Thang Hoang, Ph.D.

Contact Information

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2202 Kraft Drive
Blacksburg, VA, 24060

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Research Interests

Applied Cryptography
Security and Privacy
Privacy-Enhancing Technologies
Biometrics

Education

University of South Florida, Tampa, Florida, United States — 2019 − 2020
Doctor of Philosophy, Computer Science
- Dissertation: *Privacy-Preserving and Functional Information Systems*
- Advisor: Dr. Attila Altay Yavuz

Oregon State University, Corvallis, Oregon, United States — 2015 − 2018
PhD student, Computer Science
- Advisor: Dr. Attila Altay Yavuz
Phi Kappa Phi Honor Society (OSU Chapter)

Chonnam National University, Gwangju, South Korea — 2012 − 2014
Master of Science, Computer Science
- Thesis: *Gait Authentication on Mobile Phone Using Pattern Recognition and Biometric Cryptosystem*
- Advisor: Dr. Deokjai Choi

University of Science VNU-HCMC, Ho Chi Minh city, Vietnam — 2006 − 2010
Bachelor of Science, Computer Science
- Thesis: *Integrating Camera Based Supervision System to Access Control Devices and Applications*
- Advisor: Dr. Thuc D. Nguyen

Professional Experiences

Assistant Professor, Department of Computer Science, Virginia Tech, Blacksburg, VA — Dec 2020 − current

Postdoctoral Fellow, Computer Science, Carnegie Mellon University, Pittsburgh, PA — Aug 2020 − current
- Host: Prof. Elaine Shi

Research Associate, CSE, University of South Florida, Tampa, FL — Aug 2020 − Dec 2020
- Host: Prof. Attila A. Yavuz

Research Intern, Robert Bosch Research & Technology Center, Pittsburgh, PA, USA — 2016, 2018
- Mentor: Dr. Jorge Guajardo Merchan

Lecturer, Saigon Technology University, Ho Chi Minh city, Vietnam — 2014 − 2015

Research Scientist, RedOne Technologies Co., Ltd., Gwangju, South Korea — 2014 − 2015

Publications

Journals

[1] **Thang Hoang**, Attila A. Yavuz and Jorge Guajardo, "A Multi-server ORAM Framework with Constant Client Bandwidth Blowup". *ACM Transactions on Privacy and Security* (ACM TOPS), 2020. doi:10.1145/3369108

[HYDG19] **Thang Hoang**, Attila A. Yavuz, F. Betül Durak and Jorge Guajardo, "A Multi-Server Oblivious Dynamic Searchable

Encryption Framework". *Journal of Computer Security* (JCS), IOS Press, pre-press, pp. 1-28, 2019.
doi:10.3233/JCS-191300

[2] **Thang Hoang**, Attila A. Yavuz and Jorge Guajardo, "A Secure Searchable Encryption Framework for Privacy-Critical Cloud Storage Services". *IEEE Transactions on Services Computing* (IEEE TSC), in press. (SCIE).
doi:10.1109/TSC.2019.2897096

[3] **Thang Hoang**, Ceyhun D. Ozkaptan, Gabriel Hackebeil and Attila A. Yavuz, "Efficient Oblivious Data Structures for Database Services on the Cloud". *IEEE Transactions on Cloud Computing* (IEEE TCC), in press. (SCI).
doi:10.1109/TCC.2018.2879104

[4] **Thang Hoang**, Thuc Nguyen and Deokjai Choi, "Gait Authentication on Mobile Phone Using Biometric Cryptosystem and Fuzzy Commitment Scheme". *International Journal of Information Security* (IJIS), Volume 14, Issue 6, pp. 549–560, November 2015. (SCIE).
doi:10.1007/s10207-015-0273-1

[5] **Thang Hoang** and Deokjai Choi, "Secure and Privacy Enhanced Gait Authentication on Smart Phone". *The Scientific World Journal* (TSWJ), Volume 2014, May 2014. (SCIE).
doi:10.1155/2014/438254

[6] **Thang Hoang**, Thuc D. Nguyen, Chuyen Luong, Son Do and Deokjai Choi, "Adaptive Cross-Device Gait Recognition Using Mobile Accelerometer". *Journal of Information Processing System* (JIPS), Volume 9, Issue 2, pp. 333–348, June 2013.
doi:10.3745/JIPS.2013.9.2.333

[7] Viet Q. Vo, **Thang Hoang** and Deokjai Choi, "Personalization in Mobile Activity Recognition System using K-Medoids Clustering Algorithm". *International Journal of Distributed Sensor Networks* (IJDSN), Volume 2013, June 2013. (SCIE).
doi:10.1155/2013/315841

Conferences

[8] **Thang Hoang**, Rouzbeh Behnia, Yeongjin Jang, and Attila A. Yavuz, "MOSE: Practical Multi-User Oblivious Storage via Secure Enclaves", in 10th *ACM Conference on Data and Application Security and Privacy* (CODASPY), March 2020, New Orleans, Louisiana.
doi:10.1145/3374664.3375749

[9] **Thang Hoang**, Jorge Guajardo, and Attila A. Yavuz, "MACAO: A Maliciously-Secure and Client-Efficient Active ORAM Framework", in *the Annual Network and Distributed System Security Symposium* (NDSS), February 2020, San Diego, California.
doi:10.14722/ndss.2020.24313

[10] **Thang Hoang**, Muslum O. Ozmen, Yeongjin Jang, and Attila A. Yavuz, "Hardware-Supported ORAM in Effect: Practical Oblivious Search and Update on Very Large Dataset", in 19th *Privacy Enhancing Technologies Symposium* (PETS), July 2019, Stockholm, Sweden.
doi:10.2478/popets-2019-0010

[11] **Thang Hoang**, Attila A. Yavuz, F. Betül Durak, and Jorge Guajardo, "Oblivious Dynamic Searchable Encryption on Distributed Cloud Systems", in 32nd *Annual IFIP WG 11.3 Conference on Data and Applications Security and Privacy* (IFIP DBSec), July 2018, Bergamo, Italy. *⋆**Best Paper Award**⋆*
doi:10.1007/978-3-319-95729-6_8

[12] Muslum O. Ozmen, **Thang Hoang**, and Attila A. Yavuz, "Forward-Private Dynamic Searchable Symmetric Encryption with Efficient Search", in *IEEE International Conference on Communications* (IEEE ICC), May 2018, Kansas City, MO, USA.
doi:10.1109/ICC.2018.8422480

[13] Lam Tran, **Thang Hoang**, Thuc Nguyen and Deokjai Choi, "Improving Gait Cryptosystem Security Using Gray Code Quantization and Linear Discriminant Analysis", in *International Conference on Information Security* (ISC), pp. 214–229, November 2017, Ho Chi Minh city, Vietnam.
doi:10.1007/978-3-319-69659-1_12

[14] **Thang Hoang**, Ceyhun D. Ozkaptan, Attila A. Yavuz, Jorge Guajardo and Tam Nguyen, "S^{3}ORAM: A Computation-Efficient and Constant Client Bandwidth Blowup ORAM with Shamir Secret Sharing", in *24th ACM Conference on Computer and Communications Security* (ACM CCS), pp. 491–505, October 2017, Dallas, Texas, United States. doi:10.1145/3133956.3134090

[15] **Thang Hoang**, Attila A. Yavuz and Jorge Guajardo, "Practical and Secure Dynamic Searchable Encryption via Oblivious Access on Distributed Data Structure", in *32nd Annual Computer Security Applications Conference* (ACSAC), pp. 302–313, December 2016, Los Angeles, California, United States. doi:10.1145/2991079.2991088

[16] **Thang Hoang**, Deokjai Choi and Thuc Nguyen, "On the Instability of Sensor Orientation in Gait Verification on Mobile Phone", in *12th International Conference on Security and Cryptography* (SECRYPT), pp. 148–159, July 2015, Colmar, France. doi:10.5220/0005572001480159

[17] **Thang Hoang** and Deokjai Choi, "A Biometric Cryptosystem Using Gait Captured from Mobile Accelerometer", in *FTRA International Symposium on Ubiquitous Computing and Embedded Systems*, December 2013, Danang, Vietnam. *Best Paper Award* (*published in [HC14]*)

[18] **Thang Hoang**, Deokjai Choi, Viet Vo, Anh Nguyen and Thuc Nguyen, "A Lightweight Gait Authentication on Mobile Phone Regardless of Installation Error", in *28th International Information Security and Privacy Conference* (IFIP SEC), pp. 83–101, July 2013, Auckland, New Zealand. doi:10.1007/978-3-642-39218-4_7

[19] Chuyen Luong, Son Do, **Thang Hoang** and Deokjai Choi, "A Mobility Prediction Algorithm for The Seamless Handoff", in *5th International Conference Ubiquitous and Future Networks* (IEEE ICUFN), pp. 424–429, July 2013, Danang, Vietnam. doi:10.1109/ICUFN.2013.6614854

[20] Viet Q. Vo, **Thang Hoang** and Deokjai Choi, "Adaptive Energy-Saving Strategy for Activity Recognition on Mobile Phone", in *IEEE International Symposium on Signal Processing and Information Technology* (IEEE ISSPIT), pp. 95–100, December 2012, Ho Chi Minh city, Vietnam. doi:10.1109/ISSPIT.2012.6621267

[21] **Thang Hoang**, Viet Q. Vo, Thuc D. Nguyen and Deokjai Choi, "Gait Identification Using Accelerometer on Mobile Phone", in *1st International Conference on Control, Automation and Information Sciences* (IEEE ICCAIS), pp. 344–348, November 2012, Ho Chi Minh city, Vietnam. *Best Paper Award* doi:10.1109/ICCAIS.2012.6466615

PATENTS

[1] **Thang Hoang** and Jorge Guajardo, "Secure and Efficient Multi-server Oblivious Random Access Machine in a Malicious Execution Environment" *(submitted)*.

[2] **Thang Hoang**, Attila A. Yavuz and Jorge Guajardo, "Practical and Secure Dynamic Searchable Encryption via Oblivious Access on Distribution Data Structure" *(submitted)*.

[3] **Thang Hoang**, Muslum O. Ozmen and Attila A. Yavuz, "Forward-Private Dynamic Searchable Symmetric Encryption with Efficient Search", OSU-17-55, Provisional Application No: 62/572,339, Submitted: Oct 10, 2017.

[4] Deokjai Choi, **Thang Hoang**, Thuc D. Nguyen and Thu D. Tran, "Device and Method for Authentication System using Prime Number", Korea Patent 10-1754796, Filed: September 17, 2014, Issued: June 30, 2017.

[5] Deokjai Choi and **Thang Hoang**, "Secure Authentication System, and its Device and Method for Biometric Information, Derived Information from User Characteristic Information", Korea Patent 10-1622253, Filed: July 09, 2014, Issued: May 12, 2016.

[6] **Thang Hoang**, Deokjai Choi and Chilwoo Lee, "Gait Authentication System and its Device and Method", Korea Patent 10-1622252, Filed: December 11, 2013, Issued: May 12, 2016.

Awards and Honors

Awards and Grants

- Student Conferenceship Travel Grant (ACSAC)   2016

Research Achievements

- Best Paper Award in IFIP DBSec 2018, Bergamo, Italy   2018
- Best Paper Award in UCES 2013 symposium, Da Nang, Vietnam   2013
- Best Paper Award for the most innovative application in ICCAIS 2012, Ho Chi Minh city, Vietnam   2012

Professional Services

Program Committee

- CosDEO Workshop (*affiliated with PerCom*)   2018, 2020

Journal Reviewer

- ACM Digital Threats: Research and Practice (DTRAP)   2020*
- ACM Transactions on Privacy and Security (ACM TOPS)   2017*, 2020*
- IEEE Transactions on Dependable and Secure Computing (IEEE TDSC)   2017*, 2018*, 2020
- IEEE Transactions on Information Forensics and Security (IEEE TIFS)   2018*
- IEEE Transactions on Cybernetics   2019*
- IEEE Transactions on Cloud Computing (IEEE TCC)   2019
- Elsevier Computers & Security   2020
- Elsevier Information Sciences   2017
- Elsevier Journal of Information Security and Applications   2019

*External reviewer

Conference Reviewer

- ACSAC   2017, 2018, 2019
- ASIACRYPT   2018
- EUROCRYPT   2018
- IEEE CSF   2021
- IEEE CNS   2019
- IEEE S&P   2021
- IFIP DBSec   2018, 2019
- PETS   2020, 2021
- WiSec   2020
- WWW   2019

Talks

Privacy-Preserving and Functional Information Systems

- Seminar at Binghamton University   Binghamton, NY, Mar 2020
- Remote Seminar at Virginia Tech   Blacksburg, VA, Mar 2020
- Remote Seminar at University of Iowa   Iowa City, IA, Apr 2020
- Remote Seminar at University of South Florida   Tampa, FL, Apr 2020

MACAO: A Maliciously-Secure and Client-Efficient Active ORAM Framework

- Presented at ISOC NDSS 2020   San Diego, CA, USA, Feb 2020

Distributed ORAM for Data Outsourcing

- Seminar at Cornell University   Ithaca, NY, USA, Nov 2019

S^3ORAM: A Computation-Efficient and Constant Client Bandwidth Blowup ORAM with Shamir Secret Sharing

- Presented at ACM CCS 2017   Dallas, TX, USA, Oct 2017

Practical and Secure Dynamic Searchable Encryption via Oblivious Access on Distributed Data Structure

- Presented at ACSAC 2016   Los Angeles, CA, USA, Dec 2016

Wireless Network Security

- Seminar at Eduroam Workshop, University of Indonesia   Depok, Indonesia, Aug 2015

On the Instability of Sensor Orientation in Gait Verification on Mobile Phone

- Presented at SECRYPT 2015   Colmar, France, Jul 2015

A Lightweight Gait Authentication on Mobile Phone Regardless of Installation Error

- Presented at IFIP SEC 2013   Auckland, New Zealand, Jul 2013

Gait Identification Using Accelerometer on Mobile Phone

- Presented at IEEE ICCAIS 2012   Ho Chi Minh city, Vietnam, Nov 2012