

THANG HOANG, PH.D.

CONTACT INFORMATION

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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 Jan 2021 – current
- Postdoctoral Fellow**, Computer Science, Carnegie Mellon University, Pittsburgh, PA Aug 2020 – Dec 2020
• 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

GRANTS

- Towards Privacy-Enhancing Technologies** Dec 2020 – current
Thang Hoang (Sole-PI), unrestricted gift, Robert Bosch
Total: \$100,000
- ACSAC Student Conferenceship Travel Grant** 2016
Total: \$1,000

PUBLICATIONS

Journals

- [1] Lam Tran, **Thang Hoang**, Thuc Nguyen, Hyunil Kim, and Deokjai Choi, “Multi-Model Long Short-Term Memory Network for Gait Recognition Using Window-Based Data Segment”. *IEEE Access*, Volume 9, pp. 23826–23839, February 2021.
doi:10.1109/ACCESS.2021.3056880
- [2] **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)*, Volume 23, Issue 1, pp. 1–35, February 2020.
doi:10.1145/3369108
- [3] **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)*, Volume 14, Issue 6, pp. 1675–1689, November 2021 (pre-print published 2019).
doi:10.1109/TSC.2019.2897096
- [4] **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)*, Volume 9, Issue 2, pp. 598–609, April 2021 (pre-print published 2019).
doi:10.1109/TCC.2018.2879104
- [5] **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, Volume 27, Issue 6, pp. 649–676, 2019.
doi:10.3233/JCS-191300
- [6] **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.
doi:10.1007/s10207-015-0273-1
- [7] **Thang Hoang** and Deokjai Choi, “Secure and Privacy Enhanced Gait Authentication on Smart Phone”. *The Scientific World Journal (TSWJ)*, Volume 2014, May 2014.
doi:10.1155/2014/438254
- [8] **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
- [9] 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.
doi:10.1155/2013/315841

Conferences

- [10] Jiaheng Zhang, Tiancheng Xie, **Thang Hoang**, Elaine Shi, and Yupeng Zhang, “Polynomial Commitment with a One-to-Many Prover and Applications”, in *31st USENIX Security Symposium (USENIX Security)*, August 2022, Boston, MA, USA.
- [11] Weikeng Chen, **Thang Hoang**, Jorge Guajardo, and Attila A. Yavuz, “A Metadata-Hiding File-Sharing System with Malicious Security”, in *the Annual Network and Distributed System Security Symposium (NDSS)*, February 2022, San Diego, CA, USA.
- [12] Efe Ulas Akay Seyitoglu, Attila A. Yavuz, and **Thang Hoang**, “Proof-of-Useful-Randomness: Mitigating the Energy Waste in Blockchain Proof-of-Work”, in *18th International Conference on Security and Cryptography (SE-CRYPT)*, July 2021 (virtual).
doi:10.5220/0010519204120419

- [13] **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, LA.
doi:10.1145/3374664.3375749
- [14] **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, CA, USA.
doi:10.14722/ndss.2020.24313
- [15] **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
- [16] **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
- [17] 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
- [18] 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, Vietnam.
doi:10.1007/978-3-319-69659-1_12
- [19] **Thang Hoang**, Ceyhun D. Ozkaptan, Attila A. Yavuz, Jorge Guajardo, and Tam Nguyen, “S³ORAM: 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, TX, USA.
doi:10.1145/3133956.3134090
- [20] **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, CA, USA.
doi:10.1145/2991079.2991088
- [21] **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
- [22] **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*** (extended version published in [7])
- [23] **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
- [24] 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

- [25] 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
- [26] **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, 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”. (*Filed*)
- [2] Attila A. Yavuz, Jorge Guajardo, and **Thang Hoang**, “Method and System for Search Pattern Oblivious Dynamic Symmetric Searchable Encryption”, US Patent 11144663B2, Filed: Dec 28, 2017, Issued: Oct 21, 2021.
- [3] **Thang Hoang**, Muslum O. Ozmen, and Attila A. Yavuz, “Forward-Private Dynamic Searchable Symmetric Encryption with Efficient Search”, US Patent 10922273, Filed: Oct 10, 2017, Issued: Feb 16, 2021.
- [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

- 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

Organizing Committee

- IEEE S&P (Short Talks Chair) (2022)

Program Committee

- WWW (2022), ACSAC (2021), IEEE ICCCN (2021), CosDEO (PerCom Workshop) (2018, 2020)

Journal Reviewer

- ACM Digital Threats: Research and Practice (2020, 2021), ACM Transactions on Privacy and Security (2017, 2020), IEEE Transactions on Dependable and Secure Computing (2017 - 2021), IEEE Transactions on Information Forensics and Security (2018 - 2021), IEEE Transactions on Cybernetics (2019), IEEE Transactions on Cloud Computing (2019, 2021), Elsevier Computers & Security (2020), Elsevier Information Sciences (2017), Elsevier Journal of Information Security and Applications (2019)

Conference Reviewer

- ACM CCS (2021), IEEE S&P (2021), PETS (2020 - 2022), ACSAC (2017 - 2019), ASIACRYPT (2018), EUROCRYPT (2018), IEEE CSF (2021), IEEE CNS (2019), IFIP DBSec (2018, 2019), WiSec (2020), WWW (2019)

TALKS

Privacy-Preserving and Functional Information Systems

- Seminar at Binghamton University Binghamton, NY, Mar 2020
- Seminar at Virginia Tech Remote, Mar 2020
- Seminar at University of Iowa Remote, Apr 2020

- 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
- S³ORAM: 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