CURRICULUM VITAE

MINGYAN LIU

Professor of EECS

Associate Dean for Academic Affairs, College of Engineering

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RESEARCH INTERESTS and EXPERTISE

My research interests are in optimal resource allocation, game theory, sequential decision theory, incentive design, and performance modeling and analysis, generally within the context of communication networks. My most recent research activities combine modeling and mining of large scale Internet measurement data and machine learning techniques for cyber risk quantification, and the use of contract theory to design innovative cyber insurance policies. Some of my research output in this space has been successfully commercialized.

EDUCATION

University of Maryland, College Park,	Electrical and Comp. Engr.,	Ph.D.,	August 2000
University of Maryland, College Park,	Systems Engineering,	M.S.,	August 1997
Nanjing Univ. Aero. & Astro., China,	Electrical Engineering,	B.S.,	June 1995

APPOINTMENTS

Associate Dean	Academic Affairs, College of Engineering, 6/2023 - present;
Chair,	ECE, University of Michigan, Ann Arbor, 9/2018 - 5/2023;
Professor,	EECS Department, University of Michigan, Ann Arbor, 9/2012 - present;
Associate Professor,	EECS Department, University of Michigan, Ann Arbor, 9/2006 - 8/2012;
Assistant Professor,	EECS Department, University of Michigan, Ann Arbor, 9/2000 - 8/2006;
Visiting Researcher,	University of Science and Technology, Hong Kong, 11/2007 - 2/2008;
Visiting Researcher,	Microsoft Research, Redmond, WA, 3/2008 - 6/2008;
Research Engineer,	Center for Satellite and Hybrid Communication Networks, University of Maryland, College Park, 8/1997 - 8/2000;
Visiting Researcher,	Telcordia Inc., 6 - 8/1998;

AWARDS and HONORS

1. Highlighted in the IEEE ComSoc Celebrating Women Project, 2023.

2. Michigan Road Scholar, 2023.

3. Named Alice L. Hunt Collegiate Professor of Engineering, University of Michigan, 2022.

4. Stars in Networking and Communications Award, N2Women, 2021.

5. Big Ten Academic Alliance (BTAA) Fellow, 2020-2021.

6. Distinguished University Innovator Award, University of Michigan, 2018.

7. The ECE Distinguished Alumni Award, Electrical & Computer Engineering Department, University of Maryland, College Park, 2017.

8. The Monroe-Brown Foundation Service Excellence Award, College of Engineering, University of Michigan, 2017.

9. "Crossing the Valley of Death" PI Excellence Award, Department of Homeland Security, Cyber Security Division, February 2016.

10. The Monroe-Brown Foundation Education Excellence Award, College of Engineering, University of Michigan, 2015.

11. Elizabeth C. Crosby Award for research, University of Michigan, 2014.

12. IEEE Fellow (class of 2014), for contributions to modeling of wireless ad-hoc and sensor networks.

13. Best Application Paper Award, IEEE/ACM Conference on Data Science and Advanced Analytics (DSAA), for paper "Detecting hidden propagation structure and its application to analyzing phishing," October 2014.

14. Best Paper Award, IEEE/ACM conference on Information Processing in Sensor Networks (IPSN), for paper "In-situ soil moisture sensing: measurement scheduling and estimation using compressive sensing," April 2012.

15. A paper I co-authored with collaborators from Hong Kong University of Science and Technology (HKUST), entitled "Mining Spectrum Usage Data: A Large-Scale Spectrum Measurement Study" was selected as the Spotlight Paper for the June 2012 issue of the *IEEE Transactions on Mobile Computing*, and was highlighted on the journal home page.

16. Outstanding Achievement Award, EECS Department, University of Michigan, 2010.

17. NSF CAREER Award, 9/1/2003-8/31/2008.

18. Elizabeth C. Crosby Award for research, University of Michigan, 2003.

19. Graduate Fellow, University of Maryland, College Park, 1995-1997.

SIGNIFICANT ACCOMPLISHMENTS

1. I co-founded the start-up company, QuadMetrics, Inc., in 2014 to commercialize technology I co-developed at UM on predictive data analytics for cyber security. The start-up was featured in a January 2016 Wall Street Journal Article (http://blogs.wsj.com/cio/2016/01/12/cybersecurity-startup-quadmetrics-calculates-odds-a-company-will-be-breached/tab/print/), and named a "Cool Vendor of 2016" by Gartner. It was subsequently acquired by the analytics software firm FICO in May 2016. The technology is now being used as a risk management tool by companies spanning sectors from banking to automotive, and as an underwriting tool by major insurance companies around the world. It has also become part of an ESG (Environmental, Social, and Corporate Governance) rating for institutional investors.

2. From 2005 to 2014 I was part of a NASA project on using in-situ sensing techniques to measure and collect in real-time fine-grained soil moisture data, and was the lead on the instrumentation part of the project. This work led to the development and deployment of soil moisture sending network in Oklahoma in 2010 and California in 2011-2021. These are the first-ever large-scale soil moisture sensor networks deployed in open field; they are also among the first of outdoor deployments.

3. I have been the lead PI in numerous federally funded projects, including a current ARO MURI. I am frequently involved in large, multi-year efforts working with multi-disciplinary teams of experts from different areas, including the NSF ERC "Wireless Integrated Micro-Systems (WIMS)" from 2002-2007, and the NIST TIP "Cyber-enabled Wireless Monitoring Systems for the Protection of Deteriorating National Infrastructure Systems", from 2009-2014. My research has also been funded by DARPA, DHS, ONR, ARO, and ARL.

4. Paper "Random Waypoint Considered Harmful" (with J. Yoon and B. Noble, published in Proceedings of IEEE INFOCOM 2003) has been consistently ranked on citeseer as one of the most cited articles in computer science published in 2003. The citation count (from google scholar) on this paper to date exceeds 1650.

5. Total citation count as of November 2023 (Google Scholar): over 14,000, h-index 53, i10-index 157.

TEACHING EXPERIENCE

ENGR 100, *Self-Driving Cars, Drones, and Beyond: An Intro to Autonomous Electronic Systems*
Winter 2018

EECS 353, *Introduction to Communication Systems*
Winter 2006

EECS 401 (now EECS 301), *Probabilistic Methods in Engineering*
Winter 2001, Winter 2004, Fall 2004, Fall 2010-2012

EECS 452, *DSP Major Design Experience*
Fall 2008, Fall 2009, Fall 2013, Winter 2014, Fall 2015

EECS 489, *Computer Networks*
Fall 2002

EECS 501, *Probability and Random Processes*
Winter 2015

EECS 554, *Digital Communication and Coding*
Fall 2003, Fall 2005

EECS 557, *Communication Networks*
Fall 2000, Fall 2001, Winter 2003, Winter 2005, Winter 2009-2011, Winter 2013, Winter 2014

EECS 598, *Special Topics: Modeling and Simulation Techniques in Networking*
Winter 2002

EECS 598, *Special Topics: Skills for Success in Graduate Studies*
Fall 2022

RESEARCH ADVISING

- 26 doctoral students: 21 graduated, 5 active.

  1. Kun Jin, *Strategic Interactions and Incentive Mechanisms on Multi-scale Networks*. April 2023. (Member of Technical Staff, TikTok.)
  2. Xueru Zhang, *Socially Responsible Machine Learning: On the Preservation of Individual Privacy and Fairness*. June 2021. (**Assistant Professor of Computer Science, The Ohio State University**)

3. Chaowei Xiao, *Secure Learning in Adversarial Environments.* May 2020. (**Nvidia/Assistant Professor of Information and Computer Science, University of Wisconsin-Madison**)

4. Mehrdad Moharrami (co-advised with Vijay Subramanian), *A Study of Phase Transition in New Random Graph Families.* January 2020. (**Assistant Professor of Computer Science, University of Iowa**)

5. Mahdi Khalili, *Incentive Mechanisms for Managing and Controlling Cyber Risks: The Role of Cyber Insurance and Resource Pooling.* December 2019. (**Assistant Professor of Computer and Information Science, University of Delaware**)

6. Armin Sarabi, *Quantifying Security: Methods, Challenges and Applications.* December 2017. (Assistant Research Scientist, UM)

7. Parinaz Naghizadeh, *On the Provision of Public Goods on Networks: Incentives, Exit Equilibrium, and Applications to Cyber Security.* May 2016. (**Assistant Professor of ECE, UC San Diego**)

8. Yang Liu, *Harnessing the Power of Multi-Source Data: an Exploration of Diversity and Similarity.* October 2015. (**Assistant Professor of Computer Science, UC Santa Cruz**)

9. Qingsi Wang, *Optimal Channel-Switching Strategies in Multi-channel Wireless Networks.* June 2014. (Qualcomm Research, CA)

10. Shang-Pin Sheng, *Incentivizing Secondary Spectrum Trading: A Profit Perspective.* May 2014. (Engineer, IMO, CA)

11. Chun Lo (co-advised with Jerome P. Lynch), *Efficient Sensor Fault Diagnosis in Wireless Sensor Networks.* April 2014. (Consultant, MicroStrategy, VA)

12. Cem Tekin, *Online Learning in Bandit Problems.* January 2013. (**Associate Professor of ECE, Bilkent University, Turkey**)

13. Yi Wang (co-advised with Demos Teneketzis), *Sensor Scheduling under Energy Constraints.* April 2011. (Embedded Software Engineer, American Axel and Manufacturing, Detroit, MI)

14. Sahand H. A. Ahmad, *Optimal and Suboptimal Policies for Opportunistic Spectrum Access: A Resource Allocation Approach.* June 2010. (Quantitative Researcher, Zurich Capital Market, Inc, Zurich, Switzerland)

15. David I Shuman, *From Sleeping to Stockpiling: Energy Conservation via Stochastic Scheduling.* March 2010. (**Professor of Data Science and Applied Mathematics, Olin College of Engineering**)

16. Dongsook Kim, *Low Duty-Cycled Wireless Sensor Networks: Connectivity and Opportunistic Routing.* September 2008. (Engineer, Samsung, Korea)

17. Jungkeun Yoon (co-advised with Brian Noble), *Mobility Models for Mobile Systems.* June 2007. (Attorney, Darae Law, Seoul, Korea)

18. Nicholas B. Chang, *Sequential Resource Allocation in Communication Networks: Guessing Games, Strategies, and Online Algorithms.* June 2007. (Senior Research Scientist, Applied Communication Sciences, Red Bank, NJ)

19. Chih-fan Hsin, *Reliable and Energy-Efficient Wireless Sensor Networks for Surveillance and Monitoring.* February 2006. (Senior Software Engineer, Intel, Portland, OR)

20. Navid Ehsan, *Optimal Resource Allocation and Performance Modeling in Wireless Networks in the Presence of Delay or Fading.* May 2005. (Systems Engineer, Qualcomm, San Diego, CA)

21. Enrique J. Duarte-Melo, *Field-Gathering Wireless Sensor Networks: Throughput Scaling Laws and Network Lifetime.* April 2005. (Principal, Boston Consulting Group, Dallas, TX)

- Ten undergraduate research students.

BOOKS and MONOGRAPHs

[O1] M. Liu, "Embracing Risk: Cyber Insurance as an Incentive Mechanism for Cybersecurity", Morgan & Claypool Publishers, June 2021.

[O2] C. Tekin and M. Liu, "Online Learning Methods for Networking," *Foundations and Trends in Networking*, vol. 8, issue 4, January 2015.

BOOK CHAPTERS (All invited and refereed)

[B1] X. Zhang and M. Liu, "Fairness in Learning-Based Sequential Decision Algorithms: A Survey", in *Handbook on Reinforcement Learning and Control*, Springer Studies in Systems, Decision and Control 325, Vamvoudakis (Eds), June 2021.

[B2] A. Sarabi, K. Jin, and M. Liu, "Smart Internet Probing: Scanning Using Adaptive Machine Learning", in *Game Theory and Machine Learning for Cyber Security*, C. Kamboua, C. Kiekintveld, F. Fang, Q. Zhu (Eds.), Wiley-IEEE Press, April 2021, ISBN: 978-1-119-72392-9.

[B3] Y. Liu and M. Liu, "Sequential Learning and Decision-Making in Dynamic Channel Access and Transmission Scheduling", in *Handbook of Cognitive Radio*, Springer, February 2019.

[B4] P. Naghizadeh and M. Liu, "Voluntary Participation in Cyber-Insurance Markets", in *The Economics of Information Security and Privacy*, Springer, 2015.

[B5] C. Tekin and M. Liu, "Performance and Convergence of Multiuser Online Learning and Its Applications in Dynamic Spectrum Sharing," in *Mechanism and Games for Dynamic Spectrum Allocation*, Tansu Alpcan, Holger Boche, Michael Honig, H. Vincent Poor (Eds.), Cambridge University Press, February 2014, ISBN: 9781107034129.

[B6] A. Silva, M. Moghaddam and M. Liu, "The Future of Wireless Underground Sensing Networks: From Theory to Practice," to appear in *The Art of Wireless Sensor Networks*, Habib M. Ammari (Ed.), Springer, 2014, ISBN: 978-3-642-40009-4.

[B7] A. Silva, M. Liu and M. Moghaddam, "Design for Low Data-Rate Environmental Monitoring Applications," to appear in *The Art of Wireless Sensor Networks*, Habib M. Ammari (Ed.), Springer, 2014, ISBN: 978-3-642-40009-4.

[B8] D. Shuman and M. Liu, "Opportunistic Scheduling with Deadline Constraints in Wireless Networks," in *Performance Models and Risk Management in Communication Systems*, Nalan Gulpinar, Peter Harrison and Berc Rustem (Eds.), Springer, November 2010, ISBN: 9781441905338.

[B9] N. Ehsan and M. Liu, "Server Allocation In Wireless Networks: The Use of Index Policies," in *Combinatorial Optimization in Communication Networks*, Maggie Xiaoyan Cheng, Yingshu Li and Ding-Zhu Du (Eds.), Springer, March 2006, ISBN: 0387390257.

[B10] E. J. Duarte-Melo and M. Liu, "Field Gathering Wireless Sensor Networks", in *Mobile, Wireless and Sensor Networks: Technology, Applications and Future Directions*, Rajeev Shorey, A. Ananda, Mun Choon Chan, and Wei Tsang Ooi (Ed.), Wiley-IEEE Press, March 2006, ISBN: 0471718165.

[B11] M. Liu, "Performance Evaluation of TCP Splitting Over Satellite," in *Internetworking and Computing over Satellite Networks*, Yongguang Zhang, Ed., Kluwer Academics Publishers, July 2003. ISBN: 1402074247.

JOURNAL PUBLICATIONS

[J1] T. Li, D. Wilcock, J. Deng, B. Sun, V. Kavcic, M. Liu, and B. Giordani, "Novel Methodology for Detection and Prediction of Mild Cognitive Impairment using Resting-State EEG", *Alzheimer's & Dementia: The Journal of the Alzheimer's Association*, July 2023.

[J2] M. Moharrami, V. Subramanian, M. Liu, R. Sundaresan, "The Erlang weighted tree, a new branching process", *Random Structures & Algorithms*, October 2023.

[J3] T. Yin, A. Sarabi, and M. Liu, "Deterrence, Backup, or Insurance: Game-Theoretic Modeling of Ransomware", *Games Journal*, Special Issue on *Game-Theoretic Analysis of Network Security and Privacy*, MDPI, February 2023.

[J4] X. Zhang, M. Khalili, and M. Liu, "Differentially Private Real-Time Release of Sequential Data", *ACM Transactions on Privacy and Security (TOPS)*, May 2022.

[J5] M. Khalili, X. Zhang, and M. Liu, "Designing Contracts for Trading Private and Heterogeneous Data Using a Biased Differentially Private Algorithm", *IEEE Access*, April 2021.

[J6] M. Khalili, X. Zhang, and M. Liu, "Resource Pooling for Shared Fate: Incentivizing Effort in Interdependent Security Games through Cross-investments", *IEEE Transactions on Control of Network Systems (TCNS)*, vol. 8, issue 2, pp. 964-975, June 2021.

[J7] X. Zhang and M. Liu, "Long-term Impacts of Fair Machine Learning" *Ergonomics in Design*, 28(3), 7-11, 2020.

[J8] K. Zhang, Y. Liu, J. Liu, M. Liu, and T. Basar, "Distributed Learning of Average Belief Over Networks Using Sequential Observations", *Automatica*, Vol 115, 108857, May 2020.

[J9] P. Naghizadeh and M. Liu, "Using Private and Public Assessments in Security Information Sharing Agreements," *IEEE Transactions on Information Forensics and Security (TIFS)*, 15(1), pp. 1801-1814, 2020.

[J10] X. Zhang, M. Khalili, and M. Liu, "Recycled ADMM: Improving the Privacy and Accuracy of Distributed Algorithms," *IEEE Transactions on Information Forensics & Security (TIFS)*, 15(1), pp. 1723-1734, December 2020.

[J11] D. G. Dobakhshari, P. Naghizadeh, M. Liu, and V. Gupta, "A Reputation-Based Contract for Repeated Crowdsensing with Costly Verification," *IEEE Transactions on Signal Processing (TSP)*, 67(23), pp. 6092-6104, November 2019.

[J12] X. Zhang, C. Huang, M. Liu, A. Stefanopoulou, T. Ersal, "Predictive Cruise Control with Private Vehicle-to-Vehicle Communication for Improving Fuel Consumption and Emissions", *IEEE Communications Magazine, Special Issue on Secure Wireless Communications for Vehicle-to-Everything*, 57(10), pp. 91-97, October 2019.

[J13] D. Liu, X. Wu, Z. Cao, M. Liu, and M. Hou, "A Contention Detectable Mechanism for Receiver-Initiated MAC in Wireless Sensor Networks", *ACM Transactions on Embedded Computing Systems*, 18(4), June 2019.

[J14] M. Khalili, M. Liu and S. Romanosky, "Embracing and Controlling Risk Dependency in Cyber-insurance Policy Underwriting," *Journal of Cybersecurity*, 5(1), October 2019.

[J15] Y. Bai, Q. Wang, C. Lo, M. Liu, J. P. Lynch, and X. Zhang, "Adaptive Bayesian Group Testing: Algorithms and Performance", *IEEE Transactions on Signal Processing*, 156, pp. 191-207, 2019.

[J16] M. Khalili, P. Naghizadeh, and M. Liu, "Designing Cyber Insurance Policies: The Role of Pre-Screening and Security Interdependence", *IEEE Transactions on Information Forensics & Security (TIFS)*, 13(9), pp. 2226-2239, September 2018.

[J17] P. Naghizadeh and M. Liu, "Provision of Public Goods on Networks: On Existence, Uniqueness, and Centralities," *IEEE Transactions on Network Science and Engineering (TNSE)*, 5(3), pp. 225-236, July 2018.

[J18] Y. Liu and M. Liu, "An Online Learning Approach to Improving the Quality of Crowd-Sourcing," *IEEE/ACM Transactions on Networking*, 25(4), pp. 2166 - 2179, August 2017.

[J19] C. Wu, Z. Zhou, Y. Liu and M. Liu, "Mitigating Large Errors in WiFi-based Indoor Localization for Smartphones," *IEEE Transactions on Vehicular Technology*, 66(7), pp. 6246-6257, July 2017.

[J20] C. Lo, J. P. Lynch and M. Liu, "Design and Optimization of a Distributive Model-Based Sensor Fault Detection Method for Automated In-Network Execution in a Wireless Sensor Network," *International Journal of Sustainable Materials and Structural Systems*, 3(1), pp. 33-52, 2017.

[J21] P. Naghizadeh and M. Liu, "Opting out of Incentive Mechanisms: A Study of Security as a Non-Excludable Public Good," *IEEE Transactions on Information Forensics and Security (TIFS)*, 11(12), pp. 2790-2803, December 2016.

[J22] A. Sarabi, P. Naghizadeh, Y. Liu and M. Liu, "Risky Business: Fine-grained Data Breach Prediction Using Business Profiles," *Journal of Cybersecurity*, 2(1), pp. 15-28, December 2016.

[J23] C. Lo, J. P. Lynch, and M. Liu, "Distributed Model-based Nonlinear Sensor Fault Diagnosis in Wireless Sensor Networks," *Mechanical Systems and Signal Processing*, vol. 66-67, pp. 470-484, January 2016.

[J24] X. Ji, J. Wang, M. Liu, Y. Yan, P. Yang, and Y. Liu, "Hitchhike: A Preamble-based Control Plane for SNR-sensitive Wireless Networks", *IEEE Transactions on Wireless Communications*, vol. 15, no. 2, pp. 1239-1251, February 2016.

[J25] P. Naghizadeh and M. Liu, "Perceptions and Truth: A Mechanism Design Approach to Crowd-Sourcing Reputation," *IEEE/ACM Transactions on Networking*, vol. 24, no. 1, pp. 163-176, February 2016.

[J26] Q. Wang and M. Liu, "Learning in Hide-and-Seek," *IEEE/ACM Transactions on Networking*, vol. 24, no. 2, pp. 1279-1292, April 2016.

[J27] J. Xu, Q. Wang, K. Zeng, M. Liu, and W. Liu, "Sniffer Channel Assignment with Imperfect Monitoring for Cognitive Radio Networks," *IEEE Transactions on Wireless Communications*, vol. 15, no. 3, pp. 1703-1715, March 2016.

[J28] S.-P. Sheng, M. Liu and R. Saigal, "Data-Driven Channel Modeling Using Spectrum Measurement," *IEEE Transactions on Mobile Computing*, vol. 14, issue 9, pp. 1794-1805, September 2015.

[J29] Y. Liu and M. Liu, "To Stay Or To Switch: Multiuser Dynamic Channel Access with Fast and Slow Changing Channels," *IEEE Transactions on Mobile Computing*, vol. 14, Issue 4, April 2015.

[J30] X. Wu, Q. Wang and M. Liu, "In-situ Soil Moisture Sensing: Measurement Scheduling and Estimation Using Sparse Sampling," *ACM Transactions on Sensor Networks*, vol. 11, issue 2, December 2014, pp. 26:1-26:29.

[J31] Y. Liu and M. Liu, "Sufficient Conditions on the Optimality of Myopic Sensing in Opportunistic Channel Access: A Unifying Framework," *IEEE Transactions on Information Theory*, vol. 60, no. 8, August 2014, pp. 4922-4940.

[J32] S.-P. Sheng and M. Liu, "Profit Incentive in Trading Non-Exclusive Access on a Secondary Spectrum Market Through Contract Design," *IEEE/ACM Transactions on Networking*, vol. 22, issue 4, August 2014, pp. 1190-1203.

[J33] A. Silva, M. Liu and M. Moghaddam, "Ripple-2: a non-collaborative; asynchronous; and open architecture for highly-scalable and low duty-cycle WSNs," *ACM SIGMOBILE Mobile Computing and Communications Review (MC2R)*, vol. 17, issue 1, January 2013, pp. 55-60. [**Best research article in ACM-SIGMOBILE Mission-Oriented WSNs (MiSeNet'2012).**]

[J34] Y. Liu, M. Liu and J. Deng, "Evaluating Opportunistic Multi-Channel MAC: Is Diversity Gain Worth the Pain?" *IEEE Journal Selected Areas in Communications (JSAC)*, vol. 31, no. 11, pp. 2301-2311, November 2013.

[J35] C. Lo, J. P. Lynch and M. Liu, "Distributed Reference-Free Fault Detection Method for Autonomous Wireless Sensor Networks," *IEEE Sensors Journal*, vol. 13, no. 5, pp. 2009-2019, May 2013.

[J36] A. Silva, M. Liu and M. Moghaddam, "An Adaptive Energy-Management Framework for Sensor Nodes with Constrained Energy Scavenging Profiles," *Journal of Distributed Sensor Networks Special Issue "Towards Zero-Energy Distributed Sensing Systems"*, vol. 2013, Article ID 272849, pp. 1-33, October 2013.

[J37] Q. Wang and M. Liu, "Throughput Optimal Switching in Multi-Channel WLANs," *IEEE Transactions on Mobile Computing*, vol. 12, issue 12, pp. 2470-2482, December 2013.

[J38] D. Kim and M. Liu, "Optimal stochastic routing in low duty-cycled wireless sensor networks," *Journal of Internet Mathematics*, vol. 9, nos. 2-3, pp. 161-198, June 2013.

[J39] A. Silva, M. Liu and M. Moghaddam, "Power Management Techniques for Wireless Sensor Networks and Similar Low-Power Communication Devices Based on Non-Rechargeable Batteries," *Journal of Computer Networks and Communications (JCNC)*, vol. 2012, article ID 757291, 10 pages, doi: 10.1155/2012/757291, September 2012.

[J40] L. M. Law, J. Huang and M. Liu, "Price of Anarchy of Wireless Congestion Games," *IEEE Transactions on Wireless Communications*, vol. 11, no. 10, pp. 3778-3787, October 2012.

[J41] C. Tekin and M. Liu, "Online Learning of Rested and Restless Bandits," *IEEE Transactions on Information Theory*, vol. 58, no. 8, pp. 5588-5611, August 2012.

[J42] C. Tekin, M. Liu, R. Southwell, J. Huang and S. Ahmad, "Atomic Congestion Game on a Graph and Its Applications in Networking," *IEEE/ACM Transactions on Networking*, vol. 20, no. 5, pp. 1541-1552, October 2012.

[J43] A. Jindal and M. Liu, "Networked Computing In Wireless Sensor Networks for Structural Health Monitoring," *IEEE/ACM Transactions on Networking*, vol. 20, no. 4, pp. 1203-1216, August 2012.

[J44] X. Wu and M. Liu, "In-Situ Soil Moisture Sensing: Optimal Sensor Placement and Field Estimation," *ACM Transactions on Sensor networks*, vol. 8, no. 4, pp. 33:1-33:30, November 2012.

[J45] A. Jindal, K. Psounis and M. Liu, "CapEst: A Measurement-Based Approach to Estimating Link Capacity in Wireless Networks," *IEEE Transactions on Mobile Computing*, vol. 11, no. 12, pp. 2098-2108, December 2012.

[J46] Q. Liang, M. Liu, and D. Yuan, "Channel Estimation for Opportunistic Spectrum Access: Uniform and Random Sensing," *IEEE Transactions on Mobile Computing*, vol. 11, issue 8, pp. 1304-1316, August 2012.

[J47] S. Yin, D. Chen, Q. Zhang, M. Liu and S. Li, "Mining Spectrum Usage Data: A Large-Scale Spectrum Measurement Study", *IEEE Transactions on Mobile Computing*, vol. 11, issue 6, pp. 1033-1046, June 2012.

[J48] D. I Shuman and M. Liu, "Energy Efficient Transmission Scheduling With Strict Underflow Constraints," *IEEE Transactions on Information Theory*, vol. 57, no. 3, pp. 1344-1367, March 2011.

[J49] M. Moghaddam, D. Entekhabi, Y. Goykhman, K. Li, M. Liu, A. Mahajan, A. Nayyar, D. Shuman and D. Teneketzis, "A Wireless Soil Moisture Smart Sensor Web Using Physics-Based Optimal Control: Concept and Initial Demonstrations", *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS) Special Issue on Earth Observation Sensor Web*, vol. 3(4), pp. 522-535, December 2010. (**Invited and refereed**)

[J50] D. I Shuman, A. Nayyar, A. Mahajan, Y. Goykhman, K. Li, M. Liu, D. Teneketzis, M. Moghaddam and D. Entekhabi, "Soil Moisture Sensing: Closing the Loop Between Data Assimilation and Optimal Control," *Proceedings of the IEEE Special Issue on Sensor Network Applications*, vol. 98, no. 11, pp. 1918-1933, November, 2010. (**Invited and refereed**)

[J51] N. B. Chang and M. Liu, "Optimal Channel Probing and Transmission Scheduling for Opportunistic Spectrum Access," *IEEE/ACM Transactions on Networking*, vol. 17, no. 6, pp. 1805-1818, December 2009.

[J52] S. H. A. Ahmad, M. Liu, T. Javidi, Q. Zhao and B. Krishnamachari, "Optimality of Myopic Sensing in Multi-Channel Opportunistic Access," *IEEE Transactions on Information Theory*, vol. 55, no. 9, pp. 4040-4050, September 2009.

[J53] C. Hsin and M. Liu, "Hitting Time Analysis for A Class of Random Packet Forwarding Schemes in Ad Hoc Networks," *Journal of Ad Hoc Networks*, vol. 7, issue. 3, pp. 500-513, May 2009.

[J54] N. Ehsan and M. Liu, "Server Allocation With Delayed State Observation: Sufficient Conditions For the Optimality of an Index Policy," *IEEE Transactions on Wireless Communication*, vol. 8, no. 4, pp. 1693-1705, April 2009.

[J55] N. Chang and M. Liu, "Constrained Sequential Resource Allocation and Guessing Games," *IEEE Transactions on Information Theory*, vol. 54, no. 11, pp. 4946-4965, November 2008.

[J56] N. Chang and M. Liu, "Optimal Competitive Algorithms for Opportunistic Spectrum Access," *IEEE Journal of Selected Areas in Communications (JSAC)*, special issue on Game Theory in Communication Systems, vol. 26, no. 7, pp. 1183- 1192, September 2008.

[J57] T. Stoenescu, M. Liu and D. Teneketzis, "Multirate Multicast Service Provisioning II: A Tâtonnement Process for Rate Allocation," *Mathematical Methods in Operations Research*, vol. 65, no. 3, pp. 389-415, June 2007.

[J58] T. Stoenescu, M. Liu and D. Teneketzis, "Multirate Multicast Service Provisioning I: An Algorithm for Optimal Price Splitting Along Multicast Trees," *Mathematical Methods in Operations Research*, vol. 65, no. 2, pp. 199-228, April 2007.

[J59] N. Chang and M. Liu, "Controlled Flooding Search In a Large Network," *IEEE/ACM Transactions on Networking*, vol. 15, no. 2, pp. 436-449, April 2007.

[J60] N. Ehsan and M. Liu, "Optimal Bandwidth Allocation in a Delay Channel," *IEEE Journal of Selected Areas in Communications (JSAC)*, special issue on Non-linear Optimization of Communication Systems, vol. 24, no. 8, pp. 1614-1626, August 2006.

[J61] C. Hsin and M. Liu, "Randomly Duty-cycled Wireless Sensors Networks: the Dynamics of Coverage," *IEEE Transactions on Wireless Communications*, vol. 5, no. 11, pp. 3182-3192, November 2006.

[J62] J. Yoon, M. Liu and B. D. Noble, "A General Framework to Construct Stationary Mobility Models for the Simulation of Mobile Networks," in *IEEE Transactions on Mobile Computing*, vol. 5, no. 7, pp. 860–871, July 2006.

[J63] C. Hsin and M. Liu, "A Two-Phase Self-Monitoring Mechanism for Wireless Sensor Networks" *Elsevier Journal of Computer Communications*, Special Issue on Sensor Networks, vol. 29, issue 4, pp. 462–476, February 2006.

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[C69] Y. Liu and M. Liu, "Detecting Hidden Propagation Structure and Its Application to Analyzing Phishing," *ACM/IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, October 2014, Shanghai, China. **[Best Application Paper Award]**

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[C79] Q. Wang and M. Liu, "Joint Control of Transmission Power and Channel Switching Against Adaptive Jamming," *Annual Allerton Conference on Control, Communication, and Computing (Allerton)*, October 2013, Allerton, IL.

[C80] Y. Liu and M. Liu, "Group Learning and Opinion Diffusion in a Broadcast Network," *Annual Allerton Conference on Control, Communication, and Computing (Allerton)*, October 2013, Allerton, IL.

[C81] C. Lo, M. Liu, J. P. Lynch and A. G. Gilbert, "Efficient Sensor Fault Detection Using Combinatorial Group Testing," *IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS)*, pp. 199-206, May 2013, Cambridge, MA.

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[C84] Y. Liu and M. Liu, "To stay or to switch: multiuser dynamic channel access," *IEEE Annual Conference on Computer Communications (INFOCOM)*, pp. 1249-1257, April 2013, Turin, Italy.

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[C86] J. Zhang, A. Chivukula, M. Bailey, M. Karir, and M. Liu, "Characterization of Blacklists and Tainted Network Traffic," *Proceedings of the 14th Passive and Active Measurement Conference (PAM)*, Hong Kong, China, March 18 - 20, 2013.

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[C88] C. Tekin and M. Liu, "Online Learning in Decentralized Multi-user Spectrum Access with Synchronized Explorations," *IEEE Military Communication Conference (MILCOM)*, October 2012, Orlando, FL.

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[C90] A. Silva, M. Liu and M. Moghaddam, "Ripple-2 : A Non-Collaborative, Asynchronous, and Open Architecture for Highly-Scalable and Low Duty-Cycle WSNs," *ACM International Workshop on Mission-Oriented Wireless Sensor Networking (MiSeNet)*, August 2012, pp. 39-44, Istanbul, Turkey.

[C91] Y. Gai, B. Krishnamachari and M. Liu, "Online learning for combinatorial network optimization with restless Markovian rewards," *IEEE Communication Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, June 2012, pp. 28-36, Seoul, Korea. **[Honorable Mention: top 3 papers out of 68 accepted out of 219 reviewed.]**

[C92] S.-P. Sheng and M. Liu, "Optimal contract design for an efficient secondary spectrum market," *International Conference on Game Theory for Networks (GameNets)*, May 2012, Vancouver, British Columbia, Canada.

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[C94] X. Wu and M. Liu, "In-situ soil moisture sensing: measurement scheduling and estimation using compressive sensing," *IEEE/ACM conference on Information Processing in Sensor Networks (IPSN)*, April 2012, Beijing, China. **[Best Paper Award]**

[C95] C. Tekin and M. Liu, "Approximately optimal adaptive learning in opportunistic spectrum access," *IEEE Annual Conference on Computer Communications (INFOCOM)*, March 2012, Orlando, FL.

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[C98] L. M. Law, J. Huang and M. Liu, "Price of anarchy of congestion games with player-specific constants," in *International Conference on Wireless Communications & Signal Processing (WCSP)*, pp. 1-6, November 2011, Nanjing, China.

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[C104] C. Tekin and M. Liu, "Performance and Convergence of Multi-user Online Learning," in *ICST International Conference on Game Theory for Networks (GameNets)*, pp. 1-16, April 2011, Shanghai, China. **[Best paper award finalist]**

[C105] C. Tekin and M. Liu, "Online learning in opportunistic spectrum access: a restless bandit approach," in *IEEE Annual Conference on Computer Communications (INFOCOM)*, pp. 2462-2470, April 2011, Shanghai, China.

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[C116] D. I. Shuman and M. Liu, "Energy-Efficient Transmission Scheduling for Wireless Media Streaming with Strict Underflow Constraints", in *Proc. International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt)*, pp. 354-359, April 2008, Berlin, Germany.

[C117] N. B. Chang and M. Liu, "Competitive Analysis of Opportunistic Spectrum Access Strategies", in *IEEE Annual Conference on Computer Communications (INFOCOM)*, pp. 1535-1542, April 2008, Phoenix, AZ.

[C118] A. Josan, M. Liu, D. Neuhoff and S. Pradhan, "Throughput Scaling in Random Wireless Networks: A Non-Hierarchical Multipath Routing Strategy", in *Annual Allerton Conference on Communication, Control and Computing (Allerton)*, pp. 1-7, September 2007, Allerton, IL.

[C119] N. B. Chang and M. Liu, "Optimal channel probing and transmission scheduling for opportunistic spectrum access", in *Proc. ACM International Conference on Mobile Computing and Networking (MobiCom)*, pp. 27-38, September 2007, Montreal, Canada.

[C120] J. Yoon, B. Noble and M. Liu, "Surface Street Traffic Estimation", in *Proc. the Fifth International Conference on Mobile Systems, Applications, and Services (MobiSys)*, pp. 220-232, June 2007, Puerto Rico.

[C121] Y. Wang, M. Liu and D. Teneketzis, "Sensor scheduling for multiple parameters estimation under energy constraint", in *Proc. IEEE Military Communication Conference (MILCOM)*, pp. 1-7, October 2006, Washington, D.C.

[C122] E. J. Duarte-Melo, A. Josan, M. Liu, D. L. Neuhoff, and S. S. Pradhan, "The effect of node density and propagation model on throughput scaling of wireless networks," in *Proc. IEEE International Symposium on Information Theory (ISIT)*, pp. 1693-1697, July 2006.

[C123] J. Yoon, B. Noble, M. Liu and M. Kim, "Building realistic mobility models from coarse-grained traces," in *the Fourth International Conference on Mobile Systems, Applications, and Services (MobiSys)*, pp. 178-190, June 2006, Uppsala, Sweden.

[C124] N. B. Chang and M. Liu, "Controlled flooding search with delay constraints", in *IEEE Annual Conference on Computer Communications (INFOCOM)*, pp. 1-12, April 2006.

[C125] N. Ehsan and M. Liu, "Dynamic bandwidth allocation for low power devices with random connectivity," in *Proc. IEEE Conference on Decision and Control (CDC)*, pp. 6034-3039, December 2005, Seville, Spain.

[C126] D. Kim, C. Hsin and M. Liu, "Asymptotic connectivity of low duty-cycled wireless sensor networks", in *Proc. IEEE Military Communication Conference (MILCOM)*, pp. 2241-2247, October 2005, Atlantic City, NJ.

[C127] C. Hsin and M. Liu, "Partial clustering: maintaining connectivity in a low duty-cycled dense wireless sensor network," *IEEE Workshop on Algorithms for Ad Hoc and Sensor Networks (WMAN)*, pp. 1-8, April 2005, Denver, CO.

[C128] N. B. Chang and M. Liu, "Optimal controlled flooding search in large wireless networks," in *Proc. International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt)*, pp. 229–237, March 2005, Trentino, Italy.

[C129] N. Ehsan and M. Liu, "Properties of optimal resource sharing in a delay channel," in *Proc. IEEE Conference on Decision and Control (CDC)*, vol. 3, pp. 3277–3282, December 2004, Paradise Island, Bahamas.

[C130] N. Ehsan and M. Liu, "Properties of optimal power and admission control for a single user queue in a time varying wireless channel," in *Proc. Annual Allerton Conference on Communication, Control and Computing (Allerton)*, pp. 1-10, September 2004, Allerton, IL.

[C131] N. B. Chang and M. Liu, "Revisiting TTL-based controlled flooding search: optimality and randomization," in *Proc. ACM International Conference on Mobile Computing and Networking (MobiCom)*, pp. 85–99, September 2004, Philadelphia, PA.

[C132] C. Hsin and M. Liu, "Network coverage using low duty-cycled sensors: random and coordinated algorithms", in *Proc. International Workshop on Information Processing in Sensor Networks (IPSN)*, vol. 1, pp. 433–442, April 2004, Berkeley, CA.

[C133] N. Ehsan and M. Liu, "On the optimality of an index policy for bandwidth allocation with delayed state observation and differentiated services", in *Proc. IEEE Annual Conference on Computer Communications (INFOCOM)*, vol. 3, pp. 1974–1983, April 2004, Hong Kong.

[C134] E. J. Duarte-Melo, M. Liu, and A. Misra, "A modeling framework for computing lifetime and information capacity in wireless sensor networks", in *Proc. International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt)*, pp. 1-10, March 2004, Cambridge, UK.

[C135] T. M. Stoenescu, M. Liu, and D. Teneketzis, "An approach to rate allocation in multicast", in *Proc. IEEE Conference on Decision and Control (CDC)*, vol. 3, pp. 2100–2105. December 2003, Maui, HI.

[C136] D. Kim and M. Liu, "Distributed admission control via Dual-Queue Management", in *Proc. IEEE Vehicular Technology Conference Fall (VTC)*, October 2003, vol. 4, pp. 2599–2603, Orlando, FL.

[C137] J. Yoon, M. Liu, and B. Noble, "Sound mobility models", in *Proc. ACM International Conference on Mobile Computing and Networking (MobiCom)*, vol. 1, pp. 205–216, September 2003, San Diego, CA.

[C138] N. Ehsan and M. Liu, "Analysis of TCP transient behavior and its effect on file transfer latency," in *Proc. IEEE International Conference on Communications (ICC)*, vol. 3, pp. 1806–1811, May 2003, Anchorage, AK.

[C139] J. Yoon, M. Liu, and B. Noble, "Random Waypoint considered harmful," in *Proc. IEEE Annual Conference on Computer Communications (INFOCOM)*, vol. 2, pp. 1312–1321, April 2003, San Francisco, CA.

[C140] D. Marco, E. J. Duarte-Melo, M. Liu, and D. L. Neuhoff, "On the many-to-one transport capacity of a dense wireless sensor network and the compressibility of its data," in *Proc. International Workshop on Information Processing in Sensor Networks (IPSN)*, vol. 1, pp. 1–16, April 2003, Palo Alto, CA.

[C141] E. J. Duarte-Melo and M. Liu, "Analysis of energy consumption and lifetime of heterogeneous wireless sensor networks," in *Proc. IEEE Global Communications Conference (GLOBECOM)*, vol. 1, pp. 21–25, November 2002, Taipei, Taiwan.

[C142] C. Hsin and M. Liu, "A distributed monitoring mechanism for wireless sensor networks," in *Proc. ACM Workshop on Wireless Security (WiSe)*, pp. 57–66, September 2002, Atlanta, GA.

[C143] E. J. Duarte-Melo and M. Liu, "Energy efficiency in many-to-one communications in wireless networks," in *Proc. IEEE Midwest Symposium on Circuits and Systems (MWSCAS)*, pp. 21-25, August 2002, Tulsa, OK.

[C144] N. Ehsan, M. Liu, and R. Ragland, "A measurement based study of Internet over satellite," in *Proc. International Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS)*, pp. 448–458, July 2002, San Diego, CA.

[C145] M. Liu and N. Ehsan, "Modeling TCP Performance with Proxies," in *Proc. International Conference on Internet Computing (IC)*, vol. 1, pp. 3–10, June 2002, Las Vegas, NV.

[C146] M. Liu and N. Ehsan, "Modeling and analysis of TCP enhancement over Heterogeneous Links," in *Proc. International Conference on Networking (ICN)*, vol. 2, pp. 51–60, July 2001, Colmar, France.

[C147] M. Liu and J. S. Baras, "Performance analysis using a hierarchical loss network model," in *Proc. IEEE Global Communications Conference (GLOBECOM)*, pp. 1793-1797, November 2000, San Francisco, CA.

[C148] M. Liu and J. S. Baras, "Automatic Differentiation for Iterative Process and Its Applications in Network Performance Analysis," in *The 3rd International Conference/Workshop on Automatic Differentiation: From Simulation to Optimization (AD 2000)*, June 2000, Nice, France.

[C149] M. Liu, M. Karir and J. S. Baras, "Caching and multicasting in DBS systems," in *Proc. International Conference on Parallel Computing (ICPC)*, pp. 56–61, September 1999, Aizu-Wakamazu, Japan.

NON-REFEREED INVITED CONFERENCE PUBLICATIONS

[N1] M. Khalili, X. Zhang, and M. Liu, "Public Good Provision Games on Networks with Resource Pooling", *International Conference on NETwork Games COntrol and oPtimization (NetGCoop)*, November 2018, New York, NY.

[N2] M. Moharrami, V. Subramanian, M. Liu and R. Sundaresan, "Local Weak Convergence of a Local Preferences Based Random Graph Model", *Annual Allerton Conference on Control, Communication, and Computing (Allerton)*, October 2018, Allerton, IL.

[N3] P. Naghizadeh and M. Liu, "Inter-temporal Incentives in Security Information Sharing Agreements," in *Information Theory and Applications Workshop (ITA)*, February 2016, UC San Diego, CA.

[N4] P. Naghizadeh and M. Liu, "Closing the Price of Anarchy Gap in the Interdependent Security Game", in *Information Theory and Applications Workshop (ITA)*, February 2014, UC San Diego, CA.

[N5] P. Naghizadeh and M. Liu, "Collective revelation through mechanism design," in *Information Theory and Applications Workshop (ITA)*, February 2013, UC San Diego, CA.

[N6] P. Naghizadehi and M. Liu, "Mechanisms to establish network reputation," in *Information Theory and Applications Workshop (ITA)*, February 2012, UC San Diego, CA.

[N7] R. Rao and M. Liu, "Latency-Optimizing File Splitting for Transmission over a Large Multi-Hop Network," in *Information Theory and Applications Workshop (ITA)*, February 2011, UC San Diego, CA.

[N8] A. Jindal, K. Psounis and M. Liu, "CapEst: Estimating wireless link capacity in multi-hop networks," in *Information Theory and Applications Workshop (ITA)*, February 2011, UC San Diego, CA.

[N9] Q. Liang and M. Liu, "Channel estimation for opportunistic spectrum access: uniform and random sensing," in *Information Theory and Applications Workshop (ITA)*, February 2010, UC San Diego, CA.

[N10] D. Kim and M. Liu, "Optimal stochastic routing strategies in low duty-cycled wireless sensor networks," in *International Wireless Internet Conference (WICON)*, November 2008, Maui, HI.

[N11] M. Moghaddam, D. Entekhabi, Y. Goykhman, M. Liu, A. Mahajan, A. Nayyar, D. Shuman, and D. Teneketzis, "A soil moisture smart sensor web using data assimilation and optimal control: formulation and first laboratory demonstration," in *IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, July 2009, Boston, MA.

[N12] N. Chang and M. Liu, "Optimal channel probing and transmission scheduling in a multichannel system," in *Information Theory and Applications Workshop (ITA)*, January 2007, San Diego, CA.

[N13] D. Shuman and M. Liu, "Optimal sleep scheduling of a wireless sensor node", in *Proc. Annual Asilomar Conference on Signals, Systems, and Computers (Asilomar)*, October 2006, Monterey, CA.

[N14] N. Chang and M. Liu, "Delay constrained flooding search", in *Information Theory and Applications Inaugural Workshop (ITA)*, February 2006, University of California, San Diego.

[N15] N. Ehsan and M. Liu, "Minimizing power consumption in wireless networks with quality of service requirement", in *Proc. Annual Allerton Conference on Communication, Control and Computing (Allerton)*, September 2005, Allerton, IL.

[N16] T. Javidi, R. Vijayakumar and M. Liu, "Saturation rate in 802.11 revisited", in *Proc. Annual Allerton Conference on Communication, Control and Computing (Allerton)*, September 2005, Allerton, IL.

[N17] E. J. Duarte-Melo, M. Liu, and A. Misra, "A computational approach to the joint design of distributed data compression and data dissemination in a field-gathering wireless sensor network", in *Proc. Annual Allerton Conference on Communication, Control and Computing (Allerton)*, October 2003, Allerton, IL.

[N18] M. Liu. "Sequential use of wireless sensors for target estimate and tracking", in *Proc. IEEE Military Communication Conference (MILCOM)*, vol. 1, pp. 664–669, October 2003, Boston, MA.

CONFERENCE and WORKSHOP PRESENTATIONS

1. "Cooperation for Better Competition: A Sequential Game Model of Flocking," *Information Theory and Applications Workshop (ITA)*, February 2023, San Diego, CA. **Invited presentation.**

2. "Cyber Insurance and the Ransomware Twist," *Information Theory and Applications Workshop (ITA)*, May 2022, San Diego, CA. **Invited presentation.**

3. "Multi-Scale Network Games," *Information Theory and Applications Workshop (ITA)*, February 2020, San Diego, CA. **Invited presentation.**

4. "Using Fair Machine Learning in Sequential Decision Making," *Information Theory and Applications Workshop (ITA)*, February 2019, San Diego, CA. **Invited presentation.**

5. "Compressing the Internet: Numerical Representation of Internet Hosts," *Information Theory and Applications Workshop (ITA)*, February 2018, San Diego, CA. **Invited presentation.**

6. "Provision of Public Goods on Networks: On Existence, Uniqueness, and Centralities," *UECE Lisbon Meetings in Game Theory and Applications*, November 2016, Lisbon, Portugal. *Invited presentation.*

7. "Inter-temporal Incentives in Security Information Sharing Agreements," *Information Theory and Applications Workshop (ITA)*, February 2016, San Diego, CA. **Invited paper and presentation.**

8. "Adaptive Demand Response: Online Learning of Restless and Controlled Bandits," *IEEE International Conference on Smart Grid Communications (SmartGrid- Comm)*, November 2014, Venice, Italy.

9. "Detecting Hidden Propagation Structure and Its Application to Analyzing Phishing," *ACM/IEEE International Conference on Data Science and Advanced Analytics (DSAA)*, October 2014, Shanghai, China.

10. "Closing the Price of Anarchy Gap in the Interdependent Security Game", *Information Theory and Applications Workshop (ITA)*, February 2014, San Diego, CA. **Invited paper and presentation.**

11. "In-Situ Soil Moisture Sensing: from Physical Models to Optimal Control to System Deployment", *IEEE SENSORS*, November 2013, Baltimore, MD. **Invited talk.**

12. "Collective revelation through mechanism design", *Information Theory and Applications Workshop (ITA)*, February 2013, San Diego, CA. **Invited abstract and presentation.**

13. "Online learning of rested and restless bandits", *Information Theory and Applications Workshop (ITA)*, February 2011, San Diego, CA. **Invited abstract and presentation.**

14. "Channel estimation for opportunistic spectrum access: uniform and random sensing", *Information Theory and Applications Workshop (ITA)*, February 2010, San Diego, CA. **Invited paper and presentation.**

15. "Congestion Games and their application to Spectrum Sharing", *Annual INFORMs meeting*, San Diego, October 2009. **Invited talk.**

16. "Energy-efficient transmission scheduling with a strict underflow constraint," *Information Theory and Applications Workshop (ITA)*, February 2009, San Diego, CA. **Invited talk.**

17. "Competitive Analysis of Opportunistic Spectrum Access," *Annual Asilomar Conference on Signals, Systems, and Computers (Asilomar)*, October 2008, Monterey CA. **Invited talk.**

18. "Optimal channel probing and transmission scheduling in a multi-channel system," *Information Theory and Applications Workshop (ITA)*, January 2007, San Diego, CA. **Invited talk.**

19. "Delay constrained flooding search", *Information Theory and Applications Inaugural Workshop (ITA)*, February 2006. **Invited talk.**

20. "Dynamic bandwidth allocation for low power devices with random connectivity," IEEE Conference on Decision and Control (CDC), December 2005, Seville, Spain.

21. "Properties of optimal resource sharing in a delay channel", *IEEE Conference on Decision and Control (CDC)*, December 2004. Invited talk. **Invited paper and presentation**.

22. "On the optimality of an index policy for bandwidth allocation with delayed state observation and differentiated services", *IEEE Annual Conference on Computer Communications (INFOCOM)*, March 2004.

23. "A computational approach to the joint design of distributed data compression and data dissemination in a field-gathering wireless sensor network", *Annual Allerton Conference on Communication, Control and Computing (Allerton)*, October 2003. **Invited paper and presentation**.

24. "Sequential use of wireless sensors for target estimation and tracking", *IEEE Military Communication Conference (MILCOM)*, October 2003. **Invited paper and presentation**.

25. "On the many-to-one transport capacity of a dense wireless sensor network and the compressibility of its data," *International Workshop on Information Processing in Sensor Networks (IPSN)*, April 2003.

26. "Modeling TCP performance with proxies", *International Workshop on Wireless and Wired Internet Communications (WWIC)*, June 2002.

27. "Modeling and analysis of TCP enhancement over heterogeneous links", *International Conference on Networking (ICN)*, July 2001.

28. "Performance analysis using a hierarchical loss network model," *IEEE Global Communications Conference (GLOBECOM)*, November 2000.

KEYNOTES, INVITED TALKS and SEMINARS

- "Multi-scale Network Games: Modeling, Analysis, and Control," **keynote**, Workshop on Counter-adversarial inference, control and learning: New Frontiers, Newer Challenges, IEEE Conference on Decision and Control (CDC), December 2023.

- "When Things Get Big: Using Hierarchy to Gain Analytical and Computational Advantage in Multi-Agent Systems," **keynote**, NSF/ARO Workshop on New Frontiers in Networked Dynamical Systems: Assured Learning, Communication and Control, University of Maryland, College Park, October 2023.

- "Cyber Insurance and the Case of Ransomware,"

  – **The Ira H. Shapiro Lecture**, Smith School of Business, University of Maryland, College Park, March 2022.

  – FDA Division for Medical Device Security Lunch and Learning Seminar Series, October 2021.

  – University of Minnesota Center for Medical Device Cybersecurity Seminar Series, October 2021.

- "Can Machine Learning be Fair in Sequential Decision Making,"

  - UC Santa Barbara, ECE Department Control Seminar, November 2022.
  - UC Irvine, EECS Department Distinguished Seminar, April 2022.
  - Bilkent University, EEE Department Distinguished Seminar, March 2022.
  - TAMU Kingsville, ECE Department Spring Seminar, March 2021.

- "Cybersecurity and Risk Quantification: The Startup Adventure of a Theorist,"

  - IEEE Chapter seminar, UM Dearborn, Nov 2019.

- "From Risk Transfer to Risk Mitigation in Contract Design: Cyber Insurance as an Incentive Mechanism for Cybersecurity,"

  - **Keynote**, Conference on Decision and Game Theory for Security (GameSec 2019), Stockholm, Oct 2019.
  - Distinguished Seminars, ECE Department, Iowa State Univ. Oct 2019.
  - Distinguished Seminars, ECE Department, Ohio State Univ. Aug 2019.

- "Cyber Risk Quantification: Risk Dependency and Its Impact on Modeling and Underwriting,"

  - Future of Cyber Risk Conference, University of Cambridge, July 2019.

- "Cyber Risk Quantification: From Breach Prediction to Incentive Design"

  - Distinguished Faculty Seminar, Information Engineering Department, CUHK, May 2019.
  - School of Engineering Seminar, CUHK Shenzhen, May 2019.
  - Department Seminar, Electrical and Computer Engineering, Univ. of Virginia, March 2019.

- "Cybersecurity and Risk Quantification: the Startup Adventure of a Theorist"

  - Guest lecture, Center for Entrepreneurship (CfE), University of Michigan, September 2018.

- "Fine-grained Data Breach Prediction Using Business Profiles (and Its Application in Public Policy Making)"

  - Thirteenth Annual Forum on Financial Information Systems and Cybersecurity: A Public Policy Perspective, University of Maryland, January 2017.

- "Confessions of a Pseudo Data Scientist: An Adventure in Quantitative Cybersecurity"

  - Women in Data Science (WiDS), MIDAS, University of Michigan, February 2017.

- "Quantitative Cybersecurity: Breach Prediction and Incentive Design"

  - CS Seminar, Notre Dame University, December 2018.
  - CS Seminar, New York University, March 2018.
  - Control Seminar, University of Southern California, April 2017.
  - Celebrating Women in Computing Seminar, ECE Department, Carnegie Mellon University, March 2017.

- Advanced Networking Colloquium, Institute for Systems Research (ISR) and ECE Department, University of Maryland, September 2016.

- "Forecasting Cybersecurity Incidents and Its Role in Designing Incentive Mechanisms"

  - CRW-W Seminar, Computer Science Department, Oakland University, April 2016.
  - ECE Seminar, Winlab, Rutgers University, March 2016.
  - EE:Systems CSP Seminar, University of Michigan, Ann Arbor, February 2016.

- "Toward a Global Network Reputation System: Metrics, Data Analysis, and Risk Prediction"

  - Invited presentation, Cyber Risk Quantification Workshop, Deloitte, April 2016.
  - Showcase Presentation, Department of Homeland Security Cyber Security Division R&D Showcase and Technical Workshop, Washington, D. C., February 2016.

- "Building a Global Network Reputation System: Classification and Community Detection of Network Level Malicious Activities"

  - Department of Homeland Security 2014 Cyber Security Division R&D Showcase and Technical Workshop, Washington, D. C., December 2014.
  - Eleventh Annual Forum on Financial Information Systems and Cybersecurity, University of Maryland, College Park, January 2014.

- "Incentivizing Cyber-security: Cyber-insurance and Network Reputation"

  - EE:Systems CSP Seminar, University of Michigan, Ann Arbor, May 2014.

- "Navigating Internet Neighborhoods: Reputation, Its Impact on Security, and How to Crowd-source It"

  - Advanced Networking Colloquium, Institute for Systems Research (ISR), University of Maryland, College Park, November 2013.
  - Computer and Information Science Department Seminar, Indiana University-Purdue University, Indianapolis, IN, October 2013.
  - EE:Systems Department Seminar, University of Southern California, April 2013.

- "Decision making in an unknown and changing world: decentralized multiuser online learning"

  - Winter Seminar Series, EE Department, UCLA, January 2013.

- "In-situ soil moisture sensing: measurement scheduling and estimation using compressive sensing"

  - EE Department, Shanghai Jiao Tong University (SJTU), April 2012.

- "In-situ soil moisture sensing: from physical models to optimal control to system deployment"

  - Microsoft Research Asia, Beijing, China, April 2012.

- "Online Learning in Dynamic Spectrum Access: Restless Bandits, Equilibrium and Social Optimality"

  - Computer and Information Science Department, University of Michigan Dearborn, December 2011.

- – EE Department, University of California, Los Angeles, April 2011.
- – EE Department, Chinese University of Hong Kong, Hong Kong, March 2011.
- – EE Department, University of Pennsylvania, Philadelphia, March 2011.
- – ECE Department, University of Southern California, Los Angeles, December 2010.

- "From Networked Sensing to Networked Computing," *NSF Workshop on the Future Directions of Wireless Sensor Networks*, November 2009, Arlington, VA.

- "Spectrum sharing as congestion games"

  - – Annual INFORMs meeting, San Diego, October 2009.
  - – CSE Department, City University of Hong Kong, July 2008.
  - – CSE Department, Hong Kong University of Science and Technology, Hong Kong, July 2008.
  - – Seminar Series, Microsoft Research, Redmond, WA, June 2008.

- "Opportunistic spectrum access via dynamic resource allocation"

  - – EE Department, University of Minnesota, Twin Cities, December 2009.
  - – University of California, Berkeley, October 2008.
  - – Army Research Lab, College Park, MD, August 2008.
  - – EE Department, University of Southern California, June 2008.
  - – Microsoft Research, Redmond, WA, March 2008.
  - – Chinese University of Hong Kong, Hong Kong, January 2008.
  - – Shandong University, Jinan, Shandong, China, December 2007.
  - – Microsoft Research Asia, Beijing, China, December 2007.

- "Opportunistic spectrum access: stochastic and competitive analysis", *UCSD Advanced Networking Science summer lecture series*, CALIT2, UCSD, August 2007.

- "Modeling a dense wireless sensor network: complexity, stability and robustness", *IPAM Workshop on Mathematical Challenges and Opportunities in Sensor Networking* January 2007, UCLA, Los Angeles, CA

- "Controlled flooding search in a large network"

  - – Seminar Series, ECE Department, Michigan State University, East Lansing, MI, February 2007.
  - – Seminar Series, Fujitsu Laboratory, College Park, MD, June 2005.
  - – Networking Group Seminar, ECE Department, University of California, San Diego, May 2005.
  - – Seminar Series, CS Department, University of California, Riverside, April 2005.
  - – Advanced Networking Seminar, ECE Department, University of Southern California, April 2005.
  - – Seminar Series, California Institute of Technology, April 2005.
  - – Advanced Networking Seminar Series, CS Department, Indiana University-Purdue University at Fort Wayne, February 2005.
  - – Army Research Lab (ARL) Collaborative Technology Alliance (CTA) Distinguished Lecture Series, January 2005.

- "Dynamic bandwidth allocation for low power devices", *IEEE Computer Communication Workshop (CCW)*, October 2005, Los Angeles, CA

- "Building sound mobility models for mobile system studies",

    – DARPA Network Modeling and Simulation (NMS) PI project review meeting, November 2004.

    – Seminar Series, Telcordia Technologies Inc., October 2004.

    – CS Department Seminar, University of Illinois at Urbana-Champaign, October 2003.

- "Revisiting TTL-based controlled flooding search: optimal and randomized strategies",

    – EE Department Seminar, Stanford University, June 2004.

    – ECE Department Seminar Series, Northwestern University, May 2004.

- "Data-gathering wireless sensor networks: capacity, organization and energy efficiency" *Workshop on Mobile, Wireless and Sensor Networks: Technology and Future Directions (MOBWISER)*, sponsored by National University of Singapore, March 2004.

- "Networking with low duty cycled wireless sensors", University of Michigan Wireless Integrated Micro-Systems (WIMS) ERC Lecture Series, March 2004.

- "Optimal bandwidth allocation with imperfect state observation and batch assignment", Coordinated Sciences Lab Seminar Series in Systems, University of Illinois at Urbana-Champaign, September 2003.

- "Optimal in-route bandwidth allocation for the two-way DirecWay network", Hughes Network Systems, collaborative research talk, August 2003.

- "Data-gathering wireless sensor networks: organization, capacity and in-network processing", University of Maryland Center for Satellite and Hybrid Communication Networks (CSHCN) Advanced Networks Colloquium Series, November 2002.

- "Proxy performance in a heterogeneous environment", Hughes Network Systems, Advanced Technology Group Seminar Series, June 2001.

FUNDED GRANTS and PROJECTS

(Total over \$9M in (my share of) external funding)

1. "Analog Cyber", The Boeing Company, PI M. Liu, 5/1/2023-4/30/2024, \$50,000.

2. "Vehicle-centric applications and enhancements of the Matter standard for Connected Devices", General Motors, PI M. Liu, 7/1/2023-6/30/2024, \$99,980.

3. "AI Institute: Symbiotic Foundations for AI and Network Research", an NSF AI Institute, Lead OSU, UM PI M. Liu, Co-PI L. Ying, 10/1/2021-9/30/2026, \$1.2M, out of a total of \$25M.

4. "State-dependent Multi-protocol Network Scanning", Cisco Systems, Inc., PI A. Sarabi, Co-PI M. Liu, 10/1/2021-9/30/2022, \$210,857.

5. "Device Authentication Using the Unique Characteristics of the Transmitted Signal", Ford-UM Alliance, PI H.-S. Kim, Co-PI M. Liu, 05/01/2021-04/30/2023, \$210,000.

6. "Fairness in Machine Learning with Human in the Loop", NSF/Amazon, PI M. Liu, 02/01/2021-01/31/2024, $239,875. (Joint with UCSC, OSU, and Purdue).

7. "SaTC: CORE: Small: A Deep Learning Framework for Intelligent Active and Passive Measurements in the Age of Internet of Things", NSF CNS, PI A. Sarabi, Co-PI M. Liu, 9/1/2020-8/31/2024, $500,000.

8. "Right-Time, Right-Place: A Reinforcement Learning Approach for Idle-Car Repositioning", DiDi Chuxin, through UM MIDAS, PI. L. Ying, Co-PI M. Liu and V. Subramanian, 9/1/2020-8/31/2021, $100,000.

9. "REU: EAGER: Theory and Practice of Risk-Informed Cyber Insurance Policies: Risk Dependency, Risk Aggregation, and Active Threat Landscape", NSF CNS, PI M. Liu, 6/1/2020-9/30/2021, $16,000.

10. "REU: TTP: Small: Network-Level Security Posture Assessment and Predictive Analytics: From Theory to Practice", NSF CNS, PI M. Liu, 6/1/2020-8/14/2021, $16,000.

11. "EAGER: Theory and Practice of Risk-Informed Cyber Insurance Policies: Risk Dependency, Risk Aggregation, and Active Threat Landscape", NSF CNS, PI M. Liu, 10/1/2019-9/30/2021, $199,997.

12. "Multi-scale Network Games of Competition and Collusion", ARO MURI, PI M. Liu, 7/5/2018-7/4/2023, $1.25M (of $6.25M total).

13. "A New Paradigm in Risk-Informed Cyber Insurance Policy Design: Meta-Policies and Risk Aggregation", DHS, PI M. Liu, 12/19/2017-12/18/2018, $350,000.

14. "CPS: Small: Collaborative Research: Incentivizing Desirable User Behavior in a Class of CPS", NSF CPS, PI M. Liu, 10/1/2017-9/30/2020, $250,000.

15. "CPS: Synergy: Connected Testbeds for Connected Vehicles", NSF CPS, PI E. Tulga, Co-PI M. Liu and A. Stefanopoulou, 10/1/2016-9/30/2020, $272,004 (of $800,000 total).

16. "TTP: Small: Network-Level Security Posture Assessment and Predictive Analytics: From Theory to Practice", NSF CNS, PI M. Liu, 8/15/2016-8/14/2021, $499,982.

17. "Leadership Workshop for Female Faculty in the College of Engineering", Elizabeth Caroline Crosby Fund, University of Michigan, PI M. Liu, December 2014, $19,500.

18. "TWC: Small: Understanding Network Level Malicious Activities: Classification, Community Detection and Inference of Security Interdependence", NSF SaTC, PI M. Liu, 9/1/2014-8/31/2018, $493,823.

19. "CPS: Synergy: Collaborative Research: Cyber-Physical System Frameworks for Observation and Control of Mobile Agents for Health Monitoring of Civil Infrastructure Systems", NSF CPS, PI J. P. Lynch, Co-PI M. Liu, 1/1/2015-12/31/2017, $279,971 (of $587,136 total).

20. "Towards a Global Network Reputation System: A Mechanism Design Approach", DHS, PI M. Liu, 9/14/2013-9/13/2016, $1,247,627.

21. "Playing the Devil's Advocate: The Profit Perspective in Secondary Spectrum Markets", NSF NeTS, PI M. Liu, collaborative research with University of Pennsylvania, 9/1/2012-8/31/2015, $215,000 (of $430,000 total).

22. "Land information system for SMAP Tier-1 and AirMOSS Earth Venture-1 Decadal Survey Missions: Integration of SoilSCAPE, remote sensing, and modeling", PI M. Moghaddam, Co-PI M. Liu and D. Teneketzis of EECS, R. Cook, G. Palanisamy, and S. Vannan of Oak Ridge National Lab, and D. Entekhabi of MIT, 9/1/2012-8/31/2015, $265K (of $1,487,216 total).

23. "Sensing sensors: compressed sampling with co-design of hardware and algorithms across multiple layers in wireless sensor networks", NSF CCF, PI M. P. Flynn, Co-PI M. Liu, J. Lynch, A. Gilbert, W. Stark, D. Wentzloff, 9/1/2009-8/31/2014, $488,213 (of $2.7M total).

24. "Cyber-enabled Wireless Monitoring Systems for the Protection of Deteriorating National Infrastructure Systems," NIST TIP, PI J. Lynch, Co-PI M. Liu et al, 2/1/2009-1/31/2014, $350,000 (of $19M total).

25. "(Task augmentation) Ground Network Design and Dynamic Operation for Near Real-Time Validation of Space-Borne Soil Moisture Measurements", NASA AIST, PI: M. Moghaddam. Co-PI: M. Liu, 3/1/2011-2/29/2012, $65,085 (of $295,000 total).

26. "Ground Network Design and Dynamic Operation for Near Real-Time Validation of Space-Borne Soil Moisture Measurements", NASA AIST, PI. M. Moghaddam, Co-PI M. Liu and D. Teneketzis, 6/1/2009-5/31/2012, $332,395 (of $1.3M total).

27. "Cognitive Tactical Radios: cognition through learning and strategy", ARO, PI M. Liu, September 2011-September 2012, $49,901.

28. "Pushing the wireless coexistence boundary using the SORA platform", funded by Microsoft Research, PI M. Liu, Co-PI A. Anastasopoulos, W. Stark, July 2011, $20,000 (of $60,000 total).

29. "Pushing the wireless coexistence boundary using the SORA platform", funded by Microsoft Research, PI M. Liu, Co-PI A. Anastasopoulos, W. Stark, May 2010, equipment only.

30. "Soil Moisture Smart Sensor Web Using Data Assimilation and Optimal Control", NASA, PI M. Moghaddam, Co-PI M. Liu and D. Teneketzis, 11/01/2006-10/31/2009, $319,057 (of $1,199,963 total).

31. "Capacity-Driven Design of Large-Scale Wireless Sensor Networks", NSF CAREER award, PI M. Liu, 9/1/2003-8/31/2010, $421,853.

32. "Developing Routing Protocols Using Static Low Duty Cycled Sensors", ARL CTA (Collaborative Technology Alliance) Program (through a subcontract from Telcordia Technologies Inc.), PI M. Liu, 9/1/2003-10/30/2009, $379,264.

33. "Field-Gathering Wireless Sensor Networks", NSF Sensors and Sensor Networks Program, PI D. L. Neuhoff, Co-PI M. Liu and S. Pradhan, 9/1/2003-8/31/2006, $91,315 (of $375,000 total).

34. "Energy Efficient Wireless Networking", ONR, PI W. Stark, Co-PIs: A. Anastasopoulos, S. Lafortune, M. Liu, and D. Teneketzis, 1/1/2003-12/31/2005, $141,990 (of $1,191,403 total).

35. "Building Sound Mobility Models for Ad Hoc Network Simulation", DARPA IPTO Network Modeling and Simulation (NMS) Program (administered by US Air Force Research Lab (AFRL)), PI M. Liu, 4/15/2004-1/15/2005, $74,955.

36. "Energy Efficient Networking Mechanisms for Environmental Monitoring Wireless Sensors", WIMS NSF ERC sub-project, PI M. Liu, 9/1/2002-8/31/2007, $253,907.

37. "Distributed Data Compression and Dissemination for Wireless Sensor Networks", NSF ITR, PI D. L. Neuhoff, Co-PI M. Liu, 9/1/2001-8/31/2004, $192,621 (of $399,497 total).

38. "Dynamic Return Channel Allocation for the DirecWay Satellite System", funding from Hughes Network Systems, PI M. Liu, 9/1/2002-12/31/2004, $150,000.

39. "Fundamental Stochastic Problems in Wireless Sensor Networks", Elizabeth Caroline Crosby Fund, University of Michigan, PI M. Liu, April 2003, $8,700.

40. "Performance Evaluation of Proxies in the DirecPC Satellite System", funding from Hughes Network Systems, PI M. Liu, 1/1/2001-8/31/2002, $56,457.

PATENTS and DISCLOSURES

- Invention report "Secure Ranging and Remote Authentication using a Physically Unclonable Function", File No. 2022-287, filed March 2022.

- Invention report "Adaptive Network Probing Using Machine Learning", File No. 2020-516, filed June 2020. Preliminary filing application No.: 63/105,492

- Invention report "Numerical representations of Internet hosts and network signatures", File No. 7670, filed August 2017.

- Invention report "Meta-Policies for Cyber Insurance", File No. 7395, filed February 2017. Preliminary filing application No.: 63/427,547. Title "Systems and Methods for Mitigating Cybersecurity Risk of Interdependent Entities", filed on November 23, 2022.

- Invention report "Software and tools for a network reputation system", File No. 7109, filed May 2016.

- Patent No. US 10,038,703 B2, issued in July 2018. Title: "Rating Network Security Posture And Comparing Network Maliciousness". Invention report "A Method for Quantifying the Maliciousness of Networks", File No. 6116, filed on February 18, 2014. Patent application No. 14/801,016, filed on July 18, 2014.

- Patent No. US 9,729,558 B2, issued in April 2017. Title "Network Maliciousness Susceptibility Analysis and Rating". Invention report "A Method for Predicting the Maliciousness of Networks", File No. 6088, filed on January 27, 2014.

- "A method for the generation and use of global network reputation", disclosure (UM file 4993), April 2011.

- "Sun tracker for small-scale solar energy systems", disclosure (UM file 4467), July 2009.

- "A battery-driven micro-solar power subsystem for outdoor sensor nodes", disclosure (UM file 4598), December 2009.

LEADERSHIP & SERVICES at UM

University Level
– UM Detroit Center for Innovation (DCI) Curriculum Committee, January 2020-August 2020, member.

– Rackham Executive Board, September 2018-May 2021, member.
– UM Task Force on Innovation, June 2017-May 2018, co-chair.
– Rackham Pre-Doctoral Fellowship Review Committee, 2014-2018, member.
– UM Provost's Faculty Advisory Committee (PFAC), 2011-2013, member.
– ADVANCE Launch Committees for two new faculty members in CoE, 2013-2014, convener.
– MI Sustainable Transportation Imperative (MSTI) steering committee, 2012-2013, member.
– UM-SJTU Joint Institute Faculty Search Committee: 2007-2012, member.
– Rackham AGEP adviser for ECE students: 2006-2007, adviser.

College of Engineering (CoE) Level
– Ombudsperson for 3 engineering students engaged in medical research, Jan 2023-present
– Aerospace Leadership M.Eng. Advisory Board, Aerospace Engineering Dept, 2022-present, member.
– CoE Future Campus Committee, 2021-2023, member
– CoE Covid Council, 2020-2021, member
– Nexus Cybersecurity Bootcamp Faculty Director, 2019-present
– Dean's Advisory Committee on Female Faculty (DACFF), January-December 2013, member; January 2014-June 2015, Chair.
– CoE Women Faculty Leadership Retreat Planning Committee: 2014-2015, Chair.
– CoE International Programs Committee: 2002-2007, member.
– Promotion casebook committee for the Industrial and Operations Engineering (IOE) Department, 2012-13, member.
– Reappointment casebook committee for the IOE Department, 2013-2014, member.

Department (EECS) Level
– ECE Chair: September 2018-present.
– ECE CE UG Advising: September 2019-present, advisor.
– ECE Associate Chair for Graduate Affairs: September 2014-August 2016.
– ECE Communications Area Director: 2008-2015, area director.
– ECE Executive Committee: 2008-2010, member; 2013-2014, member; 2017-2018, member.
– ECE Faculty Search Committee: 2005-2006, member; 2009-2014, member.
– ECE Faculty Cognizant for course EECS 401: 2010-2014.
– ECE Faculty Mentoring coordinator; 2012-present, co-coordinator.
– ECE Faculty mentor to two junior faculty members in ECE, September 2013-present.
– ECE Internal Review Committee: 2011-12, member.
– ECE undergraduate advising: 2006-2007, 2010-2013, advisor.
– GEECS (Girls in EECS) faculty advisor, 2011-2013; advisor.
– ECE Casebook Committee: 2009-2010, member.
– EECS Research Emphasis and Faculty Hiring Committee, 2005-2006, member.
– EE:Systems Curriculum sub-committee on proposed EECS 457, 2005, member.
– EE:Systems Admissions Committee, 2002-2007, member.
– EECS Department Web Committee, 2002, member.

Served on 40+ Doctoral Dissertation Committees as a member or cognate in the past 10 years
– Including students from EE, EE:Systems, CSE, IOE and CEE Departments.

PROFESSIONAL ACTIVITIES

Executive/Advisory Board

– *Elected Executive Board Member*, ECE Department Heads Association (ECEDHA), 2021-2026.
– *Advisory Board Member*, ECE Department, University of Washington, 2019-2021.

Awards Committees

– *Member*, SIGMETRICS Rising Star committee, 2020.

Editorial Work

– *Associate Editor*, ACM Transactions on Sensor Networks, August 2010 to August 2015.
– *Associate Editor*, IEEE/ACM Transactions on Networking, January 2008 to August 2012.
– *Associate Editor*, IEEE Transactions on Mobile Computing, October 2006 to November 2011.
– *Area Editor*, ACM SIGMOBILE Journal of Mobile Computing and Communications Review (MC2R), January 2005 to present.
– *Guest Editor*, the Proceedings of the IEEE Special Issue on Sensor Network Applications, 2009-2010.
– *Guest Editor*, EURASIP Journal on Wireless Communications and Networking Special Issue on Sensor Networks, 2005.

Conference Organizing

– *TPC Co-Chair*, Workshop on the Economics of Information Security (WEIS), Dallas, TX, April 2024.
– *Co-Organizer*, Dagstuhl Seminar on "Managing Industrial Control Systems Security Risks for Cyber Insurance", Schloss Dagstuhl in Germany, November 2021.
– *TPC Area Chair*, NeurIPS 2021, 2022, 2023.
– *TPC Area Chair*, ICML 2023.
– *TPC Area Chair*, 28th IEEE International Conference on Network Protocols (ICNP), 2020.
– *Member of Organizing Committee*, 6th Midwest Workshop on Control and Game Theory, April 2017.
– *Technical Program Chair*, 12th IEEE International Conference on Mobile Ad hoc and Sensor Systems (MASS), October 2015.
– *Technical Program Co-Chair*, the 10th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS), May 2014.
– *Area TPC Co-Chair*, the Annual IEEE International Conference on Computer Communications (INFOCOM), 2008, 2010, 2011, 2012, 2013.
– *Vice Chair*, Algorithms Track, the 9th IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS), May 2013.
– *Technical Program Vice Co-Chair*, the 3rd IEEE International Conference on Mobile Ad hoc and Sensor Systems (MASS), October 2006.
– *Poster/Demo Chair*, the 4th IEEE International Conference on Sensors and Ad Hoc Communications and Networks (SECON), June 2007.
– *Workshop Chair*, the 4th International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt), April 2006.
– *Technical Program Co-Chair*, the 2nd International Workshop on Wireless and Wired Internet Communications (WWIC), February 2004.

Session Organizer/Chair

– IEEE Conference on Decision and Control (CDC), 2004, 2005;
– Annual Allerton Conference on Communication, Control and Computing (Allerton), 2009, 2011-13;

– International Workshop on Information Processing in Sensor Networks (IPSN), 2005;
– ACM International Conference on Mobile Computing and Networking (MobiCom), 2004, 2009, 2013;
– IEEE Annual Conference on Computer Communications (INFOCOM), 2003, 2004;
– IEEE 45th Midwest Symposium on Circuits and Systems (MWSCAS), 2002;
– IEEE Wireless Communication and Networking Conference (WCNC), 2000.

Technical Program Committee Member
– WEIS 2021, 2022, 2023;
– ACM NetECON 2017, 2018, 2019;
– IEEE MASCOT 2017;
– ACM SIGMETRICS, 2015, 2016, 2017;
– Tenth European Conference on Wireless Sensor Networks (EWSN), 2013;
– Conference on Game Theory in Networks (GameNets), 2009, 2011;
– International Symposium on Algorithms for Sensor Systems, Wireless Ad Hoc Networks and Autonomous Mobile Entities (ALGOSENSORS), 2010, 2011;
– IEEE Military Conference (MILCOM), 2011, 2012;
– IEEE International Conference on Sensor and Ad Hoc Networks (SECON), 2004, 2005, 2007, 2009, 2010, 2011, 2012;
– IEEE Annual Conference on Computer Communications (INFOCOM), 2004, 2005, 2006, 2008, 2009, 2010;
– ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc), 2007, 2014, 2015, 2017, 2018;
– Third Workshop on Embedded Networked Sensors (EmNets), May 2006;
– International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt), 2006, 2007;
– ACM International Conference on Mobile Computing and Networking (MobiCom), 2005, 2006, 2013;
– ACM Conference on Embedded Networked Sensor Systems (SenSys), 2005;
– International Workshop on Information Progressing in Sensor Networks (IPSN), 2004, 2005, 2006, 2009, 2013;
– International Workshop on Measurement, Modeling, and Performance Analysis of Wireless Sensor Networks (SenMetrics), 2005;
– International Conference on Quality of Service in Heterogeneous Wired/Wireless Networks (QShine), 2004;
– IEEE International Conference on Networks (ICON), 2004;
– IFIP Mobile and Wireless Communications Networks (MWCN), 2004;
– International Conference on Broadband Networks (Broadnets), 2004;
– Workshop on Broadband Advanced Sensor Networks (BASENET), 2004;
– International Workshop on Applications and Services in Wireless Networks (AWSN), 2004, 2005;
– International Workshop on Wireless Local Networks (WLN), 2003;
– International Conference on Internet Computing (IC), 2004.

Industrial Working Group
– Cyber Risk Quantification Working Group; member April 2016 - present.

Reviewer for Journals and Conferences
– IEEE/ACM Transactions on Networking; IEEE Transactions on Communications; IEEE Transactions on Information Theory; IEEE Transactions on Signal Processing; IEEE Transactions on Wire-

less Communications; IEEE Journal of Selected Areas in Communications; IEEE Transactions on Vehicular Technology; Elsevier Journal of Computer Networks; ACM Journal on Mobile Networks and Applications (MONET);

– IEEE International Conference on Communications (ICC); IEEE Global Communications Conference (GLOBECOM); IEEE Conference on Decision and Control (CDC).

Proposal and Panel Reviews
– Reviewer for NSF, ONR, ARO and AAAS.

Graduate program/Department review
– EE Department, University of Cincinnati, Winter 2015.
– ECE Department, Michigan Tech University, Fall 2019.
– ECE Department, University of Virginia, Fall 2019.
– ECE Department, NC State University, Winter 2023.
– ECE Department, Carnegie Mellon University, Spring 2023.
– Institute for Systems Research (SR), University of Maryland, College Park, Summer 2023.
– ECE Department, University of Washington, Seattle, Fall 2023.