

Prof. TING HE

RESEARCH INTEREST

Developing novel solutions in the space of network analytics, monitoring, scheduling, performance analysis, and optimization using techniques from statistical inference, online learning, stochastic optimization, information theory, and graph theory

EDUCATION

- 2003-2007 MS/Ph.D. in Electrical & Computer Engineering, Cornell University
Thesis Title: *Nonparametric and Partially Nonparametric Statistical Inference in Wireless Sensor Networks*
Thesis Advisor: Prof. Lang Tong
GPA: 4.16 / 4.3
- 1999-2003 B.S. in Computer Science, Peking University, Beijing, China
Thesis Title: *Analysis of the multi-target mechanism in GNU debugger (GDB)*
Thesis Advisor: Prof. Xu Cheng
GPA of major courses: 3.90 / 4.0

EMPLOYMENT HISTORY

- 2016-present **Associated Professor**, Computer Science and Engineering, Pennsylvania State University
Network science, network security, statistical inference, performance analysis and optimization
- 2007-2016 **Research Staff Member**, IBM
Fundamental and application-oriented research on wireless networking, network modeling, network analytics, and network security
- 2003-2007 **Graduate Research Assistant**, Cornell University
Thesis research on statistical inference in wireless sensor networks and information theory

SCHOLASTIC AWARDS AND ACHIEVEMENTS

- 2020 Distinguished TPC Member Award at *IEEE INFOCOM*
- 2018 Distinguished TPC Member Award at *IEEE INFOCOM*
- 2017 N2Women: Rising Stars in Networking and Communications
- 2016 IBM Research Division Award for Scientific Advances in Quality of Information
- 2016 Distinguished TPC Member Award at *IEEE INFOCOM*
- 2015 Most Collaboratively Complete Publications Award by *International Technology Alliance (ITA) in Network and Information Sciences*
- 2015 Kenneth C. Sevcik Outstanding Student Paper Award at *ACM SIGMETRICS*
- 2013 IBM Research Outstanding Contributor Award
- 2013 Best Paper Award at *IEEE ICDCS*
- 2013 Best Paper Nominee at *ACM IMC*
- 2013 Best Student Paper at *International Technology Alliance (ITA) Annual Fall Meeting*
- 2009 IBM Research Outstanding Contributor Award
- 2005 Best Student Paper Award at *IEEE ICASSP*
- 2003 Excellent Student Award of Beijing, China
- 2003 Outstanding Graduate of Beijing, China
- 2000-2002 Winner of Excellent Student Award of Peking University for 3 years

2000-2002 Recipient of Canon, Sony, Yang-Wang Academician Scholarships

RESEARCH PROJECTS

Network Tomography in Multi-domain Networks

Developed theory and algorithms for unique identification of link/node states from states of end-to-end paths measured between monitors, including: (i) verifiable conditions and efficient network planning (monitor placement, path construction) algorithms to guarantee identifiability of additive link metrics, (ii) novel measure and efficient algorithms to quantify network capability in localizing failures from Boolean path states, (iii) efficient algorithms to design probe allocation for inferring link parameters from stochastic path performance metrics.

Joint Routing and Resource Allocation in Edge Clouds

Developed theory and algorithms for: (i) optimal service placement, service migration, and request routing for services at the network edge, (ii) optimal content placement and load balancing for caches at the network edge.

Online Learning in Large Dynamic Networks

Developed theory and algorithms for: (i) end-host-based learning of shortest path using coupled or decoupled probing, (ii) tracking Markovian time-varying link states using adaptive sampling.

Workload Scheduling in Opportunistic Clouds

Developed algorithms and performance analysis for scheduling parallel tasks with synchronization constraints onto servers with stochastic availability.

Controlled Mobility in Delay-Tolerant Networks

Developed algorithms and performance analysis for dynamically controlling mobile relays (aka data ferries) to provide delay-tolerant communications between partitioned mobile nodes based on partial observations.

Semi-non-parametric Stepping-Stone Detection

Developed detector and performance analysis for detecting encrypted stepping-stone attacks from timestamps of incoming/outgoing packet flows in the presence timing perturbation and chaff packets.

Non-parametric Change Detection

Developed detector and performance analysis for detecting and localizing changes in the unknown distribution of sensor alarms in 2D space.

JOURNAL PUBLICATIONS

1. M. Yu, T. Xie, **T. He**, P. McDaniel, and Q. K. Burke, "Flow Table Security in SDN: Adversarial Reconnaissance and Intelligent Attacks," submitted to *IEEE/ACM Transactions on Networking*, Feb. 2020
2. C-C. Chiu and **T. He**, "Stealthy DGoS Attack: DeGrading of Service under the Watch of Network Tomography," submitted to *IEEE/ACM Transactions on Networking*, Jan. 2020
3. V. Farhadi, F. Mehmeti, **T. He**, T. La Porta, H. Khamfroush, S. Wang, K. S. Chan, and K. Poularakis, "Service Placement and Request Scheduling for Data-intensive Applications in Edge Clouds," submitted to *IEEE/ACM Transactions on Networking*, Dec. 2019
4. A. Munir, **T. He**, R. Raghavendra, F. Le, and A. X. Liu, "Network Scheduling and Compute Resource Aware Task Placement in Datacenters," accepted to *IEEE/ACM Transactions on Networking*, Jul. 2020
5. Y. Lin, **T. He**, S. Wang, K. Chan, and S. Pasteris, "Looking Glass of NFV: Inferring the Structure and State of NFV Network from External Observations," *IEEE/ACM Transactions on Networking*, vol. 28, no. 4, pp. 1477-1490, Aug. 2020

6. H. Lu, M-J. Li, **T. He**, S. Wang, V. Narayanan, and K. S. Chan, "Robust Coreset Construction for Distributed Machine Learning," accepted to *IEEE Journal on Selected Areas in Communications – Special Issue on Advances in Artificial Intelligence and Machine Learning for Networking*, Oct. 2019
7. N. Bartolini, **T. He**, V. Arrigoni, A. Massini, F. Trombetti, and H. Khamfroush, "On Fundamental Bounds on Failure Identifiability by Boolean Network Tomography," *IEEE/ACM Transactions on Networking*, vol. 28, no. 2, pp. 588-601, Apr. 2020
8. S. Wang, R. Uргаonkar, M. Zafer, **T. He**, K. Chan, and K. Leung, "Dynamic Service Migration in Mobile Edge Computing based on Markov Decision Process," *IEEE/ACM Transactions on Networking*, vol. 27, no. 3, pp. 1272-1288, Jun. 2019
9. D. Z. Tootaghaj, N. Bartolini, H. Khamfroush, **T. He**, N. R. Chaudhuri, and T. La Porta, "Mitigation and Recovery from Cascading Failures in Interdependent Networks under Uncertainty," *IEEE Transactions on Control of Network Systems*, vol. 6, no. 2, pp. 501-514, Jun. 2019
10. S. Wang, T. Tuor, T. Salonidis, K.K. Leung, C. Makaya, **T. He**, and K. Chan, "Adaptive Federated Learning in Resource Constrained Edge Computing Systems," *IEEE Journal on Selected Areas in Communications, Special Issue on Artificial Intelligence and Machine Learning for Networking and Communications*, vol. 37, no. 6, pp. 1205-1221, Jun. 2019
11. S. Achleitner, N. Bartolini, **T. He**, T. La Porta, and D. Z. Tootaghaj, "Fast Network Configuration in Software Defined Networking," *IEEE Transactions on Network and Service Management*, vol. 15, no. 4, pp. 1249-1263, Dec. 2018
12. S. Shukla, O. Bhardwaj, A. Abouzeid, T. Salonidis, and **T. He**, "Proactive Retention-Aware Caching with Multi-path Routing for Wireless Edge Networks," *IEEE Journal on Selected Areas in Communications, Special Issue on Caching for Communication Systems and Networks*, vol. 36, no. 6, pp. 1286-1299, Jun. 2018
13. **T. He**, E. N. Ciftcioglu, S. Wang, and K. S. Chan, "Location Privacy in Mobile Edge Clouds: A Chaff-based Approach," *IEEE Journal on Selected Areas in Communications, Special Issue on Emerging Technologies in Software-driven Communication*, vol. 35, no. 11, pp. 2625-2636, Nov. 2017
14. **T. He**, A. Gkelias, L. Ma, K. K. Leung, A. Swami, and D. Towsley, "Robust and Efficient Monitor Placement for Network Tomography in Dynamic Networks," *IEEE/ACM Transactions on Networking*, vol. 25, no. 3, pp. 1732-1745, Jun. 2017
15. M. Dehghan, B. Jiang, A. Seetharam, **T. He**, T. Salonidis, J. Kurose, D. Towsley, and R. Sitaraman, "On the Complexity of Optimal Request Routing and Content Caching in Heterogeneous Cache Networks," *IEEE/ACM Transactions on Networking*, vol. 25, no. 3, pp. 1635-1648, Jun. 2017
16. S. Wang, R. Uргаonkar, **T. He**, K. Chan, M. Zafer, and K. K. Leung, "Dynamic Service Placement for Mobile Micro-Clouds with Predicted Future Costs," *IEEE Transactions on Parallel and Distributed Systems*, vol. 28, no. 4, pp. 1002-1016, Apr. 2017
17. L. Ma, **T. He**, A. Swami, D. Towsley, and K. K. Leung, "Network Capability in Localizing Node Failures via End-to-End Path Measurements," *IEEE/ACM Transactions on Networking*, vol. 25, no. 1, pp. 434-450, Feb. 2017
18. L. Ma, **T. He**, A. swami, D. Towsley, and K.K. Leung, "On Optimal Monitor Placement for Localizing Node Failures via Network Tomography," *Elsevier Performance Evaluation, Special Issue: Performance 2015*, vol. 91, pp. 16-37, Sep. 2015
19. R. Uргаonkar, S. Wang, **T. He**, M. Zafer, K. Chan, and K.K. Leung, "Dynamic Service Migration and Workload Scheduling in Edge-Clouds," *Elsevier Performance Evaluation, Special Issue: Performance 2015*, vol. 91, pp. 205-228, Sep. 2015

20. L. Ma, **T. He**, K. Leung, A. Swami, and D. Towsley, "Inferring Link Metrics from End-to-End Path Measurements: Identifiability and Monitor Placement," *IEEE/ACM Transactions on Networking*, vol. 22, no. 4, pp. 1351-1368, Jun. 2014
21. A. Anandkumar, **T. He**, C. Bisdikian, and D. Agrawal, "Seeing through Black Boxes: Tracking Transactions through Queues under Monitoring Resource Constraints," *Elsevier Performance Evaluation*, vol. 70, no. 12, pp. 1090-1110, Dec. 2013
22. W. Wei, **T. He**, C. Bisdikian, D. Goeckel, B. Jiang, L. Kaplan, and D. Towsley, "Impact of In-network Aggregation on Target Tracking Quality under Network Delays," *IEEE Journal of Selected Areas in Communications, Special Issue on In-Network Computation: Exploring the Fundamental Limits*, vol. 31, no. 4, pp. 808-818, Apr. 2013
23. S. Marano, V. Matta, **T. He**, and L. Tong, "The Embedding Capacity of Information Flows under Renewal Traffic," *IEEE Transactions on Information Theory*, vol. 59, no. 3, pp. 1724-1739, Mar. 2013
24. A. Agaskar, **T. He**, and L. Tong, "Distributed Detection of Multi-hop Information Flows with Fusion Capacity Constraints," *IEEE Transactions on Signal Processing*, vol. 58, no. 6, pp. 3373-3383, Jun. 2010
25. D. Verma, B. Ko, P. Zerfos, K. Lee, **T. He**, M. Duggan, A. Swami, N. Sofra, "Understanding the Quality of Monitoring for Network Management," *The Computer Journal: Special Issue on ITA*, vol. 53, no. 5, pp. 541-550, Jun. 2009
26. A. Anandkumar, C. Bisdikian, **T. He**, and D. Agrawal, "Selectively Retrofitting Monitoring in Distributed Systems," *ACM SIGMETRICS Performance Evaluation Review*, vol. 37, no. 2, pp. 6-8, Sep. 2009
27. **T. He** and L. Tong, "Detection of Information Flows," *IEEE Transactions on Information Theory*, vol. 54, no. 11, pp. 4925-4945, Nov. 2008
28. **T. He** and L. Tong, "Distributed Detection of Information Flows," *IEEE Transactions on Information Forensics and Security, Special Issue on Statistical Methods for Network Security and Forensics*, vol. 3, no. 3, pp. 390-403, Sep. 2008
29. P. Venkatasubramanian, **T. He**, and L. Tong, "Anonymous Networking amidst Eavesdroppers," *IEEE Transactions on Information Theory, Special Issue on Information-Theoretic Security*, vol. 54, no. 6, pp. 2770-2784, Jun. 2008
30. P. Venkatasubramanian, **T. He**, L. Tong, and S. Wicker, "Towards an Analytical Approach to Anonymous Wireless Networking," *IEEE Communications Magazine: Special Issue on Security in Ad Hoc Wireless Networks*, vol. 46, no. 2, pp. 140-146, Feb. 2008
31. **T. He** and L. Tong, "Detecting Encrypted Stepping-Stone Connections," *IEEE Transactions on Signal Processing*, vol. 55, no. 5, pp. 1612-1623, May 2007
32. **T. He**, S. Ben-David, and L. Tong, "Nonparametric Change Detection and Estimation in Large Scale Sensor Networks," *IEEE Transactions on Signal Processing*, vol. 54, no. 4, pp. 1204-1217, Apr. 2006

CONFERENCES AND WORKSHOPS

1. C. Chiu and **T. He**, "Stealthy DGoS Attack under Passive and Active Measurements," *IEEE Globecom*, Dec. 2020
2. Y. Huang, **T. He**, N. R. Chaudhuri, and T. La Porta, "Power Grid State Estimation under General Cyber-Physical Attacks," *IEEE SmartGridComm*, Nov. 2020
3. Q. Burke, P. McDaniel, T. La Porta, M. Yu, and **T. He**, "Misreporting Attacks in Software-Defined Networking," *International Conference on Security and Privacy in Communication Networks (SecureComm 2020)*, Oct. 2020
4. S. Gharebaghi, S. G. Vennelaganti, N. R. Chaudhuri, **T. He**, and T. La Porta, "Solving the

- Divergence Problem in AC-QSS Cascading Failure Model by Introducing the Effect of a Realistic UVLS Scheme," *IEEE PES Innovative Smart Grid Technologies Europe (ISGT-Europe)*, Oct. 2020
5. H. Lu, C. Liu, **T. He**, S. Wang, and K. S. Chan, "Sharing Models or Coresets: A Study based on Membership Inference Attack," *International Workshop on Federated Learning for User Privacy and Data Confidentiality in Conjunction with ICML 2020*, Jul. 2020
 6. H. Lu, **T. He**, S. Wang, C. Liu, M. Mahdavi, V. Narayanan, K. S. Chan, and S. Pasteris, "Communication-efficient k-Means for Edge-based Machine Learning," *IEEE ICDCS*, Jul. 2020
 7. H. Lu, C. Liu, S. Wang, **T. He**, V. Narayanan, K. S. Chan, and S. Pasteris, "Joint Coreset Construction and Quantization for Distributed Machine Learning," *IFIP Networking*, Jun. 2020
 8. Y. Lin, **T. He**, S. Wang, and K. S. Chan, "Waypoint-based Topology Inference," *IEEE ICC*, Jun. 2020
 9. S. Stein, M. Ochal, I.-A. Moisiu, E. Gerding, R. Ganti, **T. He**, and T. La Porta, "Strategyproof Reinforcement Learning for Online Resource Allocation," *AAMAS*, May 2020
 10. C-C. Chiu and **T. He**, "Stealthy DGoS Attack: DeGrading of Service under the Watch of Network Tomography," *IEEE INFOCOM*, Apr. 2020
 11. M. Yu, **T. He**, P. McDaniel, and Q. K. Burke, "Flow Table Security in SDN: Adversarial Reconnaissance and Intelligent Attacks," *IEEE INFOCOM*, Apr. 2020
 12. H. Lu, M-J Li, **T. He**, S. Wang, V. Narayanan, and K. S. Chan, "Robust Coreset Construction for Distributed Machine Learning," *IEEE Globecom*, Dec. 2019
 13. B. Ko, S. Wang, **T. He**, and D. Conway-Jones, "On Data Summarization for Machine Learning in Multi-Organization Federations," *DAIS workshop at IEEE SMARTCOMP*, Jun. 2019
 14. Y. Lin, **T. He**, S. Wang, K. Chan, and S. Pasteris, "Multicast-based Weight Inference in General Network Topologies," *IEEE ICC*, May 2019
 15. D. Z. Tootaghaj, S. Achleitner, **T. He**, N. Bartolini, and T. La Porta, "A Minimally Disruptive Rule Update Approach in Software Defined Networking," *IFIP Networking* (poster), May 2019
 16. V. Farhadi, F. Mehmeti, T. La Porta, **T. He**, H. Khamfroush, S. Wang, and K. S. Chan, "Service Placement and Request Scheduling for Data-intensive Applications in Edge Clouds," *IEEE INFOCOM*, Apr. 2019
 17. S. Pasteris, S. Wang, M. Herbster, and **T. He**, "Service Placement with Provable Guarantees in Heterogeneous Edge Computing Systems," *IEEE INFOCOM*, Apr. 2019
 18. Y. Lin, **T. He**, S. Wang, K. S. Chan, and S. Pasteris, "Looking Glass of NFV: Inferring the Structure and State of NFV Network from External Observations," *IEEE INFOCOM*, Apr. 2019
 19. D. Z. Tootaghaj, T. La Porta, and **T. He**, "Modeling, Monitoring, and Scheduling Techniques for Network Recovery from Massive Failures," *IFIP/IEEE International Symposium on Integrated Network Management (IM) – Dissertation Papers*, Apr. 2019
 20. M. Ochal, S. Stein, F. Bi, M. Cook, E. Gerding, **T. He**, and T. La Porta, "Online Mechanism Design using Reinforcement Learning for Cloud Resource Allocation," *The AAMAS-IJCAI Workshop on Agents and Incentives in Artificial Intelligence (AI³)*, Jul. 2018
 21. **T. He**, H. Khamfroush, S. Wang, T. La Porta, and S. Stein, "It's Hard to Share: Joint Service Placement and Request Scheduling in Edge Clouds with Sharable and Non-sharable Resources," *IEEE ICDCS*, Jul. 2018
 22. L. Wang, L. Jiao, **T. He**, J. Li, and M. Muhlhauser, "Service Entity Placement for Social Virtual Reality Applications in Edge Computing," *IEEE INFOCOM*, Apr. 2018

23. S. Wang, T. Tuor, T. Salonidis, K. K. Leung, **T. He**, and K. S. Chan, "When Edge Meets Learning: Adaptive Control for Resource-Constrained Distributed Machine Learning," *IEEE INFOCOM*, Apr. 2018
24. **T. He**, "Distributed Link Anomaly Detection via Partial Network Tomography," *IFIP Performance*, Nov. 2017
25. D. Z. Tootaghaj, **T. He**, and T. La Porta, "Parsimonious Tomography: Optimizing Cost-Identifiability Trade-off for Probing-based Network Monitoring," *IFIP Performance*, Nov. 2017
26. S. Shukla, O. Bhardwaj, A. A. Abouzeid, T. Salonidis, and **T. He**, "Hold'em Caching: Proactive Retention-Aware Caching with Multi-path Routing for Wireless Edge Networks," *ACM MobiHoc*, Jul. 2017
27. **T. He**, E. N. Ciftcioglu, S. Wang, and K. S. Chan, "Location Privacy in Mobile Edge Clouds," *IEEE ICDCS* (short paper), Jun. 2017
28. N. Bartolini, **T. He**, and H. Khamfroush, "Fundamental Limits of Failure Identifiability by Boolean Network Tomography," *IEEE INFOCOM*, Apr. 2017
29. A. Munir, **T. He**, R. Raghavendra, F. Le, and A. Liu, "Network Scheduling Aware Task Placement in Datacenters," *ACM CoNext*, Dec. 2016
30. **T. He**, N. Bartolini, H. Khamfroush, I. Kim, L. Ma, and T. La Porta, "Service Placement for Detecting and Localizing Failures Using End-to-End Observations," *IEEE ICDCS*, Jun. 2016
31. **T. He**, L. Ma, A. Gkelias, K.K. Leung, A. Swami, and D. Towsley, "Robust Monitor Placement for Network Tomography in Dynamic Networks," *IEEE INFOCOM*, Apr. 2016
32. A. A. Rocha, M. Dehghan, T. Salonidis, **T. He**, and D. Towsley, "SCA: A Data Stream Caching Algorithm," *CCDWN*, Dec. 2015
33. C. Liu, **T. He**, A. Swami, D. Towsley, T. Salonidis, A. I. Bejan, and P. Yu, "Multicast vs. Unicast for Loss Tomography on Tree Topologies," *IEEE MILCOM*, Oct. 2015
34. S. Wang, K. Chan, R. Uргаonkar, **T. He**, and K. K. Leung, "Emulation-based Study of Dynamic Service Placement in Mobile Micro-Clouds," *IEEE MILCOM*, Oct. 2015
35. E. N. Ciftcioglu, K. Chan, R. Uргаonkar, S. Wang, and **T. He**, "Security-aware Service Migration for Tactical Mobile Micro-Clouds," *IEEE MILCOM*, Oct. 2015
36. **T. He**, C. Liu, A. Swami, D. Towsley, T. Salonidis, A.I. Bejan, and P. Yu, "Fisher Information-based Experiment Design for Network Tomography," *ACM SIGMETRICS*, Jun. 2015 (**Outstanding Student Paper**)
37. S. Wang, R. Uргаonkar, K. Chan, **T. He**, M. Zafer, and K.K. Leung, "Dynamic Service Placement for Mobile Micro-Clouds with Predicted Future Costs," *IEEE ICC*, Jun. 2015
38. S. Wang, R. Uргаonkar, M. Zafer, K. S. Chan, **T. He**, and K. K. Leung, "Dynamic Service Migration in Mobile Edge-Clouds," *IFIP Networking*, May 2015
39. M. Dehghan, A. Seetharam, B. Jiang, **T. He**, T. Salonidis, J. Kurose, D. Towsley, and R.K. Sitaraman, "On the Complexity of Optimal Joint Caching and Routing in Hybrid Networks," *IEEE INFOCOM*, Apr. 2015
40. L. Ma, **T. He**, A. Swami, D. Towsley, K.K. Leung, and J. Lowe, "Node Failure Localization via Network Tomography," *ACM IMC*, Nov. 2014
41. M. Dehghan, A. Seetharam, **T. He**, T. Salonidis, J. Kurose, and D. Towsley, "Optimal Caching and Routing in Hybrid Networks," *IEEE MILCOM*, Nov. 2014
42. S. Wang, R. Uргаonkar, **T. He**, M. Zafer, K. Chan, and K.K. Leung, "Mobility-induced Service

- Migration in Mobile Micro-Clouds," *IEEE MILCOM*, Nov. 2014
43. S. Tati, S. Silvestri, **T. He**, and T. La Porta, "Robust Network Tomography in the Presence of Failures," *IEEE ICDCS*, Jun. 2014
 44. L. Ma, **T. He**, K. Leung, A. Swami, and D. Towsley, "Monitor Placement for Maximal Identifiability in Network Tomography," *IEEE INFOCOM*, Apr. 2014
 45. L. Ma, **T. He**, K. K. Leung, A. Swami, and D. Towsley, "Link Identifiability in Communication Networks with Two Monitors," *IEEE Globecom*, Dec. 2013
 46. M. Dehghan, D. Towsley, D. Goeckel, and **T. He**, "Inferring Military Activity in Hybrid Networks through Cache Behavior," *IEEE MILCOM*, Nov. 2013
 47. L. Ma, **T. He**, K. Leung, A. Swami, and D. Towsley, "Identifiability of Link Metrics based on End-to-End Path Measurements," *ACM IMC*, Oct. 2013 (**Best Paper Nominee**)
 48. L. Ma, **T. He**, K. K. Leung, D. Towsley, and A. Swami, "Efficient Identification of Additive Link Metrics via Network Tomography," *IEEE ICDCS*, Jul. 2013 (**Best Paper**)
 49. Y. Ji, **T. He**, J. Tan, K-W. Lee, L. Zhang, and L. Tong, "Improving Multi-Job MapReduce Scheduling in an Opportunistic Environment," *IEEE CLOUD*, Jun. 2013
 50. **T. He**, D. Goeckel, R. Raghavendra, and D. Towsley, "Endhost-based Shortest Path Routing in Dynamic Networks: An Online Learning Approach," *IEEE INFOCOM*, Apr. 2013
 51. Q. Wang, **T. He**, K-C Chen, J. Wang, B. Ko, Y. Lin, and K-W. Lee, "Dynamic Spectrum Allocation under Cognitive Cell Network for M2M Applications," *IEEE Asilomar*, Nov. 2012
 52. **T. He**, S. Chen, H. Kim, L. Tong, and K-W. Lee, "Scheduling Parallel Tasks onto Opportunistically Available Cloud Resources," *IEEE CLOUD*, Jun. 2012
 53. Y. Zhao, Z. Zhang, **T. He**, A. X. Liu, L. Guo, and B. Fang, "A Task-based Model for the Lifespan of Peer-to-Peer Swarms," *IFIP Networking*, May 2012
 54. **T. He**, S. Chen, H. Kim, L. Tong, and K-W. Lee, "To Migrate or to Wait: Bandwidth-Latency Tradeoff in Opportunistic Scheduling of Parallel Tasks," *IEEE INFOCOM mini-conference*, Mar. 2012
 55. L. Ma, **T. He**, A. Swami, K-W. Lee, and K.K. Leung, "Switch-and-Navigate: Controlling Data Ferry Mobility for Delay-Bounded Messages," *IEEE MILCOM*, Nov. 2011
 56. S. Marano, V. Matta, **T. He**, L. Tong, "Embedding Information Flows into Renewal Traffic," *IEEE ITW*, Oct. 2011
 57. S. Chen, L. Tong, and **T. He**, "Optimal Deadline Scheduling with Commitment," *Allerton Conference*, Sept. 2011
 58. **T. He**, A. Swami, and K-W Lee, "Dispatch-and-Search: Dynamic Multi-Ferry Control in Partitioned Mobile Networks," *ACM MobiHoc*, May 2011
 59. S. Chen, **T. He**, H. Y. Wong, K-W Lee, and L. Tong, "Secondary Job Scheduling in the Cloud with Deadlines," *SMTPS workshop in conjunction with ACM IPDPS*, May 2011
 60. **T. He**, A. Anandkumar, and D. Agrawal, "Index-Based Sampling Policies for Tracking Dynamic Networks under Sampling Constraints," *IEEE INFOCOM*, Apr. 2011
 61. **T. He**, L. Kaplan, C. Bisdikian, W. Wei, and D. Towsley, "Multi-Target Tracking Using Proximity Sensors," *IEEE MILCOM*, Nov. 2010
 62. **T. He**, K-W Lee, and A. Swami, "Flying in the Dark: Controlling Autonomous Data Ferries with Partial Observations," *ACM MobiHoc*, Sept. 2010
 63. **T. He**, N. Sofra, K-W Lee, and K. K. Leung, "Utility-Based Gateway Deployment for Supporting Multi-Domain DTNs," *IEEE SECON*, Jun. 2010

64. W. Wei, **T. He**, C. Bisdikian, D. Goeckel, and D. Towsley, "Target Tracking with Packet Delays and Losses – QoI amid Latencies and Missing Data," *IEEE IQ2S*, Apr. 2010
65. C. Liu, **T. He**, K-W Lee, K. Leung, and A. Swami, "Dynamic Control of Data Ferries under Partial Observations," *IEEE WCNC*, Apr. 2010
66. Z. Charbiwala, S. Chakraborty, S. Zahedi, Y. Kim, M. Srivastava, **T. He**, and C. Bisdikian, "Compressive Oversampling for Robust Data Transmission in Sensor Networks," *IEEE INFOCOM*, Mar. 2010
67. **T. He**, L. Tong, and A. Swami, "On the Maximum Throughput of Clandestine Sensor Networking," *IEEE MILCOM*, Oct. 2009
68. **T. He**, L. Tong, and A. Swami, "Maximum Throughput of Clandestine Relay," *Allerton Conference*, Sept. 2009
69. A. Anandkumar, C. Bisdikian, **T. He**, and D. Agrawal, "Selectively Retrofitting Monitoring in Distributed Systems," *MAMA workshop at ACM Sigmetrics*, Jun. 2009
70. **T. He**, H. Wong, and K. Lee, "Traffic Analysis in Anonymous MANETs," *IEEE MILCOM*, Nov. 2008.
71. **T. He**, M. Zafer, and C. Bisdikian, "Detecting Transient Signals with Incomplete Observations," *IEEE MILCOM*, Nov. 2008.
72. N. Sofra, **T. He**, P. Zerfos, B. Ko, K. Lee, and K. Leung, "Accuracy Analysis of Data Aggregation for Network Monitoring," *IEEE MILCOM*, Nov. 2008.
73. **T. He** and M. Zafer, "Adaptive Sampling for Transient Signal Detection in the Presence of Missing Samples," *QoISN workshop at IEEE MASS*, Sep. 2008.
74. A. Agaskar, **T. He**, and L. Tong, "A Distributed Scheme for Detection of Information Flows in Chaff," *IEEE CISS*, Mar. 2008.
75. **T. He**, A. Agaskar, and L. Tong, "On Security-Aware Transmission Scheduling," *IEEE ICASSP*, Mar. 2008.
76. **T. He** and L. Tong, "Distributed Detection of Information Flows with Side-Information," *IEEE Asilomar*, Nov. 2007.
77. **T. He** and L. Tong, "Distributed Detection of Information Flows in Chaff", *IEEE ISIT*, Jun. 2007.
78. **T. He** and L. Tong, "Detecting Information Flows: Improving Chaff Tolerance by Joint Detection", *IEEE CISS*, Mar. 2007.
79. **T. He** and L. Tong, "Robust Detection of Stepping-Stone Attacks", *Army Science Conference*, Nov. 2006.
80. **T. He**, P. Venkitasubramaniam, and L. Tong, "Packet Scheduling Against Stepping-Stone Attacks with Chaff", *IEEE MILCOM*, Oct. 2006.
81. P. Venkitasubramaniam, **T. He**, and L. Tong, "Networking with Secrecy Constraints", *IEEE MILCOM*, Oct. 2006.
82. P. Venkitasubramaniam, **T. He**, and L. Tong, "Relay Secrecy in Networks with Eavesdroppers," *Allerton Conference*, Sep. 2006.
83. **T. He** and L. Tong, "Detecting Encrypted Interactive Stepping-Stone Connections", *IEEE ICASSP*, May 2006.
84. **T. He** and L. Tong, "A Signal Processing Perspective to Stepping-Stone Detection", *IEEE CISS*, Mar. 2006.
85. **T. He**, L. Tong, and A. Swami, "Nonparametric Change Estimation in 2D Random Fields", *IEEE MILCOM*, Oct. 2005.

86. **T. He**, S. Ben-David, and L. Tong, "Nonparametric Change Detection in 2D Random Sensor Field", *IEEE ICASSP*, Mar. 2005. (**Best Student Paper**)
87. **T. He**, S. Ben-David, and L. Tong, "Change Detection and Estimation in Large Scale Sensor Networks: Linear Complexity Algorithms", *Army Science Conference*, Nov. 2004.
88. S. Ben-David, **T. He**, and L. Tong, "Nonparametric Approach to Change Detection and Estimation in Large Scale Sensor Networks", *C/SS*, Mar. 2004.

PATENTS

1. **T. He**, L. Ma, M. Srivatsa, E. Nahum, "Client-space Network Monitoring," filed 2015
2. R. Raghavendra, **T. He**, F. Le, A. Munir, "Network State and Scheduling-aware Task Scheduling," filed 2016
3. L. Ma, **T. He**, N. Desai, "Robust Monitoring of Dynamic Cloud Networks," filed 2015
4. **T. He**, R. Raghavendra, D. Agrawal, and Y. Song, "Method and System for Mobility-Aware Dynamic Service Placement in Mobile Clouds," filed 2014
5. **T. He**, L. Ma, C. Bisdikian, and B. Ray, "Bounded-Budget Monitor Deployment in Monitoring Networks via End-to-End Probes," US Patent 9282020, issued March 8, 2016
6. **T. He**, J. Tan, Y. Ji, and K-W. Lee, "System and Method for Scheduling MapReduce Jobs in a Cluster of Dynamically Available Servers," filed 2013
7. **T. He**, D. Agrawal, and R. Raghavendra, "Enhanced Resource Management for a Network System," US Patent 9094872, issued July 28, 2015
8. **T. He**, M. Zafer, and C. Bisdikian, "Adaptive Remote Decision Making under Quality of Information Requirements," US Patent 8660022 B2, issued February 25, 2014
9. **T. He**, K-W Lee, and P. Zeros, "Forecasting-Based Service for Virtual Machine Reassignment in Computing Environment," US Patent 8601483 B2, issued December 3, 2013
10. **T. He**, Q. Wang, K-W Lee, M. Zafer, Y. H. Lin, and H. Zhan, "Quasi-Dynamic Spectrum Access Mechanism for Internet-of-Things Applications," US Patent 8594023 B2, issued November 26, 2013
11. **T. He**, C. Bisdikian, and J. Branch, "Automatic Model Evolution," US Patent 8489525 B2, issued July 16, 2013
12. D. Verma, V. Pappas, and **T. He**, "Method and Apparatus for Efficient Communication of Multiple Streams on Cellular Networks," UK Patent 2494245, issued July 8, 2013
13. C. Bisdikian, **T. He**, D. Agrawal, A. Anandkumar, and S. Perelman, "Selective Instrumentation of Distributed Applications for Transaction Monitoring", US Patent 8433786 B2, issued April 30, 2013

LEADERSHIPS AND RESPONSIBILITIES

Task lead on "Tomography of Hybrid Coalition Networks" under the International Technology Alliance (ITA) program funded by US Army and UK MoD, team members: IBM (Liang Ma, Theodoros Salonidis, Ramya Raghavendra), Imperial College (Kin K Leung, Alex Wolf), UMass (Don Towsley), PSU (Tom La Porta), and ARL (Ananthram Swami, Paul Yu), 2013-2016

Technical lead of "Measurement Science in Cloud Computing" project funded by NIST, team members: IBM (Vasilis Pappas, Erich Nahum, Aurelie Lozano, Kang-won Lee), Cornell (Lang Tong), 2010-2012

Task lead on "Controlled Mobility for Interoperability" under the International Technology Alliance (ITA) program funded by US Army and UK MoD, team members: IBM (Kang-won Lee), Imperial College (Kin K Leung), ARL (Ananthram Swami), 2009-2011

FUNDING AND PROPOSALS

PI in NSF grant "SaTC: CORE: Small: Adversarial Network Reconnaissance in Software Defined Networking", with Patrick McDaniel (Co-PI), 2020-2023 (500K)

Ting He (Associate Professor)

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• webpage: <http://nsrg.cse.psu.edu/members/ting-he/>

PI in DAIS ITA BPP20 Project 8 Task 2 on “Agile Analytics Enabled by Decentralized Continuous Learning in Coalitions”, with Shiqiang Wang (IBM), Graham Bent (IBM), Kin K Leung (Imperial College), and Leandros Tassioulas (Yale), 2020-2021 (received 148K)

Co-PI in NSF grant “CPS: Medium: Coupled cAscade Modeling, Prevention, and Recovery (CAMPR): When Graph Theory Meets Trajectory Sensitivity”, with Nilanjan Chaudhuri (PI) and Tom La Porta (Co-PI), 2018-2021 (999K)

PI in NSF grant “CIF: Small: Adversarial Network Tomography: Inferring Network State from Manipulated End-to-end Measurements”, sole PI, 2018-2019 (170K)

PI in DAIS ITA BPP18 Project 3 Task 2 on “Distributed Analytics in Dynamic Coalition Environment: Placement, Scheduling, and Validation”, with Shiqiang Wang (IBM), Christopher Gibson (IBM), and Mark Herbster (UCL), 2018-2020 (total 1M, received 204K)

PI in NIST grant on “Measurement Science in Cloud Computing”, with Kang-won Lee (IBM), Vasilis Pappas (IBM), Lang Tong (Cornell), one of 27 winners out of 1300, 2010-2013 (1.5M)

PI in ITA FPP15 Project 1 Task 1 on “Tomography in Hybrid Coalition Networks,” with Liang Ma (IBM), Theodoros Salonidis (IBM), Ramya Raghavendra (IBM), Kin K Leung (Imperial College), Don Towsley (UMass), Alex Wolf (Imperial College), Tom La Porta (PSU), 2015-2016 (700K)

Co-PI in ITA FPP15 Project 2 Task 3 on “Data Stream Processing in Hybrid Coalition Networks”, with Theodoros Salonidis (IBM), Ting Wang (IBM), Peter Pietzuch (Imperial College), Don Towsley (UMass), Paul Stone (IBM), 2015-2016 (400K)

PI in ITA BPP13 Project 1 Task 1 on “Tomography in Hybrid Coalition Networks,” with Theodoros Salonidis (IBM), Kin K Leung (Imperial College), Don Towsley (UMass), 2013-2015 (800K)

Co-PI in ITA BPP13 Project 2 Task 1 on “Mobile Micro-Cloud,” with Raghu Ganti (IBM), Kin K Leung (Imperial College), Katy Warr (Roke Manor), Robert Hancock (Roke Manor), 2013-2015 (800K)

PI in ITA BPP09 Project 2 Task 1 “Enhancing Interoperability between Coalition Networks by Controlled Mobile Gateways,” with Kin K Leung (Imperial College), Kang-won Lee (IBM), 2009-2011 (600K)

Co-PI in project proposal on “Software Defined Coalitions” as part of IBM Proposal for the Distributed Analytics and Information Science (DAIS) International Technology Alliance (ITA) program by US Army and UK MoD, 2016-2021 (funded 2016)

TEACHING

Undergraduate Courses:

CMPEN 362: Communication Networks, Penn State University, Spring 2018

Graduate Courses:

CSE 514: Computer Networks, Penn State University, Fall 2017

CSE 597: Inferential Network Monitoring, Penn State University, Fall 2016

SEMINAR AND INVITED TALKS

“Networking Research in an Era of Buzzwords”, Faculty Seminar, Penn State University, 2018

“Active Network Tomography: A Measurement Design Perspective,” Colloquium, Temple University, 2017

“Inferring Network Internal State via Network Tomography,” Colloquium, University of Southern California, 2016

“Inferring Network Internal State via Network Tomography,” Colloquium, University of Colorado-Boulder, 2016

“Inferring Network Internal State via Network Tomography,” Colloquium, Penn State University, 2016

“Reliable Network State Inference via Network Tomography,” Applied Probability Seminar, IBM Research, 2015

Ting He (Associate Professor)

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• webpage: <http://nsrg.cse.psu.edu/members/ting-he/>

“Bandwidth-Latency Tradeoff in Opportunistic Scheduling of Parallel Tasks,” seminar, Cornell University, 2011

“Flying in the Dark: Controlling Autonomous Data Ferries with Partial Observations,” seminar, Columbia University, 2010

“Controlling Autonomous Data Ferries with Partial Observations,” seminar, UMass Amherst, 2010

Teaching assistant of course on “Digital Signal Processing”, Cornell University, 2006

ADVISING

PhD Students (advised/co-advised)

Tian Xie, Fall 2019-present

Yudi Huang, Fall 2019-present

Cho-Chun Chiu, Spring 2019-present

Yilei Lin, Fall 2017-present

Hanlin Lu, Fall 2017-present

Vajiheh Farhadi (co-advised with Tom La Porta), Spring 2017-present

Diman Zad Tootaghaj (co-advised with Tom La Porta), Fall 2017-May 2018

PhD Students (committee)

Hui-Ju Hung, Fall 2017-present

Heting Liu, Fall 2020-present

Fang He, Fall 2020-present

Noor Felemban, Fall 2020-present

Peter Zientara, Fall 2018-October 2019

MS/MENG Students

Mingli Yu, Fall 2018-May 2020

Ming-Ju Li, Summer 2018-May 2019

Undergrad Students

Jeffery Cao (Honor advisor), Fall 2018-Spring 2020

Jason Chhay (Honor advisor), Fall 2018-Spring 2021

Shaobo Guan (Honor advisor), Fall 2018-Spring 2020

Aishan Liu (Honor advisor), Fall 2018-Spring 2020

Wei Qin Wang (Honor advisor), Fall 2018-Fall 2019

Frederick Zhang (Honor advisor), Fall 2018-Spring 2020

Yifei Xiao (Honor thesis supervisor), Fall 2017-Spring 2018

Mengjie Li (CERI supervisor), Spring 2017

MENTORING

Liang Ma (PhD student at Imperial College), 2011-2014, generated one journal paper (TON 2014), six conference papers (IMC 2014, INFOCOM 2014, Globecom 2013, IMC 2013-Best Paper Nominee, ICDCS 2013-Best Paper, MILCOM 2011)

Chang Liu (PhD student at UMass), 2013-2015, generated two conference papers (SIGMETRICS 2015-Best Student Paper, MILCOM 2015)

Shiqiang Wang (PhD student at Imperial College), 2013-2015, generated two journal submissions (TMC, TPDS), five conference papers (Performance 2015, ICC 2015, Networking 2015, MILCOM 2015, MILCOM 2014)

Mostafa Dehghan (PhD student at UMass), 2013-2015, generated three conference papers (INFOCOM 2015, MILCOM 2014, MILCOM 2013)

Ting He (Associate Professor)

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• webpage: <http://nsrg.cse.psu.edu/members/ting-he/>

Srikar Tati (PhD student at PSU), 2013, generated one conference paper (ICDCS 2014)

Yuting Ji (PhD student at Cornell), 2012, generated one conference paper (CLOUD 2013)

Shiyao Chen (PhD student at Cornell), 2010-2011, generated four conference papers (CLOUD 2012, INFOCOM-mini 2012, IPDPS workshop 2011, Allerton 2011)

Chi Liu (PhD student at Imperial College), 2009, generated one conference paper (WCNC 2010)

Ameya Agaskar (MS student at Cornell), 2008, generated one journal paper (TSP 2010), two conference papers (CISS 2008, ICASSP 2008)

Nikoletta Sofra (PhD student at Imperial College), 2008-2009, generated one journal paper (The Computer Journal 2009), two conference papers (SECON 2010, MILCOM 2008)

DIVERSITY AND OUTREACH

Organizer of Computer Science and Engineering Camp for Girls 2020

Mentor, Panelist, and N2Women Event Chair at INFOCOM 2020

Role Model Speaker at the 30th and 31st Women in Math and Science Conference at Millersville University 2017-2018

Faculty mentor at the Grace Hopper Celebration 2017

N2Women Membership Co-chair 2013-2014

PhD Forum committee at the Grace Hopper Celebration 2011

IBM Fellowship committee for Communication and Networking PIC, 2008-2009

Chair of Mentoring Program of Women ECE, Cornell University, 2005

MEMBERSHIPS AND SERVICES

IEEE Senior Member since 2013; IEEE Member 2007-2013; IEEE Student Member 2004-2007

Associate Editor for IEEE/ACM Transactions on Networking 2017-2021 and IEEE Transactions on Communications (TCOM) 2017-2020

Area TPC Chair for IEEE INFOCOM 2021

Steering Committee for ICCCN Workshop on Edge Computing and Networking (ECN) 2018

Organizing Committee for ACM MobiHoc 2019 (Corporate Sponsorship Chair)

TPC Member for IEEE INFOCOM 2009-2020, IEEE MILCOM 2013-present, IEEE ICCCN 2020 (advisory TPC), IEEE ICC 2019, IEEE ICNP 2018, IEEE IWQoS 2014-2018, IEEE WiOpt 2016, CCN workshop at MASS 2015, ICNC 2014, IFIP Networking 2013, IEEE SECON 2010-2013, BroadNets 2010, QShine 2009

Workshop co-chair for ITA workshop on “Content and Context Aware Networking in Challenged Hybrid Networks,” with Tom La Porta (PSU) and Alex Wolf (Imperial College), 2013

Panelist for IEEE SECON 2010

Reviewer for refereed journals including *IEEE Transactions on Signal Processing*, *IEEE Transactions on Information Theory*, *IEEE Transactions on Computers*, *IEEE Transactions on Information Forensics and Security*, *IEEE Signal Processing Letters*, *IEEE/ACM Transactions on Networking*, *IEEE Transactions on Wireless Communications*, *IEEE Transactions on Mobile Computing*, *IEEE Transactions on Automatic Control*, *IEEE Transactions on Parallel and Distributed Systems*, *IEEE Journal on Selected Areas in Communications*, *ACM Transactions on Autonomous and Adaptive Systems*, *ACM Computing Surveys*, *Elsevier Journal on Computer Networks*, *Elsevier Journal on Computer Communications*, *Wireless Networks*, and refereed conferences including *IEEE ICASSP*, *IEEE ISIT*, *IEEE MILCOM*, *IEEE MASS*, *IEEE WiOpt*, *IEEE Globecom*, and *Annual Conference of ITA*