

Dr. Guan-Hua (Scott) Tu

<https://www.cse.msu.edu/~ghtu>

Email: ghtu@msu.edu

Research Interests

Security, IoT, mobile systems, and wireless networking.

Education

- Ph.D. in Computer Science, University of California, Los Angeles 2015
- M.S. in Computer Science, University of California, Los Angeles 2013
- M.S.E in Computer Science and Engineering, National Taiwan University 2003
- B.S.E in Computer Science and Engineering, National Central University 2001

Employment

- Assistant Professor, Michigan State University, East Lansing *Fall 2016 - present*
- Postdoctoral Scholar, University of California, Los Angeles 2015 - 2016
- Graduate Research Assistant, University of California, Los Angeles 2011 - 2015
- Research Intern, IBM TJ Watson Research Center *Summer 2012, 2013, 2014*
- Senior Software Engineer/Project Manager, MediaTek Inc. 2003 - 2009
- Research Assistant, National Taiwan University 2001 - 2003

Grants

1. Guan-Hua Tu (Leading PI) and Jiliang Tang (Co-PI). **National Science Foundation (NSF)**, “SaTC: CORE: Small: Side-channel Attacks Against Mobile Users: Singularity Detection, Behavior Identification, and Automated Rectification,” 10/2018-10/2021, \$499,976.
2. Guan-Hua Tu (Leading PI) and Mi Zhang (Co-PI). **National Science Foundation (NSF)**, “NeTS: Small: Exploring the Design, Implementation, Operation Issues of Cellular IoT via Formal Analysis and Empirical Validation,” 10/2018-10/2021, \$499,980.

Honors and Awards

- Google Android Security Reward, 2019
- Facebook Security Award, 2017
- UCLA Dissertation Year Fellowship Award, 2015
- IBM PhD Fellowship Award, 2014
- UCLA Graduate Fellowship Award, 2012 and 2013

Media Report

- [8]: [MSU Today](#)’18, [Futurity](#)’18, [NBCNews](#)’19.
[17]: [TheVerge](#)’15, [RCSWirelessNews](#)’15, [Techxina](#)’15, [NewsUnited](#)’15.
[24]: [MIT Technology Review](#)’12, [Computer World](#)’12, [Fiscal Times](#)’12, [TheVerge](#)’12.

Publications

1. Xinyu Lei, [Guan-Hua Tu](#), Chi-Yu Li, Tian Xie, Mi Zhang, *SecWIR: Securing Smart Home IoT Communications via Wi-Fi Routers with Embedded Intelligence*, accepted to **ACM MOBISYS 2020 (acceptance rate:34/175=19.4%)**.
2. Tian Xie, [Guan-Hua Tu](#), Chi-Yu Li, Chunyi Peng, *How Can IoT Services Pose New Security Threats In Operational Cellular Networks?*, **IEEE Transactions on Mobile Computing**, to appear.
3. Yu-Han Lu, Chi-Yu Li, Yao-Yu Li, Sandy Hsin-Yu Hsiao, Tian Xie, [Guan-Hua Tu](#), Wei-Xun Chen, *Ghost Calls from Operational 4G Call Systems: IMS Vulnerability, Call DoS Attack, and Countermeasure*, accepted to **ACM MOBICOM 2020 (acceptance rate: 24/139 = 17.3%, Fall submission run)**.
4. Xinyu Lei, [Guan-Hua Tu](#), Chi-Yu Li, Tian Xie, Mi Zhang, *Fast and Secure kNN Query Processing in Cloud Computing*, accepted to **IEEE CNS 2020 (acceptance rate: 43/151 = 28.4%)**.
5. Xinyu Lei, Alex X. Liu, Rui Li, [Guan-Hua Tu](#) *SecEQP: A Secure and Efficient Scheme for SkNN Query Problem over Encrypted Geodata on Cloud*, **IEEE ICDE 2019**.
6. Tian Xie, Sihan Wang, [Guan-Hua Tu](#), Chi-Yu Li, Xinyu Lei *Exploring the Insecurity of Google Account Registration Protocol via Model Checking*, **IEEE SSCI 2019**.
7. Yuanjie Li, Chunyi Peng, Haotian Deng, Zengwen Yuan, [Guan-Hua Tu](#), Jiayao Li, Songwu Lu, *Device-Customized Multi-Carrier Network Access on Commodity Smartphones*, **IEEE/ACM Transactions on Networking**, Sep. 2018.
8. Tian Xie, [Guan-Hua Tu](#), Chi-Yu Li, Chunyi Peng, Jaiwei Li, Mi Zhang, *The Dark Side of Operational Wi-Fi Calling Services*, **IEEE CNS 2018** (acceptance rate:51/181=28.1%) - **Best Paper Award, Google Security Reward**.
9. Xinyu Lei, [Guan-Hua Tu](#), Alex Liu, Chi-Yu Li, Tian Xie, *The Insecurity of Home Digital Voice Assistants - Vulnerabilities, Attacks and Countermeasures*, **IEEE CNS 2018 (acceptance rate:51/181=28.1%)**.
10. Tian Xie, Chi-Yu Li, Jiliang Tang, [Guan-Hua Tu](#), *How Voice Service Threatens Cellular-connected IoT Devices in the Operational 4G LTE Networks*, **IEEE ICC 2018**.
11. Chi-Yu Li, Giovanni Salinas, Po-Hao Huang, [Guan-Hua Tu](#), Guo-Huang Hsu, Tien-Yuan Hsieh, *V2PSense: Enabling Cellular-based V2P Collision Warning Service Through Mobile Sensing.*, **IEEE ICC 2018**.
12. Chi-Yu Li, Hsueh-Yang Liu, Po-Hao Huang, Hsu-Tung Chien, [Guan-Hua Tu](#), Pei-Yuan Hong, Ying-Dar Lin, *Mobile Edge Computing Platform Deployment in 4G LTE Networks: A Middlebox Approach*, **USENIX HotEdge 2018**.
13. [Guan-Hua Tu](#), Chi-Yu Li, Chunyi Peng, Yuanjie Li, Songwu Lu, *New Security Threats Caused by IMS-based SMS Service in 4G LTE Networks.*, **ACM CCS'16 (acceptance rate: 137/837 = 16.4%)**, **Facebook Security Award**.
14. [Guan-Hua Tu](#), Yuanjie Li, Chunyi Peng, Chi-Yu Li, Songwu Lu, *Detecting Problematic Control-Plane Protocol Interactions in Mobile Networks.*, **IEEE/ACM Transactions of Networking**, 24(2): 1209-1222, April 2016.
15. [Guan-Hua Tu](#), Chi-Yu Li, Chunyi Peng, Zengwen Yuan, Yuanjie Li, Xiaohu Zhao, Songwu Lu, *VoLTE*: A Lightweight Voice Solution to 4G LTE Networks.*, **ACM HotMobile, 2016**.

16. Yuanjie Li, Haotian Deng, Chunyi Peng, Zengwen Yuan, [Guan-Hua Tu](#), Jiayao Li, Songwu Lu, *iCellular: Device-Customized Cellular Network Access on Commodity Smartphones.*, **USENIX NSDI, 2016 (acceptance rate: 45/225 = 20%)**.
17. Chi-Yu Li*, [Guan-Hua Tu](#)* (*Co-Primary), Chunyi Peng, Zengwen Yuan, Yuanjie Li, Songwu Lu, Xinbing Wang. *Insecurity of Voice Solution VoLTE in LTE Mobile Networks*, **ACM CCS 2015 (acceptance rate:128/646=19.8%)**.
18. [Guan-Hua Tu](#), Chi-Yu Li, Chunyi Peng, Songwu Lu. *How Voice Call Technology Poses Security Threats in 4G LTE Networks*, **IEEE CNS 2015 (acceptance rate:48/171=28%)**.
19. [Guan-Hua Tu](#), Yuanjie Li, Chunyi Peng, Chi-Yu Li, Hongyi Wang, Songwu Lu, *Control-Plane Protocol Interactions in Cellular Networks*, **ACM SIGCOMM 2014 (acceptance rate:45/237=19.0%)**.
20. Chunyi Peng, Chi-Yu Li, Hongyi Wang, [Guan-Hua Tu](#) , Songwu Lu, *Real Threats to Your Data Bills: Security Loopholes and Defense in Mobile Data Charging*, **ACM CCS 2014 (acceptance rate:114/585=19.5%)**.
21. [Guan-Hua Tu](#), Chunyi Peng, Hongyi Wang, Chi-Yu Li, Songwu Lu, *How Voice Calls Affect Data in Operational LTE Networks*, **ACM MOBICOM 2013 (acceptance rate:28/208=13.5%)**.
22. [Guan-Hua Tu](#), Chunyi Peng, Chi-Yu Li, Xingyu Ma , Hongyi Wang, Tao Wang, Songwu Lu, *Accounting for Roaming Users on Mobile Data Access: Issues and Root Causes*, **ACM MOBISYS 2013 (acceptance rate:33/211=15.6%)**.
23. Shiqiang Wang, [Guan-Hua Tu](#), Raghu Ganti, Ting He, Kin Leung, Howard Tripp, Katy Warr, Murtaza Zafer, *Mobile Micro-Cloud: Application Classification, Mapping, and Deployment*, AMITA 2013.
24. Chunyi Peng*,[Guan-Hua Tu](#)* (*Co-Primary) , Chi-Yu Li, Songwu Lu, *Can We Pay for What We Get in 3G Data Access?*, **ACM MOBICOM 2012 (acceptance rate: 32/212 = 15.1%)**.
25. Chunyi Peng, Chi-Yu Li, [Guan-Hua Tu](#), Songwu Lu, Lixia Zhang, *Mobile Data Charging: New Attacks and Countermeasures*, **ACM CCS 2012 (acceptance rate:80/423=18.9%)**.
26. Phone Lin, [Guan-Hua Tu](#), *An Improved GGSN Failure Restoration Mechanism for UMTS*, **ACM/Springer Wireless Networks**, 12(1):91-103, February 2006.
27. S.-M. Cheng, Phone Lin, [Guan-Hua Tu](#), L.-C. Fu, C.-F Liang, *An Intelligent GGSN Dispatching Mechanism for UMTS*, Elsevier **Computer Communications**, 28(8): 947-955, May 2005.

Book Chapter

28. [Guan-Hua Tu](#), *Short Message Service Programming for Wireless Internet* Chapters 3 and 4, Functionalities of Short Message Service Gateway, ISBN:957-8675-83-6, February 2002.

US Patents

29. Anku Jain, Amit Kumar, [Guan-Hua Tu](#), *Mobile communication apparatus having anti-theft and auto-notification functions*, US. Patent, Patent Number: [US 10,064,050](#), August 2018, **(Granted)**
30. Anku Jain, Amit Kumar, [Guan-Hua Tu](#), *Mobile communication apparatus having anti-theft and auto-notification functions*, US. Patent, Patent Number: [US 9,241,058](#), January 2016, **(Granted)**

31. Anku Jain, Amit Kumar, Guan-Hua Tu, *Mobile communication apparatus having anti-theft and auto-notification functions*, US. Patent, Patent Number: [US 9,160,830](#), October 2015, **(Granted)**
32. Guan-Hua Tu, *Mobile communication apparatus having anti-theft and auto-notification functions*, US. Patent, Patent Number: [US 7,574,235](#), August 2009, **(Granted)**
33. Guan-Hua Tu, *Method and system for serverless VOIP service in personal communication network*, US. Patent, Patent Number: [US 7,519,075](#), April, 2009, **(Granted)**
34. Guan-Hua Tu, J.-C Wang, *Method and mobile apparatus of receiving a multimedia message*, US Patent, Patent number: [US 7,835,758](#), November, 2010, **(Granted)**
35. Phone Lin, Y.-B. Lin, Guan-Hua Tu, and R.-G Cheng, *An Overflow Control Mechanism for Frame Synchronization of Base Station in Wireless Communication Systems*, US. Patent, Patent Number: [US 7,359,356](#), August 2008, **(Granted)**

Teaching Experience

- CSE 425, Introduction to Computer Security, Michigan State University, Spring 2018, Fall 2018, and Spring 2019.
- CSE 825, Computer and Network Security, Michigan State University, Fall 2017, Fall 2019.
- CSE 422, Computer Network, Michigan State University, Spring 2017
- CS 170A: Mathematical Modeling and Methods for Computer Science, University of California, Los Angeles, Spring 2013
- CS M151B, Computer System Architecture, University of California, Winter 2013
- CS 211: Network Protocol and Systems Software Design for Wireless and Mobile, University of California, Los Angeles, Fall 2012 and Fall 2013

Academic service Technical Program Committee

- IEEE BigData'19, IFIP Networking'19, IEEE ICDCS'19, IEEE VTC'19, IEEE BigData'18, IEEE CNS'18, IEEE DSC'18, IEEE VTC'18, IEEE DSC'17, ACM WearSys'17, IEEE VTC'17, ACM WiNTECH'17, IEEE ICC'17, and IEEE NetV'17.

Journal/Conference reviewers

- IEEE Transactions on Dependable and Secure Computing, ACM Transactions on Privacy and Security, IEEE Transactions on Dependable and Secure Computing, IEEE/ACM Transaction on Networking, IEEE Transactions on Mobile Computing, IEEE Transactions on Vehicular Technology, IEEE Wireless Network, ACM MOBICOM, and IEEE ICNP.