protection Competition 2017 Oct 2017
<http://www.humangenomeprivacy.org/2017/>
- **Excellence Award**, Crypto Contest Oct 2017
Korea Cryptography Forum.
- **Second Prize**, iDASH Genomic Data Privacy and Security Protection Competition 2016 Nov 2016
<http://www.humangenomeprivacy.org/2016/>
- **Best Award**, Crypto Contest Oct 2016
Korea Cryptography Forum.
- **Excellence Award**, Crypto Contest Oct 2014
Korea Cryptography Forum.

	<ul style="list-style-type: none"> ▪ Award for Excellence in Teaching Seoul National University. 	Aug 2014
	<ul style="list-style-type: none"> ▪ Global PhD Fellowship (\$15,000) National Foundation Research of Korea. 	Sep 2012–Aug 2017
	<ul style="list-style-type: none"> ▪ BK 21+ Scholarship Ministry of Education of Korea. 	Sep 2012–Aug 2017
	<ul style="list-style-type: none"> ▪ Best Award, Undergraduate Mathematical Olympiad 2006 Korean Mathematical Society. 	Nov 2006
	<ul style="list-style-type: none"> ▪ Excellence Award, Undergraduate Mathematical Olympiad 2005 Korean Mathematical Society. 	2005
	<ul style="list-style-type: none"> ▪ Silver Medal, the 45th International Mathematical Olympiad Athens, Greece. 	Jun 2004
INVITED TALKS	<ul style="list-style-type: none"> ▪ Construction and Bootstrapping of Approximate Homomorphic Encryption 22nd Workshop on Elliptic Curve Cryptography (ECC 2018), Osaka, Japan. 	Nov 2018
	<ul style="list-style-type: none"> ▪ Homomorphic Matrix Computation and Application to Neural Networks Microsoft Research, Redmond, USA. 	Jun 2018
	<ul style="list-style-type: none"> ▪ Approximate Homomorphic Encryption: Construction and Application The Second Homomorphic Encryption Standardization Workshop, Cambridge, USA. 	Mar 2018
	<ul style="list-style-type: none"> ▪ Homomorphic Encryption for Approximate Arithmetic Lattice and Cryptography Meeting, ENS de Lyon, France. 	Dec 2017
	<ul style="list-style-type: none"> ▪ Homomorphic Encryption for Arithmetic of Approximate Numbers Microsoft Research, Redmond, USA. 	Jun 2017
	<ul style="list-style-type: none"> ▪ Post-Quantum Public-Key Encryption from LWR Korea Internet and Security Agency, Korea. 	Mar 2017
CONFERENCE PRESENTATIONS	<ul style="list-style-type: none"> ▪ A Full RNS Variant of Approximate Homomorphic Encryption SAC 2018, University of Calgary, Canada. 	Aug 2018
	<ul style="list-style-type: none"> ▪ Bootstrapping for Approximate Homomorphic Encryption EUROCRYPT 2018, Tel Aviv, Israel. 	May 2018
	<ul style="list-style-type: none"> ▪ Homomorphic Encryption for Arithmetic of Approximate Numbers ASIACRYPT 2017, Hong Kong. 	Dec 2017
	<ul style="list-style-type: none"> ▪ Privacy-Preserving Logistic Regression based on the HEAAN Library iDASH Privacy & Security Workshop 2017, Florida, USA. 	Oct 2017
	<ul style="list-style-type: none"> ▪ Secure Searching of Biomarkers Using Hybrid GSW Encryption Scheme iDASH Privacy & Security Workshop 2016, Chicago, USA. 	Nov 2016
	<ul style="list-style-type: none"> ▪ Secure Sketch for Set Distance on Noisy Data 2014 KMS Annual Meeting, Yonsei University, Korea. 	Oct 2014
	<ul style="list-style-type: none"> ▪ A Group Action on \mathbb{Z}_p^\times and the Generalized DLP with Auxiliary Inputs SAC 2013, Simon Fraser University, Canada. 	Aug 2013
OTHER WORK EXPERIENCE	<ul style="list-style-type: none"> ▪ Visiting Scholar (Prof. Xiaoqian Jiang) Division of Biomedical Informatics, University of California, San Diego, USA. 	Jun 2017 – Sep 2017
	<ul style="list-style-type: none"> ▪ Intern (Prof. Damien Stehlé) Computer Science Department, ENS de Lyon, France. 	Jul 2015 – Aug 2015
LANGUAGES	<ul style="list-style-type: none"> ▪ Korean: Native language. ▪ English: Fluent. 	
SKILLS	\LaTeX , C/C++, Python	

[Last update on 2019-02-04]