

Ting Wang

A. Biographical Information

Contact Information

Business Address 19 Memorial DR W, Bethlehem PA, 18015
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Educational Background

2006 ~ 2011	Ph.D., Computer Science Dissertation: <i>Data Analytics for Networked and Possibly Private Sources</i>	Georgia Institute of Technology
2004 ~ 2006	M.Sc., Computer Science Thesis: <i>SeMap - A Generic Mapping Construction System</i>	The University of British Columbia
2000 ~ 2004	B.E., Computer Science and Technology	Zhejiang University

Professional Positions

2015 ~ Present	Lehigh University <i>Assistant Professor</i>	Bethlehem, PA
2011 ~ 2015	IBM Thomas J. Watson Research Center <i>Research Staff Member and Security Analytics Lead</i>	Yorktown Heights, NY
2007 ~ 2010	IBM Thomas J. Watson Research Center <i>Summer Research Intern</i>	Hawthorne, NY
2006 ~ 2011	Georgia Institute of Technology <i>Research Assistant</i>	Atlanta, GA
2005 ~ 2006	The University of British Columbia <i>Research Assistant</i>	Vancouver, Canada

B. Publications and Creative Activities

Publications (†: students mentored or supervised)

Books

[B1] Multisource Data Analytics
Ting Wang
LAP Lambert Academic Publishing, 2015

Book Chapters

[B2] Output Privacy in Stream Mining
Ting Wang and Ling Liu
Editors: Francesco Bonchi and Elena Ferrari
Privacy-Aware Knowledge Discovery: Novel Applications and New Techniques, Chapman & Hall/CRC Press, 2010

[B3] From Data Privacy to Location Privacy
Ting Wang and Ling Liu
Editors: Jeffrey Tsai and Philip Yu
Machine Learning in Cyber Trust: Reliability, Security, and Privacy, Springer-Verlag, 2009

Refereed Journal Publications

[J1] Indexing Earth Mover's Distance over Network Metrics
Ting Wang, Shicong Meng and Jiang Bian
IEEE Transactions on Knowledge and Data Engineering (TKDE), 27(1):1588-1601, 2015

- [J2] Why Amazon's Ratings Might Mislead You: The Story of Herding Effects
Ting Wang and Dashun Wang
Big Data Journal (Big Data), 2(4):196-204, 2014
- [J3] MUSE: Asset Risk Scoring in Enterprise Network with Mutually Reinforced Reputation Propagation
Xin Hu, Ting Wang, Marc Stoecklin, Douglas Schales, Jiyong Jang and Reiner Sailer
EURASIP Journal on Information Security (EURASIP), 2014:17, 2014
- [J4] State Monitoring in Cloud Datacenters
Shicong Meng, Ling Liu and Ting Wang
IEEE Transactions on Knowledge and Data Engineering (TKDE), 23(9):1328-1344, 2011
- [J5] Output Privacy in Data Mining
Ting Wang and Ling Liu
ACM Transactions on Database Systems (TODS), 36(1):1-34, 2011
- [J6] Execution Assurance for Massive Computing Tasks
Ting Wang and Ling Liu
IEICE Transactions on Information and Systems (IEICE), E93-D(6):1343-1351, 2010
- [J7] Privacy-Aware Mobile Services over Road Networks
Ting Wang and Ling Liu
Proceedings of the VLDB Endowment (PVLDB), 2(1):1042-1053, 2009

Refereed Conference Publications

- [C1] Inspiration or Preparation? Explaining Creativity in Scientific Enterprise
Xinyang Zhang[†], Dashun Wang and Ting Wang
The 25th ACM International Conference on Information and Knowledge Management (CIKM), 2016
- [C2] BotMeter: Charting DGA-Bot Landscapes in Large Networks
Ting Wang, Xin Hu, Jiyong Jang, Shouling Ji, Marc Stoecklin and Teryl Taylor
The 36th IEEE International Conference on Distributed Computing Systems (ICDCS), 2016
- [C3] Baywatch: Robust Beaconing Detection to Identify Infected Hosts in Large-Scale Enterprise Networks
Xin Hu, Jiyong Jang, Marc Stoecklin, Ting Wang, Douglas Schales, Dhilung Kirat and Josyula Rao
The 46th Annual IEEE/IFIP International Conference on Dependable Systems and Networks (DSN), 2016
- [C4] Detecting Malicious Exploit Kits using Tree-based Similarity Searches
Teryl Taylor[†], Xin Hu, Ting Wang, Jiyong Jang, Marc Stoecklin, Fabian Monroe and Reiner Sailer
The 6th ACM Conference on Data and Application Security and Privacy (CODASPY), 2016
- [C5] Characterizing and Detecting Malicious Web Infrastructures through Server Visibility Analysis
Jialong Zhang[†], Xin Hu, Jiyong Jang, Ting Wang, Guofei Gu and Marc Stoecklin
IEEE International Conference on Computer Communications (INFOCOM), 2016
- [C6] PARS: A Uniform and Open-source Password Analysis and Research System
Shouling Ji[†], Shukun Yang, Ting Wang, Changchang Liu, Wei-han Lee and Raheem Beyah
The 31st Annual Computer Science Applications Conference (ACSAC), 2015
- [C7] Rateless and Pollution-Attack-Resilient Network Coding
Wentao Huang[†], Ting Wang, Xin Hu, Jiyong Jang and Theodoros Salonidis
The 2015 IEEE International Symposium on Information Theory (ISIT), 2015
- [C8] Highly Scalable Distributed Feature Collection and Correlation Engine for Low Latency Big Data Analytics
Douglas Schales, Xin Hu, Jiyong Jang, Reiner Sailer, Marc Stoecklin and Ting Wang
The 31st IEEE International Conference on Data Engineering (ICDE), 2015
- [C9] Quantifying Herding Effects in Crowd Wisdom
Ting Wang, Dashun Wang and Fei Wang
The 20th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), 2014

- [C10] Kaleido: Network Traffic Attribution using Multifaceted Footprinting
Ting Wang, Fei Wang, Douglas Schales and Reiner Sailer
The 2014 SIAM International Conference on Data Mining (SDM), 2014
- [C11] Rebuilding the Tower of Babel: Towards Cross-System Malware Information Sharing
Ting Wang, Shicong Meng, Wei Gao and Xin Hu
The 23rd ACM International Conference on Information and Knowledge Management (CIKM), 2014
- [C12] Lightweight Authentication of Freshness in Outsourced Key-Value Store
Yuzhe Tang[†], Ting Wang, Ling Liu, Xin Hu and Jiyong Jang
The 30th Annual Computer Security Applications Conference (ACSAC), 2014
- [C13] On Exploiting Dynamic Execution Patterns for Workload Offloading in Mobile Cloud Applications
Wei Gao, Yong Li, Haoyang Lu, Ting Wang and Cong Liu
The 22nd IEEE International Conference on Network Protocol (ICNP), 2014
- [C14] System Demonstration: Outsourcing Key-Value Stores with Verifiable Data Freshness
Yuzhe Tang[†], Ting Wang, Xin Hu, Reiner Sailer, Peter Pietzuch and Ling Liu
The 30th IEEE International Conference on Data Engineering (ICDE), 2014
- [C15] Reconciling Malware Labeling Discrepancy using Consensus Learning
Ting Wang, Xin Hu, Shicong Meng and Reiner Sailer
The 30th IEEE International Conference on Data Engineering Workshops (ICDEW), 2014
- [C16] Stream Computing for Large-Scale, Multi-Channel Cyber Threat Analytics
Douglas Schales, Mihai Christodorescu, Xin Hu, Jiyong Jang, Josyula Rao, Reiner Sailer, Marc Stoecklin, Wietse Venema and Ting Wang
The 15th IEEE International Conference on Information Reuse and Integration (IRI), 2014
- [C17] Asset Risk Scoring in Enterprise Network with Mutually Reinforced Reputation Propagation
Xin Hu, Ting Wang, Marc Stoecklin, Douglas Schales, Jiyong Jang and Reiner Sailer
2014 IEEE Security and Privacy Workshops (IEEE S&PW), 2014
- [C18] Extended Abstract: CloudLEGO - Scalable Cross-VM-Type Application Performance Prediction
Shicong Meng, Arun Iyengar, Ling Liu, Ting Wang, Jian Tan, Ignacio Silva-Lepe and Isabelle Rouvellou
The 4th ACM Symposium on Cloud Computing (SoCC), 2013
- [C19] Fine-grained Access Control of Personal Data
Ting Wang, Mudhakar Srivatsa and Ling Liu
The 17th ACM Symposium on Access Control Models and Technologies (SACMAT), 2012
- [C20] Microscopic Social Influence
Ting Wang, Mudhakar Srivatsa, Dakshi Agrawal and Ling Liu
The 2012 SIAM International Conference on Data Mining (SDM), 2012
- [C21] Privacy Preserving Indexing for eHealth Information Networks
Yuzhe Tang, Ting Wang, Ling Liu, Shicong Meng and Balaji Palanisamy
The 20th ACM International Conference on Information and Knowledge Management (CIKM), 2011
- [C22] Modeling Data Flow in Socio-information Networks: A Risk Estimation Approach
Ting Wang, Mudhakar Srivatsa, Dakshi Agrawal and Ling Liu
The 16th ACM Symposium on Access Control Models and Technologies (SACMAT), 2011
- [C23] XColor: Protecting General Proximity Privacy
Ting Wang and Ling Liu
The 26th IEEE International Conference on Data Engineering (ICDE), 2010
- [C24] Monitoring Continuous State Violation in Datacenters: Exploring the Time Dimension
Shicong Meng, Ting Wang and Ling Liu
The 26th IEEE International Conference on Data Engineering (ICDE), 2010
- [C25] Spatio-temporal Patterns in Network Events
Ting Wang, Mudhakar Srivatsa, Dakshi Agrawal and Ling Liu
The 6th International Conference on Emerging Networking Experiments and Technologies (CoNEXT), 2010

- [C26] A General Proximity Privacy Principle
Ting Wang, Shicong Meng, Bhuvan Bamba, Ling Liu and Calton Pu
The 25th IEEE International Conference on Data Engineering (ICDE), 2009
- [C27] Learning, Indexing, and Diagnosing Network Faults
Ting Wang, Mudhakar Srivatsa, Dakshi Agrawal and Ling Liu
The 15th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD), 2009
- [C28] Butterfly: Protecting Output Privacy in Stream Mining
Ting Wang and Ling Liu
The 24th IEEE International Conference on Data Engineering (ICDE), 2008
- [C29] Supporting Anonymous Location Queries in Mobile Environments with Privacygrid
Bhuvan Bamba, Ling Liu, Peter Pesti and Ting Wang
The 17th International Conference on World Wide Web (WWW), 2008
- [C30] A Temporal Data-Mining Approach for Discovering End-to-End Transaction Flows
Ting Wang, Chang-shing Perng, Tao Tao, Chungqiang Tang, Edward So, Chun Zhang, Rong Chang and Ling Liu
The 2008 IEEE International Conference on Web Services (ICWS), 2008
- [C31] SeMap: A Generic Mapping Construction System
Ting Wang and Rachel Pottinger
The 11th International Conference on Extending Database Technology: Advances in Database Technology (EDBT), 2008
- [C32] Efficient and Density-Aware Routing for Wireless Sensor Networks
Ting Wang, Shuang Hao, Ping Wang and Gang Peng
The 15th International Conference on Computer Communications and Networks (ICCCN), 2006
- [C33] TWStream: Finding Correlated Data Streams under Time Warping
Ting Wang
The 8th Asia-Pacific Web Conference on Frontiers of WWW Research and Development (APWeb), 2006

Working Papers

- [W1] EagleEye: Attack-Agnostic Defense against Adversarial Inputs (under review)
Ting Wang
- [W2] MDL[∞]: Accurate and Private Multiparty Deep Learning (under review)
Xinyang Zhang[†], Shouling Ji, Wendy Hui Wang and Ting Wang
- [W3] Pairwise Ranking Aggregation by Non-interactive Crowdsourcing with Budget Constraints (under review)
Changjiang Cai, Haipei Sun, Boxiang Dong, Bo Zhang, Ting Wang and Wendy Hui Wang
- [W4] FDI: Quantifying Feature-Based Data Inferability (under review)
Shouling Ji, Ting Wang, Xin Hu, Yushan Liu, Jiyong Jang, Marc Stoecklin, and Raheem Beyah
- [W5] BotMeter: A Nimble Navigator for DGA-Bot Landscape of Large Networks (under review)
Ting Wang and Pan Zhou
- [W6] Differentially Private Distributed Online Learning (under review)
Chencheng Li, Pan Zhou, Li Xiong, Qian Wang and Ting Wang
- [W7] Context-Aware Online Learning for Course Recommendation of MOOC Big Data (under review)
Pan Zhou, Yifan Hou, Ting Wang, Li Yu, Yuchong Hu and Dapeng Wu
- [W8] Graph Anonymity, Utility, and Deanonymity: Quantification, Practice, and Implication (under review)
Shouling Ji, Weiqing Li, Ting Wang and Raheem Beyah
- [W9] Primitive Learning Module Attack: Reality Today, Challenge Tomorrow (in preparation)
Ting Wang
- [W10] PADLOCK: Privacy-Aware Deep Learning of Contextual Knowledge (in preparation)
Xinyang Zhang[†] and Ting Wang
- [W11] Differentially Private Release via Generative Adversarial Networks (in preparation)
Xinyang Zhang[†] and Ting Wang

Creative Activities

Patents

- ◇ United States Patent #9,516,051: Detecting web exploit kits by tree-based structural similarity search
- ◇ United States Patent #9,489,426: Distributed feature collection and correlation engine
- ◇ United States Patent #9,003,025: User identification using multifaceted footprints
- ◇ United States Patent #8,863,293: Predicting attacks based on probabilistic game-theory

C. Awards and Honors

2013, 2014	IBM Innovation Award	IBM Corporation
2013	IBM PISCES Award for Outstanding Research	IBM Corporation
2010	Best Research Paper Award Finalist	ACM CoNEXT '10
2005	Academic Excellence Scholarship	The University of British Columbia
2004	Best Senior Thesis Award	Zhejiang University
2000	Gold Medal of National Mathematics Olympiad	Chinese Mathematical Society
2000	Gold Medal of National Physics Olympiad	Chinese Physical Society

D. Funding and Grants

Research Grants Awarded

- ◇ CRII: SaTC: Re-Envisioning Contextual Services and Mobile Privacy in the Era of Deep Learning
National Science Foundation, \$168,683, 2016~2018, Sole PI: Ting Wang

Other Grants and Gifts

- ◇ Nvidia GPU Grant, Nvidia Inc., equipment gift, Ting Wang
- ◇ AWS Research Grant, Amazon Inc., AWS cloud credits, Ting Wang

E. Editorial Board Services

- ◇ Associate Editor, The International Journal of Advanced Research in Big Data Management System (2016 ~ Present)

F. Recent Scholarly Presentations

Invited Talks

- ◇ "Security of Deep Learning Systems", Zhejiang University, 2016/12
- ◇ "Explaining Creativity in Scientific Enterprise", Computing Community Consortium Symposium, 2016/05

Conference Talks

- ◇ "BotMeter: Charting DGA-Bot Landscapes in Large Networks"
IEEE International Conference on Distributed Computing Systems, 2016/06
- ◇ "Inspiration or Preparation? Explaining Creativity in Scientific Enterprise"
ACM International Conference on Information and Knowledge Management, 2016/10
- ◇ "Quantifying Herding Effects in Crowd Wisdom"
ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 2014/08
- ◇ "Rebuilding the Tower of Babel: Towards Cross-System Malware Information Sharing"
ACM International Conference on Information and Knowledge Management, 2014/11

G: Teaching and Research Advising

Courses Taught

2017 Spring	CSE 261: <i>Discrete Structures</i> (71 enrolled)	Lehigh University
2016 Fall	CSE 347 / 447: <i>Data Mining</i> (61 enrolled)	Lehigh University
2016 Spring	CSE 350 / 450: <i>Privacy-Preserving Data Analytics</i> (13 enrolled)	Lehigh University
2015 Fall	CSE 347 / 447: <i>Data Mining</i> (50 enrolled)	Lehigh University

Advising

Undergraduate

2016 Fall	Ben Glickenhaus, Role: Independent Study Advisor	Lehigh University
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Master's

2017 Spring	Yuhan Qin, Role: Independent Study Advisor	Lehigh University
2017 Spring	Nan Lin, Role: Independent Study Advisor	Lehigh University
2016 Spring	Zihan Tang, Role: Independent Study Advisor	Lehigh University
2015 Fall	Pavithra Balaji, Role: Independent Study Advisor	Lehigh University

Doctoral

2016 ~ Present	Yujie Ji, Role: Thesis Advisor	Lehigh University
2015 ~ Present	Xinyang Zhang, Role: Thesis Advisor	Lehigh University
2016 ~ Present	Ovidiu Dan, Role: Thesis Committee Member	Lehigh University
2016 ~ Present	Tao Xu, Role: Thesis Committee Member	Lehigh University
2016 ~ Present	Qinhan Xue, Role: Thesis Committee Member	Lehigh University
2016 ~ Present	Sicong Kuang, Role: Thesis Committee Member	Lehigh University
2016 ~ Present	Ziyi Guo, Role: Thesis Committee Member	Lehigh University
2014 ~ 2016	Teryl Tylor, Role: Thesis Committee Member	The University of North Carolina at Chapel Hill

H. Services

University Services

- ◇ 2016 ~ Present, Research Computing Steering Committee, Role: Committee Member
- ◇ 2016 ~ Present, CSE Department Data Science Curriculum Committee, Role: Committee Member
- ◇ 2016 ~ 2016, mobiLehigh Game Dev Contest, Role: Faculty Judge
- ◇ 2015 ~ Present, CSE Department Graduate Student Admission Committee, Role: Committee Member
- ◇ 2015 ~ 2016, Data-X Initiative Faculty Search Committee, Role: Committee Member

Professional Services

Grant Review Panelist

- ◇ 2017 NSF CISE Research Infrastructure (CRI)
- ◇ 2014 NSF Secure and Trustworthy Cyberspace (SaTC)
- ◇ 2012 NSF Critical Techniques & Technologies for Advancing Big Data Science & Engineering (BIGDATA)

Program Committee Chair

- ◇ CIKM 2014 Workshop on Interactive Mining for Big Data

Program Committee Member

- ◇ ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) (2016, 2017)
- ◇ IEEE International Conference on Distributed Computing Systems (ICDCS) (2012, 2017)

- ◇ ACM International Conference on Web Search and Data Mining (WSDM) (2016, 2017)
- ◇ IEEE / ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM) (2016, 2017)
- ◇ SIAM International Conference on Data Mining (SDM) (2015 ~ 2017)
- ◇ International Symposium on Spatial and Temporal Databases (SSTD) (2015, 2017)
- ◇ International Joint Conference on Artificial Intelligence (IJCAI) (2015, 2016)
- ◇ IEEE International Conference on Big Data (BigData) (2016)
- ◇ IEEE International Conference on Collaborative Computing (CollaborateCom) (2011 ~ 2015)
- ◇ ASE International Conference on Big Data Science and Computing (2014)

Journal Reviewer

- ◇ ACM Transactions on Database Systems
- ◇ ACM Transactions on the Web
- ◇ IEEE Transactions on Big Data
- ◇ IEEE Transactions on Network and Service Management
- ◇ IEEE Transactions on Knowledge and Data Engineering
- ◇ Data Mining and Knowledge Discovery
- ◇ IEEE / ACM Transactions on Networking
- ◇ The International Journal on Very Large Data Bases
- ◇ IEEE Transactions on Parallel and Distributed Systems
- ◇ ACM Computing Reviews
- ◇ IEEE Internet Computing
- ◇ International Journal of Cooperative Information Systems