

## Dr. Guan-Hua (Scott) Tu

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### Research Interests

Mobile/wireless networks, system, security, and IoT.

### 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 2016 - present
- Postdoctoral Scholar, University of California, Los Angeles 2015
- Graduate Research Assistant, University of California, Los Angeles 2011 - 2015
- Research Intern, IBM TJ Watson Research Center Summer 2012, 2013, 2014
- Senior Software Engineer and Project Manager, MediaTek Inc. 2003 - 2009
- Research Assistant, National Taiwan University 2001 - 2003

### Publications

(full list:

[https://scholar.google.com/citations?hl=en&user=SqZm01IAAAJ&view\\_op=list\\_works&sortby=pubdate](https://scholar.google.com/citations?hl=en&user=SqZm01IAAAJ&view_op=list_works&sortby=pubdate))

1. **[TMC'22]**: Tian Xie, Sihan Wang, Xinyu Lei, **Guan-Hua Tu**, Chi-Yu Li, "MPKIX: Towards More Accountable and Secure Internet Application Services via Mobile Networked Systems."
2. **[MobiCom'21]**: Sihan Wang, **Guan-Hua Tu**, Xinyu Lei, Tian Xie, Chi-Yu Li, Po-Yi Chou, Fucheng Hsieh, Yiwen Hu, Li Xiao, Chunyi Peng, "Insecurity of Operational Cellular IoT Service: New Vulnerabilities, Attacks, and Countermeasures" (acceptance rate: 59/297 = 19.9%).
3. **[TMC'21]**: Tian Xie, **Guan-Hua Tu**, Bangjie Yin, Chi-Yu Li, Chunyi Peng, Mi Zhang, Hui Liu, and Xiaoming Liu, "The Untold Secrets of WiFi-Calling Services: Vulnerabilities, Attacks, and Countermeasures."
4. **[TMC'21]**: Tian Xie, **Guan-Hua Tu**, Chi-Yu Li, Chunyi Peng, "How Can IoT Services Pose New Security Threats In Operational Cellular Networks?"
5. **[CodaSpy'21]**: Xinyu Lei, **Guan-Hua Tu**, Tian Xie and Sihan Wang. "BFASTPay: a Routing-free Protocol for Fast Payment in Bitcoin Network."
6. **[CodaSpy'21]**: Yiwen Hu, Sihan Wang, **Guan-Hua Tu**, Li Xiao, Tian Xie, Xinyu Lei and Chi-Yu Li. "Security Threats from Bitcoin Wallet Smartphone Applications: Vulnerabilities, Attacks, and Countermeasures."
7. **[MobiSys'20]**: 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" (acceptance rate: 34/175=19.4%).
8. **[MobiCom'20]**: 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" (acceptance rate: 24/139 = 17.3%, summer run).
9. **[CNS'20]**: Xinyu Lei, Guan-Hua Tu, Alex X. Liu, Xie Tian, "Fast and Secure kNN Query Processing in Cloud Computing" (acceptance rate: 43/151 = 28.4%).
10. **[ICDCS'20]**: Xinyu Lei, Tian Xie, **Guan-Hua Tu**, Alex X. Liu, "An Inter-blockchain Escrow Approach for Fast Bitcoin Payment (Extended Abstract)."

11. **[ICDE'19]:** 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" (acceptance rate: 126/470 = 26.8%).
12. **[SSCI'19]:** Tian Xie, Sihan Wang, **Guan-Hua Tu**, Chi-Yu Li, Xinyu Lei "Exploring the Insecurity of Google Account Registration Protocol via Model Checking."
13. **[ToN'18]:** Yuanjie Li, Chunyi Peng, Haotian Deng, Zengwen Yuan, **Guan-Hua Tu**, Jiayao Li, Songwu Lu, "Device-Customized Multi-Carrier Network Access on Commodity Smartphones."
14. **[CNS'18]:** Tian Xie, **Guan-Hua Tu**, Chi-Yu Li, Chunyi Peng, Jaiwei Li, Mi Zhang, "The Dark Side of Operational Wi-Fi Calling Services" (acceptance rate: 51/181 = 28.1%), **Best Paper Award**, **Google Security Reward**.
15. **[CNS'18]:** Xinyu Lei, **Guan-Hua Tu**, Alex Liu, Chi-Yu Li, Tian Xie, "The Insecurity of Home Digital Voice Assistants - Vulnerabilities, Attacks and Countermeasures" (acceptance rate: 51/181 = 28.1%), **wikipedia reported**, [link](#).
16. **[ICC'18]:** Tian Xie, Chi-Yu Li, Jiliang Tang, **Guan-Hua Tu**, "How Voice Service Threatens Cellular-connected IoT Devices in the Operational 4G LTE Networks."
17. **[ICC'18]:** 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."
18. **[HotEdge'18]:** 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."
19. **[ToN'16]:** **Guan-Hua Tu**, Yuanjie Li, Chunyi Peng, Chi-Yu Li, Songwu Lu, "Detecting Problematic Control-Plane Protocol Interactions in Mobile Networks."
20. **[CCS'16]:** **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" (acceptance rate: 137/837 = 16.4%), **Facebook Security Award**.
21. **[NSDI'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.", (acceptance rate: 45/225 = 20%).
22. **[HotMobile'16]:** **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."
23. **[CCS'15]:** 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.", (acceptance rate: 128/646=19.8%).
24. **[CNS'15]:** **Guan-Hua Tu**, Chi-Yu Li, Chunyi Peng, Songwu Lu. "How Voice Call Technology Poses Security Threats in 4G LTE Networks", (acceptance rate: 48/171 = 28%).
25. **[SIGCOMM'14]:** **Guan-Hua Tu**, Yuanjie Li, Chunyi Peng, Chi-Yu Li, Hongyi Wang, Songwu Lu, "Control-Plane Protocol Interactions in Cellular Networks", (acceptance rate: 45/237=19.0%).
26. **[CCS'14]:** 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", (acceptance rate: 114/585=19.5%).
27. **[MobiCom'13]:** **Guan-Hua Tu**, Chunyi Peng, Hongyi Wang, Chi-Yu Li, Songwu Lu, "How Voice Calls Affect Data in Operational LTE Networks", (acceptance rate: 28/208=13.5%).

28. **[MobiSys'13]: 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", (acceptance rate: 33/211=15.6%).
29. **[MobiCom'12]: Chunyi Peng\***, **Guan-Hua Tu\*** (\*Co-Primary), Chi-Yu Li, Songwu Lu, "Can We Pay for What We Get in 3G Data Access?", (acceptance rate: 32/212 = 15.1%).
30. **[CCS'12]: Chunyi Peng**, Chi-Yu Li, **Guan-Hua Tu**, Songwu Lu, Lixia Zhang, "Mobile Data Charging: New Attacks and Countermeasures", (acceptance rate: 80/423=18.9%).

## US Patents

1. 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).
2. 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).
3. 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).
4. **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).
5. **Kuan-Hua Tu**, J.-C Wang, Messaging service interoperability methods and related devices, US Patent, Patent number: [US 7,685,291](#), May, 2010, (Granted).
6. **Guan-Hua Tu**, Mobile communication apparatus having anti-theft and auto-notification functions, US. Patent, Patent Number: [US 7,574,235](#), August 2009, (Granted).
7. **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).
8. 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).

## 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," 10/2018-10/2022, \$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," 10/2018-10/2022, \$499,980.

## Honors and Awards

- Google Android Security Reward, 2019
- Facebook Security Award, 2018
- UCLA Dissertation Year Fellowship Award, 2015
- IBM PhD Fellowship Award, 2014
- UCLA Graduate Fellowship Award, 2012 and 2013

**Teaching Experience**

- CSE 422 (Computer Network), Michigan State University, Spring 2017.
- CSE 425 (Introduction to Computer Security), Michigan State University, Spring 2018-2022, and Fall 2018.
- CSE 824 (Advanced Computer Network and Communications), Michigan State University, Fall 2020 and Fall 2021.
- CSE 825 (Computer and Network Security), Michigan State University, Fall 2017 and Fall 2019.

**Academic service Technical Program Committee**

- ACM MOBICOM'22, ACM MOBICOM'21, 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.