JIAYI KANG

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Research Interests

Homomorphic Encryption, Lattice-Based Zero-Knowledge Proofs

Education

PhD Candidate in Cryptography 2021 - Present

KU Leuven, Department of Electrical Engineering, COSIC research group
Supervised by Prof. Frederik Vercauteren, Prof. Nigel Smart and Dr. Ilia Iliashenko

MSc in Mathematics *(With Great Distinction)* 2019 - 2021

KU Leuven, Department of Mathematics

Master of Physics *(First Class Honors)* 2015 - 2017

The University of Manchester, Department of Physics and Astronomy

BSc in Physics *(Honor Science Program)* 2012 - 2016

Xi'an JiaoTong University, Department of Physics
Exchange to University of California, Berkeley in 2015 Spring

Publications and Preprints

- Jacob Blindenbach, Jung Hee Cheon, Gamze Gürsoy, **Jiayi Kang**. On the overflow and p-adic theory applied to Homomorphic Encryption, accepted in *Cyber Security, Cryptology, and Machine Learning (CSCML)* 2024
- Kelong Cong, **Jiayi Kang**, Georgio Nicolas, Jeongeun Park. Faster Private Decision Tree Evaluation for Batched Input from Homomorphic Encryption, in *Security and Cryptography for Networks (SCN)* 2024
- Kelong Cong, Robin Geelen, **Jiayi Kang**, Jeongeun Park. Revisiting Oblivious Top-k Selection with Applications to Secure k-NN Classification, accepted in *Selected Areas in Cryptography (SAC)* 2024
- Robin Geelen, Ilia Iliashenko, **Jiayi Kang**, Frederik Vercauteren. On Polynomial Functions Modulo p^e and Faster Bootstrapping for Homomorphic Encryption, in *EUROCRYPT* 2023
- Jacob Blindenbach[1], **Jiayi Kang**[1], Seungwan Hong[1], Caline Karam, Thomas Lehner, and Gamze Gürsoy. Ultra-secure storage and analysis of genetic data for the advancement of precision medicine, *preprint*

Talks and Seminars

- Faster Private Decision Tree Evaluation for Batched Input from Homomorphic Encryption at *Security and Cryptography for Networks (SCN)*, Amalfi, Italy, 2024
- Revisiting Oblivious Top-k Selection with Applications to Secure k-NN Classification, invited seminar at University of Luxembourg, 2024
- On Polynomial Functions Modulo p^e and Faster Bootstrapping for Homomorphic Encryption at *the 2nd Annual FHE.org Conference on Fully Homomorphic Encryption*, Tokyo, Japan, 2023

Experience

Intel Labs Jul. - Sep. 2022

Privacy Technologies Graduate Research Intern

Seoul National University Jul.-Aug. 2023

Research visit in the group led by Prof. Jung Hee Cheon

The Chinese University of Hong Kong 2017-2019

Research assistant in the physics department

Teaching

- Guest Lecturer for the course *Privacy and Big Data* (2023 Fall, 2024 Fall)
- Guest Lecturer for the course *Privacy Technologies* (2024 Fall)
- Teaching Assistant for the course *Computer Algebra for Cryptography* (2023 Spring, 2024 Spring)

♡ Master Thesis Co-supervison

- Hua Xu (2024-Present), Horizontal scalability for privately accelerating ZK provers
- Sabrine Chentouf (2024-Present), Privacy-preserving federated learning
- Ibrahim Zaidan (2024-Present), Efficient polynomial evaluation on secret data
- Pritam Pal (2023-2024), From zero to HEro: zkSNARKs proof generation with Homomorphic Encryption
- Yingshuo Xi (2022-2023), An Investigation of Polynomial Activation Functions in Neural Networks
- Siva Kumar (2022), Secure Data Classification with Homomorphic Encryption

♡ Community Services

Sub-reviewer for Eurocrypt 2025

Reviewer for Designs, Codes and Cryptography (DCC) in 2024

Sub-reviewer for Eurocrypt 2024 and WAHC 2024

Sub-reviewer for Asiacrypt 2023 and CHES 2023