

Chien-Chung Shen

Computer and Information Sciences

University of Delaware

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RESEARCH AREAS 5G and edge computing for social VR and AR applications, blockchain for federated learning, attribute-based encryption, time-sensitive networking, cybersecurity education, mobile ad hoc networks, wireless sensor networks, dynamic spectrum access networks, underwater acoustic networks, mobile cloud computing, bio-inspired networking and swarming protocols, cybersecurity, software-defined networking and network function virtualization, time-sensitive networking, control and management of broadband networks, distributed real-time systems, and simulation.

EDUCATION **Ph.D. in Computer Science** September 1992
University of California, Los Angeles (UCLA)
Dissertation: An Integrated Design Environment for Distributed Real-Time Systems
Advisor: Dr. Rajive L. Bagrodia

M.S. in Computer Science June 1984
National Chiao Tung University, Taiwan
Thesis: A Dynamic Dogleg Channel Router for VLSI Circuits
Advisor: Dr. Lih-Hsing Hsu

B.S. in Computer Science June 1982
National Chiao Tung University, Taiwan

EXPERIENCE **University of Delaware**, Professor, CIS September 2013—Present
University of Delaware, Associate Professor, CIS September 2005—August 2013
University of Delaware, Assistant Professor, CIS September 1998—August 2005
Research and teaching in the areas of mobile ad hoc and wireless sensor network, wireless network and mobile computing, mobile cloud computing, and simulation.

Bellcore, Applied Research, Research Scientist June 1993—August 1998
Research and prototyping of fault-tolerant, distributed network control and management systems for DARPA ATDNet (ATM and SONET) and DARPA MONET (WDM) projects.

AT&T, Bell Laboratories, Technical Consultant August 1992—June 1993
System architecture design, software development, and performance evaluation for network monitoring systems.

Graduate Student Researcher Spring 1989—Summer 1992
Computer Science Department, UCLA
Research and prototyping of an integrated approach to unify the design, simulation, implementation, and verification of distributed real-time systems into a single framework.

Research Assistant Fall 1986—Fall 1988
Computer Science Department, UCLA
Research, design, and performance evaluation of distributed task assignment algorithms.

C³I Officer July 1984—June 1986
Second Lieutenant, Army ROTC, Taiwan
Design and development of a military telephone network monitoring system on a network of IBM PCs.

Research Assistant

August 1982—June 1984

Department of Computer Science, National Chiao Tung University, Taiwan

Research and design of optimal task allocation strategy and algorithm to achieve minimum-turnaround-time task allocation in distributed systems. Research and prototyping of a VLSI channel router to handle cyclic conflicts and route nets with variable width.

**PROFESSIONAL
AFFILIATIONS**

1. Member of ACM
2. Member of IEEE

HONORS

1. NSF CAREER Award, 2004
2. Bellcore's CEO Award, 1996
3. Bellcore President's Recognition Award, 1995
4. Member of the Phi Tau Phi Scholastic Honor Society
5. Chinese Computer Society Scholarships

PATENTS

1. Krishna Bala, Gee-Kung Chang, Georgios Ellinas, Michael Post, Chien-Chung Shen, and John Wei, Hitless Reconfiguration of a Wavelength Division Multiplexed Optical Communication Network, U.S. Patent #6075631, June 13, 2000.

**EXTERNAL
FUNDING**

1. Co-PI, SaTC-EDU: Educating Security and Privacy of Metaverse in Metaverse to Teenagers, PI: Teya Rutherford, NSF DGE-2335807, \$299,999, September 15, 2023 - August 31, 2025.
2. PI, ITEST: Exploring Theory and Design Principles [EDT]: Mixed Reality Based Interactive Cybersecurity Education for Middle School Students, Co-PIs: Chrystalla Mouza and Teya Rutherford, NSF DRL-2048874, \$390,400, February 15, 2021 - January 31, 2024.
3. Co-PI, SaTC: EDU: Cybersecurity Education Using Interactive Storytelling with Social Robots, PI: Chrystalla Mouza, Co-PI: Tia Barnes, NSF DGE-1821794, \$299,998, September 1, 2018 - August 31, 2022.
4. Co-PI, Smart Scheduling and Coexistence in Next Generation Heterogeneous Wireless Networks, PI: Len Cimini, Cisco CG# 1390389, \$104,000 (gift without overhead), September 1, 2019 - August 31, 2020.
5. Co-PI, Aggregation and Determinism in Next Generation Wireless Networks, PI: Len Cimini, Cisco CG# 1106107, \$99,000 (gift without overhead), February 1, 2018 - January 31, 2019.
6. Sole-PI, Controlling Information with Attribute-Based Encryption and Blockchain, MITRE (National Cybersecurity FFRDC), \$75,000, October 1, 2017 - September 30, 2018.
7. Subcontract PI, Degraded Synthetic Training, Office of Naval Research STTR (Phase I) Contract #N68335-17-C-0357, \$37,500, Prime: Scalable Network Technologies, Inc., June 9, 2017 - December 9, 2017.
8. Co-PI, NeTS: Medium: Collaborative Research: In-Band Full-Duplex Underwater Acoustic Networks, NSF CNS-1704097, \$200,000, UD PI: Len Cimini, Co-PI: Xiang-Gen Xia, UA PI: Aijun Song (CNS-1704076), June 1, 2017 - May 31, 2022.
9. Co-PI, Fair and Spectrally Efficient Coexistence of LAA-LTE and Wi-Fi, PI: Len Cimini, Cisco CG# 648003, \$99,000 (gift without overhead), October 1, 2016 - November 1, 2017.
10. Sole Principal Investigator, Cybersecurity Education with Social Robots, UD Cybersecurity Initiative, \$30,000, February 1, 2016 - January 31, 2018.

11. Co-PI, Fair and Spectrally Efficient Coexistence of Multiple Radio Access Technologies in the Same Spectrum Band, PI: Len Cimini, Cisco CG# 592945, \$98,000 (gift without overhead), October 1, 2015 - September 31, 2016.
12. Subcontract PI, Human-Centric Training and Assessment System for Cyber Situational Awareness, Army Research Office STTR (Phase II) Contract #W911NF-14-C-0140, \$120,000, Prime: Scalable Network Technologies, Inc., September 10, 2014 - September 9, 2016.
13. Sole Principal Investigator, A Software-Defined Radio Based Performance Measurement Platform for Wireless Networks, NIST Cooperative Agreement #70NANB14H087, \$76,007, May 1, 2014-April 30, 2016.
14. Subcontract PI, Cognitive Task Analysis Based Modeling and Simulation Environment for Cyber Training and Assessment, Army Research Office STTR (Phase I) Contract #W911NF-13-C-0061, \$30,000, Prime: Scalable Network Technologies, Inc., April 15, 2013 - October 14, 2013.
15. Co-Principal Investigator, Collaborative Project: A Regional Cybersecurity Education Initiative, NSF DUE-1241711, PI: Kenneth Barner, 5 Co-PIs from CIS and ECE, UD: \$416,102, Shen: $\approx$ \$38,000, September 1, 2012 - August 31, 2016.
16. Sole Principal Investigator, JPMC Collaboration GET Curriculum on Mobile Cloud Computing, UD/CIS/Shen: \$38,467, June 1, 2012 - December 31, 2012.
17. Principal Investigator, NeTS:Small:Collaborative Research:Learning to Help: Trading Spectrum Ownership for Performance, NSF CNS-1016841, co-PI: Chunsheng Xin (Norfolk State University), Total: \$290,999, UD/CIS/Shen: \$149,999, September 1, 2010 - August 31, 2013.
18. Subcontract PI, Bio-Inspired Energy-Efficient and Scalable Design Approaches to Mobile Adhoc and Wireless Sensor Networks, Army SBIR (Phase II) Contract #W911QX-09-C-0076, Prime: Scalable Network Technologies, Inc., UD Co-PI: Lou Rossi, Total: $\approx$ \$730K, UD: \$364,897, CIS/Shen: \$186,902, October 1, 2009 - January 31, 2012.
19. Principal Investigator, NetSE:Autonomous Wireless Swarms: Integrating Science and Engineering, NSF CCF-0916035, co-PI: Louis Rossi, UD: \$442,000, CIS/Shen: \$223,187, September 1, 2009 - August 31, 2013.
20. Subcontract PI, Bio-Inspired Approaches to Secure Energy-Efficient Scalable Networking, Army SBIR (Phase I) Contract #W911QX-08-C-0032, Prime: Scalable Network Technologies, Inc., UD Co-PI: Lou Rossi, Total: $\approx$ \$120K, UD: \$39,999, CIS/Shen: \$20,000, December 1, 2007 - May 31, 2008.
21. Principal Investigator, Biology Inspired Autonomic Networking Protocols: Analysis and Implementation, NSF CCF-0726556, co-PI: Louis Rossi, UD: \$117,144, CIS/Shen: \$58,427, September 15, 2007 - August 31, 2011.
22. Principal Investigator, Collaborative Research: WN: Toward High-Performance Mesh Networks, NSF CNS-0721361, co-PIs: Chunsheng Xin (Norfolk State University) and Liangping Ma (San Diego Research Center), Total: \$412,000, UD/CIS/Shen: \$220,000, September 1, 2007 - August 31, 2011.
23. Sole Principal Investigator, Designing Simulation Models and Exercises in QualNet 4.0, Scalable Network Technologies, UD/CIS/Shen: \$20,000, February 1, 2007 - December 31, 2007.
24. Sole Principal Investigator, CAREER: Survivable Hybrid Networks, NSF CNS-0347460 (CAREER Award), UD/CIS/Shen: \$480,000, April 1, 2004 - March 31, 2010.

25. Subaward PI, Scalable Testbed for Next-Generation Mobile Wireless Networking Technologies, NSF CNS-0335302, University of Delaware portion - \$250,000, October 1, 2003 - September 30, 2007. (Full award leading institution: UCLA, total award: \$3,601,868, other team members: UC San Diego, UC Davis, UC Santa Barbara, UC Riverside, U. of Southern California, and U. of Delaware)
26. Sole Principal Investigator, Ad hoc Networking with Swarm Intelligence, NSF CNS-0240398, \$349,993, June 2003 - May 2006.
27. Associate Investigator, Ad hoc Network Mangement and Ad hoc Networking with Directional Antenna, Army Research Lab. CTA, \$145,000, October 2001 - September 2006. (part of \$7 million 5-year grant from ARL CTA)
28. Sole Principal Investigator, Comparative Study of Networks Simulators, Scalable Network Technologies, \$12,000, December 2004 - February 2005.
29. Sole Principal Investigator, Network Capacity Study of JTRS, RAND, \$15,000, February 2003 - August 2003.
30. Sole Principal Investigator, Computer Networking Instruction Aid Using the QualNet Simulator, Scalable Network Technologies, \$22,650, August 2002 - July 2003.
31. Sole Principal Investigator, The Space Information Networking Architecture for Future Science Missions, \$30,000, NASA NAG5-11232, August 15, 2001 - August 14, 2002.
32. Sole Principal Investigator, Design and Implementation of the Network Element Control Protocol, \$56,000, Transtech Networks, October 1, 2000 - December 31, 2001.
33. Associate Investigator, Battlefield Network Management, \$6,000, ARL ATIRP, September 1, 2000 - December 31, 2000.
34. Sole Principal Investigator, Active and Intelligent Network Control and Management, \$65,000, Telcordia Technologies, February 1, 1999 - January 31, 2000.
35. Sole Principal Investigator, Wireless Network Management, \$30,000, Telcordia Technologies, September 1, 1998 - August 31, 1999.

BOOK CHAPTERS

1. Seyedmohammad Salehi, Aijun Song, and Chien-Chung Shen, Hybrid Infrastructure for AUV Operations, in *Magnetic and Acoustic Communications: From Theory to Practice*, Editor: Fei Hu, CRC Press, April 2019. <https://doi.org/10.1201/9781315156477>
2. Chaiporn Jaikaeo and Chien-Chung Shen, Adaptive Backbone Multicast Routing for Mobile Ad hoc Networks, *Algorithms and Protocols for Wireless Ad Hoc and Sensor Networks*, Editor: Azzedine Boukerche, Wiley, March 2008.
3. Chien-Chung Shen and Zhuochuan Huang, Topology Control for Ad hoc Networks: Present Solutions and Open Issues, *Theoretical and Algorithmic Aspects of Sensor, Ad Hoc Wireless and Peer-to-Peer Networks*, Editor: Jie Wu, CRC Press, March, 2005.
4. Chien-Chung Shen, Chaiporn Jaikaeo, and Chavalit Srisathapornphat, Sensor Network Architecture and Applications, *Handbook of Sensor Networks*, Editors: Mohammad Ilyas and Imad Mahgoub, CRC Press, July 2004.

JOURNAL PUBLICATIONS

1. Hao Guo, Collin Meese, Wanxin Li, Chien-Chung Shen, and Mark Nejad, B²SFL: A Bi-level Blockchain Architecture for Secure Federated Learning-based Traffic Prediction, *IEEE Transactions on Services Computing*, accepted, 2023, doi: 10.1109/TSC.2023.3318990.
2. Hao Guo, Wanxin Li, Mark Nejad, and Chien-Chung Shen, A Hybrid Blockchain-Edge Architecture for Electronic Health Record Management with Attribute-based Cryptographic Mechanisms, *IEEE Transactions on Network and Service Management*, vol. 20, no. 2, pp. 1759-1774, Hune 2023, doi: 10.1109/TNSM.2022.3186006.

3. Guangyi Liu, Seyedmohammad Salehi, Erdem Bala, Chien-Chung Shen, and Leonard J. Cimini, Communication-Constrained Routing and Traffic Control: A Framework for Infrastructure-Assisted Autonomous Vehicles, *IEEE Transactions on Intelligent Transportation Systems*, Vol. 23, No. 12, pp. 23844-23857, December 2022, doi: 10.1109/TITS.2022.3197808.
4. Guangyi Liu, Seyedmohammad Salehi, Chien-Chung Shen, and Leonard Cimini, TDD Massive MIMO Piloting Strategy with User Information: A Reinforcement Learning Approach, *IEEE Wireless Communications Letters*, Volume 10, Issue 2, pp. 349-352, February 2021, doi: 10.1109/LWC.2020.3030728.
5. Hao Guo, Wanxin Li, Mark Nejad, and Chien-Chung Shen, Proof-of-Event Recording System for Autonomous Vehicles: A Blockchain-based Solution, *IEEE Access*, Vol. 8, 2020, pp. 182776-182786, doi: 10.1109/ACCESS.2020.3029512.
6. Wanxin Li, Hao Guo, Mark Nejad, and Chien-Chung Shen, Privacy-Preserving Traffic Management: A Blockchain and Zero-Knowledge Proof Inspired Approach, *IPEEE Access*, Vol. 8, 2020, pp. 181733-181743, doi: 10.1109/ACCESS.2020.302818D9.
7. Shengxing Liu, Aijun Song, and Chien-Chung Shen, Topology Optimization of Long-Thin Under-Ice Acoustic Sensor Networks, *IEEE Journal of Oceanic Engineering*, Volume 44, Issue 4, October 2019, pp. 1264-1278, doi: 10.1109/JOE.2018.2861958.
8. Guangyi Liu, Li Li, Len Cimini, and Chien-Chung Shen, Extending Proportional Fair Scheduling to Buffer-Aided Relay Access Networks, *IEEE Transactions on Vehicular Technology*, Volume 68, Issue 1, pp. 1041-1044, January 2019. doi: 10.1109/TVT.2018.2879757. D
9. Li Li, Jim Seymour, Len Cimini, and Chien-Chung Shen, Coexistence of Wi-Fi and LAA Networks with Adaptive Energy Detection, *IEEE Transactions on Vehicular Technology*, Volume 66, Issue 11, November 2V017, pp. 10384-10393.
10. Wei Chen, Liangping Ma, and Chien-Chung Shen, Congestion-aware MAC Layer Adaptation to Improve Video Telephony over Wi-Fi, *ACM Transactions on Multimedia Computing, Communications, and Applications*, Volume 12, Issue 5s, December 2016.
11. Fang-Jing Wu, Hsiu-Chi Hsu, Chien-Chung Shen, and Yu-Chee Tseng, Range-Free Mobile Actor Relocation in a Two-Tiered Wireless Sensor and Actor Network, *ACM Transactions on Sensor Networks*, Volume 12, Issue 2, May 2016.
12. Chunsheng Xin, Min Song, Liangping Ma, George Hsieh, and Chien-Chung Shen, An Incentivized Cooperative Architecture for Dynamic Spectrum Access Networks, *IEEE Transactions on Wireless Communications*, Vol. 12, No. 10, October 2013, Vpp. 5154-5161.
13. Chunsheng Xin, Min Song, Liangping Ma, and Chien-Chung Shen, ROP: Near-Optimal Rendezvous for Dynamic Spectrum Access Networks, *IEEE Transactions on Vehicular Technology*, Vol. 62, No. 7, September 2013, V pp. 3383-3391.
14. You-Chiun Wang, Che-Hsi Chuang, Yu-Chee Tseng, and Chien-Chung Shen, A Lightweight, Self-Adaptive Lock Gate Designation Scheme for Data Collection in Long-Thin Wireless Sensor Networks, *Wireless Communications and Mobile Computing*, Vol. 13, Issue 1, pp. 47-62, January, 2013.
15. Ilknur Aydin, Janardhan Iyengar, Phillip Conrad, Chien-Chung Shen, and Paul Amer, Evaluating TCP-Friendliness in Light of Concurrent Multipath Transfer, *Elsevier Computer Networks (COMNET) Journal*, Volume 56, Issue 7, May 2012, pp. 1876-1892.
16. Chunsheng Xin, Min Song, Liangping Ma, and Chien-Chung Shen, Performance Analysis of a Control-Free Dynamic Spectrum Access Scheme, *IEEE Transactions on Wireless Communications*, Volume 10, Issue 12, pp. 4316-4323, December 2011.

17. Ke Li, Claudio E. Torres, Kyle Thomas, Louis F. Rossi, and Chien-Chung Shen, Slime Mold Inspired Routing Protocol for Wireless Sensor Networks, *Springer Journal of Swarm Intelligence*, Volume 5, Numbers 3-4, pp. 183-223, 2011.
18. Claudio E. Torres, Louis F. Rossi, Jeremy Keffer, Ke Li, and Chien-Chung Shen, Modeling, analysis and simulation of ant-based network routing protocols, *Journal of Swarm Intelligence*, Springer, Vol. 4, No. 3, pp. 221-244, September 2010.
19. Xiaofeng Han, Xiang Cao, Errol Lloyd, and Chien-Chung Shen, Fault-tolerant Relay Node Placement in Heterogeneous Wireless Sensor Networks, *IEEE Transactions on Mobile Computing*, Vol. 9, No. 5, pp. 643-656, May 2010.
20. Justin Yackoski, Lu Zhang, Bo Gui, Chien-Chung Shen, and Len Cimini, Networking with Cooperative Communications: Holistic Design and Realistic Evaluation. *IEEE Communications Magazine*, Vol. 47, No. 8, August 2009, pp. 113-119.
21. De-Kai Liu, Chaiporn Jaikaeo, Chien-Chung Shen, and Ren-Hung Hwang, Discovering Timely Information in MANETs, *Computers and Mathematics with Applications*, Elsevier, Volume 57, Issue 11-12, June 2009, pp. 1808-1821.
22. Chunsheng Xin, Liangping Ma, and Chien-Chung Shen, A Path-Centric Channel Assignment Framework in Cognitive Radio Wireless Networks, *ACM/Springer Mobile Networks and Applications (MONET) Journal, Special Issue on Cognitive Radio Wireless Networks*, Volume 13, Issue 5, October 2008, pp. 463-476.
23. Chien-Chung Shen, Ke Li, Chaiporn Jaikaeo, and Vinay Sridhara, Ant-Based Distributed Constrained Steiner Tree Algorithm for Jointly Conserving Energy and Bounding Delay in Ad hoc Multicast Routing, *ACM Transactions on Autonomous and Adaptive Systems*, Vol. 3, Issue 1, March 2008.
24. Liangping Ma and Chien-Chung Shen, Improved Unicast Capacity Bounds for General Multi-Channel Multi-Radio Wireless Networks, *IEEE Communications Letters*. Vol. 11, No. 11, November 2007, pp. 874-876.
25. De-Kai Liu, Chaiporn Jaikaeo, Chien-Chung Shen, and Ren-Hung Hwang, Querying Time-Indexed Information in MANETs, *Ad Hoc Networks Journal*, Elsevier, Vol. 5, Issue 7, September 2007, pp. 1090-1112.
26. Chien-Chung Shen and Sundaram Rajagopalan, Protocol-Independent Multicast Packet Delivery Improvement Service for Mobile Ad hoc Networks, *Ad Hoc Networks Journal*, Elsevier, Vol. 5, Issue 2, March 2007, pp. 210-227.
27. Sundaram Rajagopalan and Chien-Chung Shen, ANSI: A Swarm Intelligence-based Unicast Routing Protocol for Hybrid Ad hoc Networks, *Journal of System Architecture*, Special issue on Nature Inspired Applied Systems, Elsevier, Vol. 52, Issues 8-9, August-September 2006, pp. 485-504.
28. Zhuochuan Huang and Chien-Chung Shen, Multibeam Antenna-Based Topology Control with Directional Power Intensity for Ad Hoc Networks, *IEEE Transactions on Mobile Computing*, Vol. 5, No. 5, pp. 508-517, May 2006.
29. Chien-Chung Shen, Zhuochuan Huang, and Chaiporn Jaikaeo, Directional Broadcast for Ad hoc Networks with Percolation Theory, *IEEE Transactions on Mobile Computing*, Vol. 5, No. 4, pp. 317-332, April 2006.
30. Chien-Chung Shen, Zhuochuan Huang, and Chaiporn Jaikaeo, Ant-Based Distributed Topology Control Algorithms for Mobile Ad hoc Networks, *ACM/Springer Wireless Networks Journal (WINET)*, Vol. 11, No. 3, May 2005, pp. 299-317.
31. Chaiporn Jaikaeo and Chien-Chung Shen, Multicast Communication in Ad hoc Networks with Directional Antennas, *Telecommunication Systems Journal*, Vol. 28, Issues 3-4, March-April, 2005, pp. 297-316.

32. Chien-Chung Shen and Chaiporn Jaikaeo, Ad hoc Multicast Routing Algorithm with Swarm Intelligence, *ACM/Springer Mobile Networks and Applications (MONET) Journal, Special Issue on Algorithmic Solutions for Wireless, Mobile, Ad Hoc and Sensor Networks*, Vol. 10, No. 1, January-February 2005, pp. 47-59.
33. Chien-Chung Shen, Sundaram Rajagopalan, Girish Borkar, and Chaiporn Jaikaeo, A Flexible Routing Architecture for Ad hoc Space Networks, *Computer Networks Journal, Special Issue on Networking for the Earth Sciences*, Elsevier, Vol. 46, No. 3, October 2004, pp. 389-410.
34. Chien-Chung Shen, Chavalit Srisathapornphat, Rui Liu, Zhuochuan Huang, Chaiporn Jaikaeo, and Errol L. Lloyd, CLTC: A Cluster-based Topology Control Framework for Ad hoc Networks, *IEEE Transactions on Mobile Computing*, Vol. 3, No. 1, January-March, 2004, pp. 18-32.
35. Chien-Chung Shen, Chavalit Srisathapornphat, and Chaiporn Jaikaeo, An Adaptive Management Architecture for Ad hoc Networks, *IEEE Communications, Special Issue on Management of Wireless Networks*, Vol. 41, No. 2, February, 2003, pp. 108-115.
36. Chien-Chung Shen, Chavalit Srisathapornphat, and Chaiporn Jaikaeo, Sensor Information Networking Architecture and Applications, *IEEE Personal Communications, Special Issue on Pervasive Computing*, Vol. 8, No. 4, August 2001, pp. 52-59.
37. Chien-Chung Shen, Discrete-Event Simulation on the Internet and the Web, *Journal of Future Generation Computer Systems*, Elsevier, Vol. 17, No. 2, October 2000, pp. 187-196.
38. John Wei, Chien-Chung Shen, Mike Post, Brian Wilson, and Yukun Tsai, Connection Management for Multiwavelength Optical Networking, *IEEE Journal on Selected Areas in Communications*, Vol. 16, No. 7, September 1998, pp. 1097-1108.
39. Robert Doverspike, Mari Maeda, Jorge Pastor, Chien-Chung Shen, Ned Stoffer, and Yukun Tsai, Network Management Research in ATDNet, *IEEE Network*, pp. 30-41, Vol. 10, No. 4, July/August 1996.
40. Rajive Bagrodia and Chien-Chung Shen, MIDAS: Integrated Design and Simulation of Distributed Systems, *IEEE Transactions on Software Engineering*, Vol. SE-17, No. 10, pp. 1042-1058, October 1991.
41. Chien-Chung Shen and Wen-Hsiang Tsai, A Graph Matching Approach to Optimal Task Assignment in Distributed Computing Systems Using a Minimax Criterion, *IEEE Transactions on Computers*, Vol. C-34, No. 3, pp. 197-203, March 1985. (One of the 200 most-cited computer science journal papers published in 1985 as recognized by Thomson ISI Science Citation Index (SCI))

ON-LINE PUBLICATIONS

1. Ehsan Meamari and Chien-Chung Shen, Profit from Two Bitcoin Mining Tactics: Towing and Shutdown, *IEEE Blockchain Technical Briefs*, January 2020.
<https://blockchain.ieee.org/technicalbriefs/january-2020>

CONFERENCE PUBLICATIONS

1. Syed Ali Asif, Raymond Patt, Teomara Rutherford, Chrystalla Mouza, and Chien-Chung Shen, Participatory Design of an Augmented Reality Firewall Game, 9th International Conference of the Immersive Learning Research Network (iLRN), California Polytechnic State University, San Luis Obispo, CA, June 26-29, 2023.
2. Abdullah Alnajim and Chien-Chung Shen, Scheduling Threats and Their Defenses in Time-Sensitive Networks, *IEEE Globecom*, December 4-8, 2022, Rio de Janeiro, Brazil.
3. Collin Meese, Hang Chen, Wanxin Li, Syed Ali Asif, Chien-Chung Shen, and Mark Nejad, BFRT: Blockchain Federated Learning for Real-time Traffic Flow Prediction, 22nd IEEE/ACM International Symposium on Cluster, Cloud and Internet Computing (CC-Grid), Taormina (Messina), Italy, May 16-19, 2022.

4. Yan-Ming Chiou and Chien-Chung Shen, Collaborative Learning with Augmented Reality Tornado Simulator, *IEEE VR 7th Annual Workshop on K-12+ Embodied Learning through Virtual and Augmented Reality (KELVAR)*, virtual, March 12–16, 2022.
5. Yan-Ming Chiou, Chien-Chung Shen, Chrystalla Mouza, and Teomara Rutherford, Augmented Reality-Based Cybersecurity Education on Phishing, *4th IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR)*, November 15-17, 2021, pp. 228-231, doi: 10.1109/AIVR52153.2021.00052.
6. Chien-Chung Shen, Yan-Ming Chiou, Chrystalla Mouza, and Teomara Rutherford, Work-in-Progress-Design and Evaluation of Mixed Reality Programs for Cybersecurity Education, *7th International Conference of the Immersive Learning Research Network (iLRN)*, virtual, May 17-June 10, 2021, pp. 1-3, doi: 10.23919/iLRN52045.2021.9459309.
7. Yan-Ming Chiou, Tia Barnes, Shameeka M Jelenewicz, Chrystalla Mouza, and Chien-Chung Shen. Teacher Views on Storytelling-based Cybersecurity Education with Social Robots. *ACM Interaction Design and Children (IDC'21)*, pp. 508–512, June 2021, doi:<https://doi.org/10.1145/3459990.3465199>
8. Hang Chen, Syed Ali Asif, Jihong Park, Chien-Chung Shen, and Mehdi Bennis, Robust Blockchain Federated Learning with Model Validation and Proof-of-Stake Inspired Consensus, *AAAI Workshop Towards Robust, Secure and Efficient Machine Learning (RSEML)*, 9 pages, February 8, 2021. (acceptance rate: 20/38)
9. Hao Guo, Wannxin Li, Ehsan Meamari, Chien-Chung Shen, and Mark Nejad, Attribute-based Multi-Signature and Encryption for EHR Management: A Blockchain-based Solution, 4-page short paper track, *IEEE International Conference on Blockchain and Cryptocurrency (ICBC)*, Toronto, Canada, May 3-6, 2020. (acceptance rate: 18%)
10. Ehsan Meamari, Hao Guo, Chien-Chung Shen and Rui Zhang, Data User-Based Attribute Based Encryption, *54th Annual Conference on Information Sciences and Systems (CISS)*, Princeton, New Jersey, March 18-20, 2020.
11. Abdullah Alnajim, Seyedmohammad Salehi, and Chien-Chung Shen, Incremental Path-Selection and Scheduling for Time-Sensitive Networks, *IEEE Globecom*, December 9–13, 2019, Hawaii, USA. (acceptance rate: 38%)
12. Zheng Guo, Aijun Song, Len Cimini, Xianggen Xia, Mohammad Towliat, and Chien-Chung Shen, Self-interference Characterization for In-Band Full Duplex Underwater Acoustic Communications, *14th ACM International Conference on Underwater Networks and Systems (WUWNet)*, Atlanta, Georgia, October 23-25, 2019.
13. Li Li, Seyedmohammad Salehi, Chien-Chung Shen, Len Cimini, and John Graybeal, Multi-Carrier LAA with Adaptive Energy Detection and Carrier Selection, *IEEE Vehicular Technology Conference (VTC2019-Fall)*, Honolulu, Hawaii, USA, September 22–25, 2019.
14. Hao Guo, Wanxin Li, Mark Nejad, and Chien-Chung Shen, Access Control for Electronic-Health Records with Hybrid Blockchain-Edge Architecture, *2nd IEEE International Conference on Blockchain*, Atlanta, USA, July 14-17, 2019. (acceptance rate 15.9%)
15. Hao Guo, Ehsan Meamari, and Chien-Chung Shen, Multi-Authority Attribute-Based Access Control with Smart Contract, *International Conference on Blockchain Technology (ICBCT)*, Honolulu, Hawaii, March 15-18, 2019. (acceptance rate 39%)
16. Seyedmohammad Salehi, Li Li, Chien-Chung Shen, Len Cimini, and John Graybeal, Traffic Differentiation in Dense WLANs with CSMA/ECA-DR MAC Protocol, *88th IEEE Vehicular Technology Conference (VTC2018-Fall)*, Chicago, Illinois, August 27–30, 2018.

17. Hao Guo, Ehsan Meamari, and Chien-Chung Shen, Blockchain-inspired Event Recording System for Autonomous Vehicles, *IEEE International Conference on Hot Topics in Information-centric Networking (HotICN)*, Shenzhen, China, August 15-17, 2018. (acceptance rate 32%)
18. Zequn Huang, Chien-Chung Shen, Sheetal Doshi, Nimmi Thomas, and Ha Duong, Web-Based Fuzzy Team Decision-Making for Cyber Situation Awareness, *Milcom*, Baltimore, MD, November 1-3, 2016. (acceptance rate 56%)
19. Shengxing Liu, Aijun Song, and Chien-Chung Shen, Acoustic communication channel model in the under-ice environment, *MTS/IEEE OCEANS*, Shanghai, China, April 10-13, 2016. (acceptance rate 66%)
20. Marcos Portnoi and Chien-Chung Shen, Location-Enhanced Authenticated Key Exchange, *Workshop on Computing, Networking and Communications, in conjunction with IEEE International Conference on Computing, Networking and Communications (ICNC)*, Kauai, Hawaii, February 15-18, 2016.
21. Li Li, Aijun Song, Leonard J. Cimini, Xiang-Gen Xia, and Chien-Chung Shen, Interference Cancellation in In-Band Full-Duplex Underwater Acoustic Systems, *MTS/IEEE OCEANS*, October 19-22, 2015, Washington, DC.
22. I-Chun Chao, Kang B. Lee, Richard Candell, Frederick Proctor, Chien-Chung Shen, and Shinn-Yan Lin, Software-defined Radio Based Measurement Platform for Wireless Networks, *International Symposium on Precision Clock Synchronization for Measurement, Control, and Communication (ISPCS)*, Beijing, China, October 11-16, 2015.
23. Zequn Huang, Chien-Chung Shen, Sheetal Doshi, Nimmi Thomas, and Ha Duong, Cognitive Task Analysis Based Training for Cyber Situation Awareness, *9th World Conference on Information Security Education (WISE9)*, Hamburg, Germany, May 26-28, 2015.
24. Wei Chen, Liangping Ma, and Chien-Chung Shen, Congestion-aware MAC layer adaptation to improve video teleconferencing over Wi-Fi, *ACM Multimedia Systems (MMSys)*, Portland, Oregon, March 18-20, 2015. (acceptance rate: 12/41=29%)
25. Zequn Huang, Chien-Chung Shen, Sheetal Doshi, Nimmi Thomas, and Ha Duong, Difficulty-Level Metric for Cyber Security Training, *IEEE International Multi-Disciplinary Conference on Cognitive Methods in Situation Awareness and Decision Support (CogSIMA)*, Orlando, Florida, March 9-12, 2015.
26. Marcos Portnoi and Chien-Chung Shen, Loc-Auth: Location-Enabled Authentication Through Attribute-Based Encryption, *IEEE International Conference on Computing, Networking and Communications (ICNC), Communications and Information Security Symposium*, Anaheim, California, February 16-19, 2015. (acceptance rate: 30%)
27. Wei Chen, Liangping Ma, Gregory Sternberg, Yuriy Reznik, and Chien-Chung Shen, User-Aware DASH over Wi-Fi, *IEEE International Conference on Computing, Networking and Communications (ICNC), Multimedia Computing and Communications Symposium*, Anaheim, California, February 16-19, 2015. (acceptance rate: 30%)
28. Varun Sharma and Chien-Chung Shen, Evaluation of an Entropy-based k -Anonymity Model for Location Based Services, *Workshop on Computing, Networking and Communications, in conjunction with IEEE International Conference on Computing, Networking and Communications (ICNC)*, Anaheim, California, February 16-19, 2015.
29. Yang Guan, Yao Xiao, Hao Feng, Chien-Chung Shen, and Len Cimini, MobiCacher: Mobility-Aware Content Caching in Small-Cell Networks, *IEEE Globecom – Wireless Networking Symposium*, Austin, Texas, December 8-12, 2014.

30. I-Chun Chao, Shinn-Yan Lin, Kang B. Lee, Chien-Chung Shen, and Fan-Ren Chang, PTP-Based Out-of-Band Direct End-to-End Latency Measurement, *Precise Time and Time Interval Systems and Applications (PTTI)*, Boston, Massachusetts, December 1-4, 2014.
31. I-Chun Chao, Shinn-Yan Lin, Kang B. Lee, Fred Proctor, Chien-Chung Shen, and Fan-Ren Chang, Precise Latency Measurement of Unidirectional-Data-Flow Network Equipment, *IEEE International Frequency Control Symposium*, Taipei, Taiwan, May 19-22, 2014.
32. Yang Guan, Yao Xiao, Len Cimini, and Chien-Chung Shen, Power Efficient Peer-to-Peer Streaming to Co-located Mobile Users, *11th IEEE Consumer Communications and Networking Conference (CCNC)*, Las Vegas, Nevada, January 10-13, 2014.
33. Yao Xiao, Yang Guan, Len Cimini, and Chien-Chung Shen, Power Efficient User Pairing for Multicasting in Heterogeneous Wireless Networks, *Milcom*, San Diego, California, November 18-20, 2013.
34. Joshua Kirby, Marco A. Montes de Oca, Stephen Senger, Louis Rossi, and Chien-Chung Shen, Tracking Time-dependent Scalar Fields with Swarms of Mobile Sensors, *IEEE 7th International Conference on Self-Adaptive and Self-Organizing Systems (SASO)*, Philadelphia, USA, September 9-13, 2013.
35. Yu Sun, Louis Rossi, Hao Luan and Chien-Chung Shen, Modeling and Analyzing Large Swarms with Covert Leaders, *IEEE 7th International Conference on Self-Adaptive and Self-Organizing Systems (SASO)*, Philadelphia, USA, September 9-13, 2013.
36. Jennifer M. Miller, Louis F. Rossi, Hao Luan, and Chien-Chung Shen, The Role of Memory in Stabilizing Swarms, *IEEE 6th International Conference on Self-Adaptive and Self-Organizing Systems (SASO)*, Lyon, France, September 10-14, 2012.
37. Rui Fang, Zequn Huang, Louis Rossi, and Chien-Chung Shen, Analysis of Ant-Based Routing with Wireless Medium Access Control, *8th International Conference on Swarm Intelligence (ANTS)*, Brussels, Belgium, September 12-14, 2012. (also Springer LNCS Volume 7461)
38. Joshua Kirby, Marco A. Montes de Oca, Stephen Senger, Louis Rossi, and Chien-Chung Shen, Swarm Interpolation Using an Approximate Chebyshev Distribution. *8th International Conference on Swarm Intelligence (ANTS)*, Brussels, Belgium, September 12-14, 2012. (also Springer LNCS Volume 7461)
39. Ke Li, Hao Luan, and Chien-Chung Shen, Qi-Ferry: Energy-Constrained Wireless Charging in Wireless Sensor Networks, *IEEE Wireless Communications and Networking Conference (WCNC)*, Paris, France, April 1-4, 2012.
40. Chunsheng Xin, Min Song, Liangping Ma, and Chien-Chung Shen, An Approximately Optimal Rendezvous Scheme for Dynamic Spectrum Access Networks, *IEEE Globecom – Cognitive Radio and Networks Symposium*, Houston, Texas, December 5-9, 2011.
41. Liangping Ma, Chien-Chung Shen, and Chunsheng Xin, CONI: Credit-based Overlay and Interweave Dynamic Spectrum Access Protocol for Cognitive Multi-hop Wireless Networks, *IEEE Globecom – Cognitive Radio and Networks Symposium*, Houston, Texas, December 5-9, 2011.
42. Rui Fang, Zequn Huang, Louis F. Rossi, and Chien-Chung Shen, Dynamic Routing Exponent Strategies for Ant-based Protocols, *8th European Event on the Application of Nature-inspired Techniques for Telecommunication Networks and other Parallel and Distributed Systems (EvoCOMNET)*, April 27-29, 2011, Torino, Italy.
43. Yang Guan, Chien-Chung Shen, and Justin Yackoski, MAC Scheduling for High Throughput Underwater Acoustic Networks, *IEEE Wireless Communications and Networking Conference (WCNC)*, Cancun, Mexico, March 28-31, 2011.

44. Yang Guan, Yao Xiao, Chien-Chung Shen, and Len Cimini, CSR: Cooperative Source Routing Using Virtual MISO in Wireless Ad hoc Networks, *IEEE Wireless Communications and Networking Conference (WCNC)*, Cancun, Mexico, March 28-31, 2011.
45. Yao Xiao, Yang Guan, Wei Chen, Chien-Chung Shen, and Len Cimini, Location-Aware Cooperative Routing in Multihop Wireless Networks, *IEEE Wireless Communications and Networking Conference (WCNC)*, Cancun, Mexico, March 28-31, 2011.
46. Chunsheng Xin, Min Song, Liangping Ma, George Hsieh, and Chien-Chung Shen, On Random Dynamic Spectrum Access for Cognitive Radio Networks, *IEEE Globecom*, Miami, Florida, December 6-10, 2010.
47. Ke Li, Chien-Chung Shen, and Guaning Chen, Energy-Constrained Bi-Objective Data Muling in Underwater Wireless Sensor Networks, *The Seventh IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS)*, San Francisco, California, November 8-12, 2010.
48. Chunsheng Xin, Min Song, Liangping Ma, George Hsieh, and Chien-Chung Shen, Network Coding Relayed Dynamic Spectrum Access, *2nd ACM SIGMOBILE Workshop on Cognitive Wireless Networking (CoRoNet)*, in conjunction with MobiCom, Chicago, Illinois, September 20, 2010.
49. Ke Li, Kyle Thomas, Claudio Torres, Louis Rossi, and Chien-Chung Shen, Slime Mold Inspired Path Formation Protocol for Wireless Sensor Networks, *7th International Conference on Swarm Intelligence (ANTS)*, Brussels, Belgium, September 8-10, 2010, LNCS 6234.
50. Chunsheng Xin, Min Song, Liangping Ma, Sachin Shetty, and Chien-Chung Shen, Control-Free Dynamic Spectrum Access for Cognitive Radio Networks, *IEEE International Conference on Communications (ICC)*, Cape Town, South Africa, May 23-27, 2010.
51. Justin Yackoski and Chien-Chung Shen, Managing End-to-End Delay for VoIP Calls in Multi-Hop Wireless Mesh Networks, *2nd International Workshop on Carrier Grade Wireless Mesh Networks (CARMEN)*, in conjunction with *IEEE INFOCOM 2010*, San Diego, California, March 19, 2010.
52. Len Cimini, Chien-Chung Shen, and Lu Zhang, The Cost of Using Cooperation in a Wireless Network, *43rd Asilomar Conference on Signals, Systems and Computers*, November 1st-4th, 2009, Pacific Grove, California.
53. Hen-Wei Tsai, Chien Chen, Chien-Chung Shen, Ron-Hong Jan, and Hsia-Hsin Li, Maintaining Cohesive Fleets via Swarming with Small-World Communications, *First IEEE Vehicular Networking Conference (VNC)*, October 28-30, 2009, Tokyo, Japan.
54. Yang Guan, Aijun Song, Justin Yackoski, Chien-Chung Shen, and Mohsen Badiy, Simulation of Underwater Acoustic Networks with Field Measurements, *MTS/IEEE OCEANS*, October 26-29, 2009, Biloxi, Mississippi.
55. Huai-En Lian, Chien Chen, Je-Wei Chang, Chien-Chung Shen, and Rong-Hong Jan, Shortest Path Routing with Reliability Requirement in Delay Tolerant Networks, *First International Conference on Future Information Networks (ICFIN)*, October 14-17, 2009, Beijing, China.
56. Ilknur Aydin and Chien-Chung Shen, Performance Evaluation of Concurrent Multipath Transfer Using SCTP Multihoming in Multihop Wireless Networks, *8th IEEE International Symposium on Network Computing and Applications (NCA)*, Cambridge, USA, July 9-11, 2009.
57. Liangping Ma and Chien-Chung Shen, Optimal channel assignment for multi-channel multi-radio wireless networks, *IEEE Milcom*, San Diego, California, November 16-19, 2008.

58. Ke Li, Kyle Thomas, Louis F. Rossi, and Chien-Chung Shen, Slime Mold Inspired Protocol for Wireless Sensor Networks, *Second IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO)*, Isola di San Servolo (Venice), Italy, October 20-24, 2008.
59. Liangping Ma and Chien-Chung Shen, Security-enhanced Virtual Channel Rendezvous Algorithm for Dynamic Spectrum Access Wireless Networks, *3rd IEEE International Symposium on New Frontiers in Dynamic Spectrum Access Networks (DySPAN)*, Chicago, Illinois, October 14-17, 2008.
60. Ke Li and Chien-Chung Shen, Balancing Transmission Power and Hop Count in Ad hoc Unicast Routing with Swarm Intelligence, *IEEE Swarm Intelligence Symposium (SIS)*, St. Louis, Missouri, September 21-23, 2008.
61. Justin Yackoski and Chien-Chung Shen, UW-FLASHR: Achieving High Channel Utilization in a Time-Based Acoustic MAC Protocol, *3rd ACM International Workshop on UnderWater Networks (WUWNet)*, in conjunction with ACM MobiCom, San Francisco, California, September 15, 2008.
62. Chunsheng Xin, Liangping Ma, and Chien-Chung Shen, A Distributed Adaptive Channel Assignment Algorithm for Dynamic Spectrum Access Mesh Networks, *International Workshop on Cognitive Networks and Communications (COGCOM)*, in conjunction with CHINACOM, Hangzhou, China, August 25-27, 2008.
63. Xiaofeng Han, Xiang Cao, Errol L. Lloyd, and Chien-Chung Shen, Deploying Directional Sensor Networks with Guaranteed Connectivity and Coverage, *5th IEEE Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, San Francisco, California, June 16-20, 2008.
64. Justin Yackoski, Lu Zhang, Bo Gui, Chien-Chung Shen, and Len Cimini, Realistic Evaluation of Cooperative Relaying Networks Using Decentralized Distributed Space-Time Block Coding, *IEEE Workshop on Cooperative Communications and Networking: Theory, Practice, and Applications (CoopNet)*, in conjunction with IEEE ICC, Beijing, China, May 23, 2008.
65. Xiang Cao and Chien-Chung Shen, Subscription-Aware Publish/Subscribe Tree Construction in Mobile Ad hoc Networks, *13th International Conference on Parallel and Distributed Systems (ICPADS)*, Hsinchu, Taiwan, December 5-7, 2007.
66. Xiaofeng Han, Louis Rossi, and Chien-Chung Shen, Autonomous Navigation of Wireless Robot Swarms with Covert Leaders, *1st International Conference on Robot Communication and Coordination (ROBOCOMM)*, Athens, Greece, October 15-17, 2007.
67. Ozcan Koc, Chaiporn Jaikaeo, and Chien-Chung Shen, Navigating Actors in Mobile Sensor Actor Networks, *1st ACM Workshop on Sensor Actor Networks* (in conjunction with ACM MobiCom), Montreal, Canada, September 10, 2007.
68. De-Kai Liu, Chaiporn Jaikaeo, Chien-Chung Shen, and Ren-Hung Hwang, Discovering Timely Information in MANETs, *Second International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA)*, Zhengzhou, China, September 14-17, 2007.
69. Chunsheng Xin, Liangping Ma, and Chien-Chung Shen, Path-Centric Channel Assignment in Cognitive Radio Wireless Networks, *2nd International Conference on Cognitive Radio Oriented Wireless Networks and Communications (CrownCom)*, Orlando, Florida, August 1-3, 2007.
70. Xiaofeng Han, Xiang Cao, Errol Lloyd, and Chien-Chung Shen, Fault-tolerant Relay Node Placement in Heterogeneous Wireless Sensor Networks, *IEEE Infocom*, Anchorage, Alaska, May 6-12, 2007.

71. Liangping Ma, Chien-Chung Shen, and Bo Ryu, Single Radio Adaptive Channel Algorithm for Spectrum Agile Wireless Ad Hoc Networks, *2nd IEEE International Symposium on New Frontiers in Dynamic Spectrum Access Networks (DySPAN)*, Dublin, Ireland, April 17–20, 2007.
72. Chaiporn Jaikaeo, Xiang Cao, and Chien-Chung Shen, A Cross-Layer Approach to Resource Discovery and Distribution in Mobile Ad hoc Networks, *ACM 3rd International Conference on Mobile Technology, Applications, and Systems*, Bangkok, Thailand, October 25–27, 2006.
73. Chavalit Srisathapornphat and Chien-Chung Shen, Swarm Intelligence-Inspired Energy Conservation Scheme in Ad Hoc Networks, *ACM 3rd International Conference on Mobile Technology, Applications, and Systems*, Bangkok, Thailand, October 25–27, 2006.
74. Chunsheng Xin and Chien-Chung Shen, Reliable Routing in Programmable Radio Wireless Networks, *IEEE Workshop on Networking Technologies for Software Defined Radio (SDR) Networks*, Reston, VA, September 25, 2006.
75. Sundaram Rajagopalan and Chien-Chung Shen, A Cross-layer Decentralized BitTorrent for Mobile Ad hoc Networks, *3rd Annual International Conference on Mobile and Ubiquitous Systems: Networks and Services (MOBIQUITOUS)*, San Jose, California, July 17–21, 2006.
76. Sundaram Rajagopalan and Chien-Chung Shen, What Does Using TCP as an Evaluation Tool Reveal about MANET Routing Protocols, *International Wireless Communications and Mobile Computing Conference (IWCMC)*, Vancouver, Canada, July 3–6, 2006.
77. Justin Yackoski and Chien-Chung Shen, Cross-layer Inference-based Fast Link Error Recovery for MANETs, *IEEE Wireless Communications and Networking Conference (WCNC)*, Las Vegas, Nevada, April 3–6, 2006.
78. Xiaofeng Han, Chien-Chung Shen, and Zhuochuan Huang, Adaptive Topology Control for Heterogeneous Mobile Ad hoc Networks Using Power Estimation, *IEEE Wireless Communications and Networking Conference (WCNC)*, Las Vegas, Nevada, April 3–6, 2006.
79. Chien-Chung Shen, Ozcan Koc, Chaiporn Jaikaeo, and Zhuochuan Huang, Trajectory Control for Mobile Access Points in MANET, *IEEE Globecom*, St. Louis, Missouri, November 28–December 2, 2005.
80. Liangping Ma, Xiaofeng Han, and Chien-Chung Shen, Dynamic Open Spectrum Sharing MAC Protocol for Wireless Ad Hoc Networks, *1st IEEE International Symposium on New Frontiers in Dynamic Spectrum Access Networks (DySPAN)*, Baltimore, Maryland, November 8–11, 2005.
81. Chunsheng Xin, B. Xie, and Chien-Chung Shen, Novel Layered Graph Model for Topology Formation and Routing in Dynamic Spectrum Access Networks, *1st IEEE International Symposium on New Frontiers in Dynamic Spectrum Access Networks (DySPAN)*, Baltimore, Maryland, November 8–11, 2005.
82. Chaiporn Jaikaeo, Vinay Sridhara, and Chien-Chung Shen, Energy Conserving Multicast for MANET with Swarm Intelligence, *2nd IEEE International Conference on Mobile Ad-Hoc and Sensor Systems (MASS)*, Washington DC, November 7–10, 2005.
83. Ozcan Koc, Justin Yackoski, and Chien-Chung Shen, Autonomous Pickup and Delivery for Delay Tolerant Mobile Networks, *2nd IEEE International Conference on Mobile Ad-Hoc and Sensor Systems (MASS)*, Washington DC, November 7–10, 2005.
84. Ilknur Aydin and Chien-Chung Shen, Evaluating Cellular SCTP over One-Hop Wireless Networks, *62nd IEEE Vehicular Technology Conference (VTC)*, Dallas, Texas, September 25–28, 2005.

85. Ilknur Aydin, Chaiporn Jaikaeo, and Chien-Chung Shen, Quorum-Based Match-Making Services for Wireless Mesh Networks, *IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob)*, Montreal, Canada, August 22-24, 2005.
86. Sundaram Rajagopalan and Chien-Chung Shen, ANSI: A Unicast Routing Protocol for Ad hoc Networks Using Swarm Intelligence, *International Conference on Artificial Intelligence (ICAI), Special Session on Swarm Intelligence*, Las Vegas, Nevada, June 27-30, 2005. (acceptance rate: 46%)
87. Chien-Chung Shen, Chaiporn Jaikaeo, Chavalit Srisathapornphat, Zhuochuan Huang, and Sundaram Rajagopalan, Ad hoc Networking with Swarm Intelligence, *4th International Workshop on Ant Colony Optimization and Swarm Intelligence (ANTS)*, Brussels, Belgium, September 5-8, 2004, Springer-Verlag LNCS 3172.
88. Zhuochuan Huang and Chien-Chung Shen, Topology Control with Directional Power Intensity for Ad hoc Networks, *IEEE Wireless Communications and Networking Conference (WCNC)*, Atlanta, Georgia, CD-ROM 6 pages, March 21-25, 2004.
89. Ahmet Duran and Chien-Chung Shen, Mobile Ad hoc P2P File Sharing, *IEEE Wireless Communications and Networking Conference (WCNC)*, Atlanta, Georgia, CD-ROM 6 pages, March 21-25, 2004.
90. Chaiporn Jaikaeo and Chien-Chung Shen, Multicast Communication in Ad hoc Networks with Directional Antennas, *12th International Conference on Computer Communications and Networks (ICCCN)*, pp. 385–390, Dallas, Texas, October 20-22, 2003. (nominated for the best paper award)
91. Chavalit Srisathapornphat and Chien-Chung Shen, Ant-Based Energy Conservation for Ad hoc Networks, *12th International Conference on Computer Communications and Networks (ICCCN)*, pp. 32–37, Dallas, Texas, October 20-22, 2003.
92. Ilknur Aydin, Woojin Seok, and Chien-Chung Shen, Cellular SCTP: A Transport-Layer Approach to Internet Mobility, *12th International Conference on Computer Communications and Networks (ICCCN)*, pp. 285–290, Dallas, Texas, October 20-22, 2003.
93. Chavalit Srisathapornphat and Chien-Chung Shen. Energy Consumption Behavior and Performance of Directional Virtual Carrier Sensing Schemes, *IEEE Wireless Communications and Networking Conference (WCNC)*, New Orleans, Louisiana, CD-ROM 6 pages, March 16-20, 2003.
94. Chien-Chung Shen, Girish Borkar, Sundaram Rajagopalan, and Chaiporn Jaikaeo. Interrogation-Based Relay Routing for Ad hoc Satellite Networks. *IEEE Globecom*, CD-ROM 5 pages, Taipei, Taiwan, November 17–21, 2002.
95. Zhuochuan Huang and Chien-Chung Shen. A Comparison Study of Omnidirectional and Directional MAC Protocols for Ad hoc Networks. *IEEE Globecom*, CD-ROM 5 pages, Taipei, Taiwan, November 17–21, 2002.
96. Ilknur Adyin and Chien-Chung Shen. Facilitating Match-Making Service in Ad hoc and Sensor Networks Using Pseudo Quorum. *11th International Conference on Computer Communications and Networks (ICCCN)*, pp. 4–9, Miami, Florida, October 14-16, 2002.
97. Zhuochuan Huang, Chien-Chung Shen, Chavalit Srisathapornphat, and Chaiporn Jaikaeo. Topology Control for Ad hoc Networks with Directional Antennas, pp. 16–21, *11th International Conference on Computer Communications and Networks (ICCCN)*, Miami, Florida, October 14-16, 2002.
98. Zhuochuan Huang and Chien-Chung Shen. A Busy-Tone Based Directional MAC Protocol for Ad hoc Networks. *IEEE Milcom*, Anaheim, California, CD-ROM 6 pages, October 7–10, 2002.

99. Chien-Chung Shen, Chavalit Srisathapornphat, and Chaiporn Jaikaeo. The Guerrilla Management Architecture for Ad hoc Networks, *IEEE Milcom*, Anaheim, California, CD-ROM 6 pages, October 7–10, 2002.
100. Chien-Chung Shen, Sundaram Rajagopalan and Girish Borkar. Advances in Ad hoc Space Networks, *2nd NASA Space Internet Workshop*, Greenbelt, Maryland, May 21–22, 2002.
101. Chaiporn Jaikaeo and Chien-Chung Shen. Adaptive Backbone-Based Multicast for Ad Hoc Networks, *IEEE International Conference on Communications (ICC)*, New York City, CD-ROM 7 pages, April 28–May 2, 2002.
102. Chavalit Srisathapornphat and Chien-Chung Shen. Coordinated Power Conservation for Ad Hoc Networks. *IEEE International Conference on Communications (ICC)*, New York City, CD-ROM 6 pages, April 28–May 2, 2002.
103. Chavalit Srisathapornphat, Chaiporn Jaikaeo, and Chien-Chung Shen Diagnosis of Sensor Network, *IEEE International Conference on Communications (ICC)*, Helsinki, Finland, CD-ROM 6 pages, June 11–15, 2001.
104. Weihua Wang and Chien-Chung Shen. An Adaptive Flow Classification Scheme for Data-Driven Label Switching Networks. *IEEE International Conference on Communications (ICC)*, Helsinki, Finland, CD-ROM 6 pages, June 11–15, 2001.
105. Chaiporn Jaikaeo, Chavalit Srisathapornphat, and Chien-Chung Shen. Sensor Information Networking Architecture, *International Workshop on Pervasive Computing (IWPC'00)*, in conjunction with *ICPP'00*, Toronto, Canada, August 21–24, 2000, pp. 23-30.
106. Chaiporn Jaikaeo, Chavalit Srisathapornphat, and Chien-Chung Shen. Querying and Tasking of Sensor Networks, *SPIE's 14th Annual International Symposium on Aerospace/Defense Sensing, Simulation, and Control (Digitization of the Battlespace V)*, Orlando, Florida, pp. 184-194, April 24–28, 2000.
107. Bo Cheng, Chien-Chung Shen, and Tsong-Ho Wu, Directory-Enabled Network Management Framework for Battlefield Networks, *IEEE Milcom*, Atlantic City, New Jersey, October 31–November 3, 1999.
108. Bo Cheng, Chien-Chung Shen, and Tsong-Ho Wu, A Directory-Based Battlespace Awareness Intelligent System, *SPIE's 13th Annual International Symposium on Aerospace/Defense Sensing, Simulation, and Control (Digitization of the Battlespace IV)*, Orlando, Florida, April 5–9, 1999.
109. Chien-Chung Shen and John Wei, Network-Level Information Model for Integrated ATM, SONET, and WDM Management, *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, pp. 176–185, New Orleans, February 15–20, 1998.
110. Chien-Chung Shen and John Wei, The Network as Distributed Object Database, *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, pp. 540–548, New Orleans, February 15–20, 1998.
111. John Wei, Chien-Chung Shen, Mike Post, Brian Wilson, Yukun Tsai, Network Control and Management of Reconfigurable WDM All-Optical Networks, *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, pp. 880–889, New Orleans, February 15–20, 1998.
112. Chien-Chung Shen, Discrete-Event Simulation on the Internet and the Web, *International Conference on Web-Based Modeling and Simulation*, San Diego, California, pp. 57–62, January 11–14, 1998.
113. Chien-Chung Shen, Deh-phone Hsing, and Tsong-Ho Wu, A Network Management Architecture for Battlefield Networks, *IEEE Milcom*, Monterey, California, pp. 1226–1231, November 2–5, 1997.

114. Chien-Chung Shen, Discrete-Event Simulation on the Web, *IEEE Milcom*, Monterey, California, pp. 188–192, November 2–5, 1997.
115. Yukun Tsai, John Wei, and Chien-Chung Shen, A Distributed Network Management System for Reconfigurable WDM Networks, *13th Annual National Fiber Optic Engineers Conference, (NFOEC)*, San Diego, California, September 21–25, 1997.
116. Chien-Chung Shen, John Wei, Mike Post, Brian Wilson, and Yukun Tsai, Network Management for MONET Bellcore LEC Networks, *3rd IEEE Workshop on WDM Network Management and Control*, Montreal, Quebec, June 8, 1997.
117. Krishna Bala, John Wei, Mike Post, and Chien-Chung Shen, Towards Hitless Reconfiguration in WDM Optical Networks for ATM Transport, *IEEE Globecom*, London UK, pp. 316–320, November 18–22, 1996.
118. Mike Post, Chien-Chung Shen, and J. Wei, The Manager/Agency Paradigm for Distributed Network Management, *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, Kyoto, Japan, pp. 44–53, April 15–19, 1996.
119. Chien-Chung Shen, A CORBA Facility for Network Simulation, *29th Winter Simulation Conference*, Coronado, California, pp. 613–620, December 8–11, 1996.
120. John Wei, Chien-Chung Shen, Brian Wilson, and Mike Post, Network Control and Management of a Reconfigurable WDM Network, *IEEE Milcom*, McLean, Virginia, October 21–24, 1996.
121. Chien-Chung Shen, CORBA-Based Multiway Rendezvous, *International Conference on Parallel and Distributed Computing and Systems*, Chicago, Illinois, October 16–19, 1996.
122. Chien-Chung Shen, Realizing Multi-Party Communication in DCE, *IASTED/ISMM International Conference on Intelligent Information Management Systems*, Washington, D.C., June 7–9, 1995.
123. Chien-Chung Shen and Rajive Bagrodia, Parallel Hybrid Models in System Design, *26th Winter Simulation Conference*, Los Angeles, pp. 589–594, December 12–15, 1993.
124. Chien-Chung Shen and Rajive Bagrodia, Design of Performance Predictable Systems, *International Workshop on Realistically Dependable Parallel Computing (READPAC)*, Stony Brook, New York, August 28–29, 1992.
125. Chien-Chung Shen and Rajive Bagrodia, An Integrated Approach to Real-Time System Design, *9th IEEE Workshop on Real-Time Operating Systems and Software*, Pittsburgh, Pennsylvania, pp. 148–151, May 13–14, 1992.
126. Chien-Chung Shen and Rajive Bagrodia, Application of MIDAS Approach to the Design of Real-Time Systems, *Real-Time Programming: Proceedings of the 17th IFAC/IFIP Workshop*, pp. 39–44, 1991.
127. Chien-Chung Shen and Rajive Bagrodia, Integrated Design, Simulation, and Verification of Real-Time Systems, *11th International Conference on Distributed Computing Systems (ICDCS)*, Arlington, Texas, pp. 164–171, May 20–24, 1991.
128. Chien-Chung Shen and Rajive Bagrodia, PIPS: An Integrated Approach to the Design of Real-Time Systems, *8th IEEE Workshop on Real-Time Operating Systems and Software*, Atlanta, Georgia, pp. 42–46, May 15–17, 1991.
129. Chien-Chung Shen and Lih-Hsing Hsu, Dynamic Dogleg VLSI Channel Router, *Proceedings of ROC EDMS*, Hsinchu, Taiwan, pp. 667–670, 1985.

**WORK-IN-
PROGRESS
PUBLICATIONS**

1. Yan-Ming Chiou, Chien-Chung Shen, Chrystalla Mouza, and Teomara Rutherford, Augmented Reality-Based Cybersecurity Education on Phishing, *4th IEEE International Conference on Artificial Intelligence and Virtual Reality (AIVR)*, Taichung, Taiwan, November 15–17, 2021.

2. Yan-Ming Chiou, Teomara Rutherford, Chrystalla Mouza, and Chien-Chung Shen, Design and Evaluation of Mixed Reality Programs for Cybersecurity Education, *7th International Conference of the Immersive Learning Research Network (iLRN)*, May 17–June 10, 2021.
3. Yan-Ming Chiou, Tia Barnes, Shameeka Jelenewicz, Chrystalla Mouza, and Chien-Chung Shen. Teacher Views on Storytelling-based Cybersecurity Education with Social Robots, *ACM Interaction Design and Children Conference*, Greece, June 24–30, 2021.
4. Yan-Ming Chiou, Tia Barnes, Chrystalla Mouza and Chien-Chung Shen. Social robot teaches cybersecurity. *ACM Interaction Design and Children Conference (IDC)*, pp. 199–204. London, UK, July 17-24, 2020. [<https://doi.org/10.1145/3397617.3397824>]

POSTER PUBLICATIONS

1. Yu Sun, Louis Rossi, and Chien-Chung Shen, Information Transfer in Swarms with Leaders, *Collective Intelligence Conference*, Boston, Massachusetts, June 10-12, 2014.
2. Marcos Portnoi and Chien-Chung Shen, Secure Zones: an Attribute-Based Encryption Advisory System for Safe Firearms, *1st IEEE Conference on Communications and Network Security (CNS)*, Washington, D.C., October 14-16, 2013.
3. Marcos Portnoi and Chien-Chung Shen, Location-Aware Sign-on and Key Exchange using Attribute-Based Encryption and Bluetooth Beacons, *1st IEEE Conference on Communications and Network Security (CNS)*, Washington, D.C., October 14-16, 2013.
4. Yang Guan and Chien-Chung Shen, MAC Scheduling for High Throughput Underwater Acoustic Networks, *5th ACM International Workshop on UnderWater Networks (WUWNet)*, Woods Hole, Massachusetts, September 30–October 1, 2010.
5. Ke Li and Chien-Chung Shen, The Underwater Data Muling Problems (UDMP), *5th ACM International Workshop on UnderWater Networks (WUWNet)*, Woods Hole, Massachusetts, September 30–October 1, 2010.
6. Ke Li, Kyle Thomas, Claudio E. Torres, Louis F. Rossi, and Chien-Chung Shen, Naturally Adaptive Protocol for Wireless Sensor Networks Based on Slime Mold, *third IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO)*, San Francisco, California, September 14-18, 2009.
7. Justin Yackoski and Chien-Chung Shen, A Frugal Time-Division MAC Protocol for Underwater Acoustic Networks, *2nd ACM International Workshop on UnderWater Networks (WUWNet)*, in conjunction with ACM MobiCom, Montreal, Canada, September 14 2007.
8. Xiaofeng Han, Louis Rossi, and Chien-Chung Shen, Navigation of Networked Autonomous Underwater Vehicles with Covert Leaders, *2nd ACM International Workshop on UnderWater Networks (WUWNet)*, in conjunction with ACM MobiCom, Montreal, Canada, September 14 2007.
9. Louis Rossi, Ke Li, Justin Yackoski, and Chien-Chung Shen, Slime Mold Inspired Coordinations for Wireless Sensor and Actor Networks, *1st ACM Workshop on Sensor Actor Networks (SANET)*, in conjunction with ACM MobiCom, Montreal, Canada, September 10, 2007.
10. Xiaofeng Han, Xiang Cao, Errol L. Lloyd, and Chien-Chung Shen, Deploying Directional Wireless Sensors with Guaranteed Coverage and Connectivity, *IEEE Infocom*, Anchorage, Alaska, May 6-12, 2007.
11. Justin Yackoski and Chien-Chung Shen, Poster: Managing Delay and Jitter in Mesh Networks through Path-Aware Distributed Transmission Scheduling, *ACM MobiCom*, Student Research Competition, Los Angeles, California, September 25-29, 2006; also *ACM SIGMOBILE Mobile Computing and Communications Review*, Volume 11, Issue 2, April 2007, pp. 49–50.

12. Chien-Chung Shen and Sundaram Rajagopalan, Poster: Protocol-independent Packet Delivery Improvement Service for Mobile Ad hoc Networks, *First IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS)*, Fort Lauderdale, Florida, October 24–27, 2004.
13. Chien-Chung Shen, Ozcan Koc, Zhuochuan Huang, and Chaiporn Jaikaeo, Poster: Trajectory Control for Mobile Access Points in MANETs, *ACM MobiHoc*, Roppongi, Japan, May 24–26, 2004.
14. Zhuochuan Huang and Chien-Chung Shen, Poster: Distributed Topology Control Mechanism for Mobile Ad hoc Networks with Swarm Intelligence, *ACM MobiHoc*, Annapolis, Maryland, June 1–3, 2003. (also appeared in *ACM Mobile Computing and Communications Review*, Vol. 7, No. 3, July 2003, pp. 21-22)
15. Chien-Chung Shen, Chavalit Srisathapornphat and Chaiporn Jaikaeo, Adaptive Autonomous Management of Ad hoc Networks, *IEEE/IFIP Network Operations and Management Symposium (NOMS)*, Florence, Italy, April 15–19, 2002.
16. Chien-Chung Shen, Chaiporn Jaikaeo, and Chavalit Srisathapornphat. Management of Embedded Distributed Computing, *11th IFIP/IEEE International Workshop on Distributed Systems: Operations and Management (DSOM)*, Austin, December 4–6, 2000.

**PH.D.
SUPERVISED**

1. Yan-Ming Chiou, Collaborative Learning with Augmented Reality and Social Robots, May 2022, Current position: Xerox PARC, Research Scientist, Palo Alto, California.
2. Hao Guo, Blockchain-inspired Architectures for Attribute-based Access Control and Zero Knowledge Proof-based Data Privacy, August 2020, Current position: Assistant Professor, Northwestern Polytechnical University, Taicang Campus, China.
3. Seyedmohammad Salehi, Delay and Collision Reduction in Wireless Networks, January, 2020, Current position: Senior Software Engineer–DevOps, Voleon, Berkeley, CA.
4. Marcos Portnoi, Software-Defined Location-Enhanced, Multi-Factor Authentication with Attribute-Based Encryption, September 2017, Current position: Lab Director, @sec Information Security, Austin, Texas.
5. Joshua Kirby, Swarm Interpolation with Mobile Sensors, co-supervision with Louis Rossi, August 2017, Current position: Staff Programmer, Microsoft, Seattle, Washington.
6. Wei Chen, Adaptive Wireless Video Streaming and Teleconferencing, February 2017, Current position: Staff Research Scientist, Kwai (Kuaishou) Inc., San Diego, California.
7. Hristo Asenov, co-supervised with Chase Cotton, A Resilient Redundant Routing Framework for Future Internet Architecture, August 2016, Current position: Staff Engineer, Circadence, Boulder, Colorado.
8. Zequn Huang, Human-Centric Training and Assessment for Cyber Situation Awareness, December 2015. Current position: Technical Lead, Meta, Mountain View, California.
9. Yang Guan, Cooperation and Resource Optimization in Wireless Networks, August 2014, Current position: Senior Software Engineer, Google, California.
10. Ke Li, Approximation Solutions to Multi-Objective Optimization Problems in Wireless Networks, September, 2011, Recipient of CIS’ Frank Pehrson Award for Outstanding Graduate Student, Current position: Staff Engineer, Akamai, Pasadena, California.
11. Ilknur Aydin, SCTP-based Concurrent Multipath Transfer in the Contexts of Multihop Wireless Networks and TCP-Friendliness, May 2010, Current position: Associate Professor, Farmingdale State College, Farmingdale, New York.

12. Justin Yackoski, Reducing Delay and Jitter in Multi-hop Wireless Networks Through Distributed Coordination. May 2009, Current position: Principal Scientist, BlueHalo (Intelligent Automation, Inc.), Rockville, Maryland.
13. Xiaofeng Han, Algorithms and Strategies for Node Placement and Coordination in Wireless Sensor Networks. January 2009, Current position: Director of Engineering, Roblox, San Mateo, California.
14. Sundaram Rajagopalan, Swarm Intelligence Methods for Mobile Ad hoc Networks, December 2006. Current position: VP, Architecture, Fidelity Investments, Waltham, Massachusetts.
15. Zhuochuan Huang, Ad hoc Networking with Power and Directionality Control, May 2005. Current position: Software Engineer, Coupang, Mountain View, California.
16. Chaiporn Jaikaeo, Multicast Routing for Mobile Wireless Ad hoc Networks, August 2004. Recipient of CIS' Frank Pehrson Award for Outstanding Graduate Student, Current position: Assistant Professor, Department of Computer Engineering, Kasetsart University, Bangkok, Thailand.
17. Chavalit Srisathapornphat, Energy Conservation Schemes for Ad hoc Networks, May 2004. Current position: Assistant Professor, Department of Computer Science, Kasetsart University, Bangkok, Thailand.

**CURRENT
PH.D.
STUDENTS**

1. Abdullah Alnajim [PhD proposal passed in May 2022]
2. Ehsan Memary [PhD proposal passed in September 2022]
3. Hang Chen [PhD proposal passed in September 2022]
4. Syed Ali Asif [PhD proposal defense planned in Fall 2023]

**MASTER'S
THESES
SUPERVISED**

1. Naveen Manicka, *Gnu Radio Testbed*, May 2007, Current position: Software Engineer, Cisco, San Jose, California.
2. Weihua Wang, *An Adaptive Flow Classification Scheme for Data-Driven Label Switching Networks*, January, 2001. Current position: Software Developer at Manugistics, Inc., Rockville, Maryland.

**SENIOR
THESIS**

1. Wenxuan (Owen) Li, Practical Implementation of Blockchain Enabled Federated Learning, Senior Thesis, Spring 2020.

**UNDERGRAD
INDEPENDENT
STUDY**

1. Matthew Rein, *Active Management of Sensor Networks*, UD Science and Engineering Scholar, Summer 2005.
2. Michael Feldman, *Computer Forensics: Technology and a Case Study*, May 2002. (co-advised with Captain Steve Bunting)

**PHD THESIS
COMMITTEES**

1. Wanxin Li (PhD 2022, CIEG), Frontiers in Blockchain for Secure Information Sharing in Next Generation Transportation Systems.
2. Guangyi Liu (PhD 2020, ECE), Advanced Wireless Networks with Densely Deployed Antennas and Imperfect Network State Information.
3. Li Li (PhD 2018, ECE), Analysis and Management of Intra- and Inter-System Interference in Wireless Communications Systems
4. Lifan Xu (PhD 2016, CIS), Android Malware Classification Using Parallelized Machine Learning Methods.
5. Yu Sun (PhD 2015, Math), Modeling and Analyzing Large Swarms with Covert Leaders.

6. Rui Fang (PhD 2014, Math), Stochastic Analysis of Ant-Based Routing and Probabilistic Modeling of Medium Access Control in Wireless Local Area Networks.
7. Hao Feng (PhD 2014, ECE), Overhead, Uncertainty, and Interference in Wireless Networks.
8. Yao Xiao (PhD 2014, ECE), Cross-Layer Design for Wireless Cooperative Networks.
9. Claudio Torres (PhD 2012, Math), Ants, Slime Mold and Droplets: A Mathematical Foundation for Swarm-based Network Models and Analysis of Droplet Motion.
10. Jennifer Miller (PhD 2012, Math), A Whole Greater Than the Sum of Its Parts: Mathematically Modeling and Analyzing Swarms.
11. Jonghyun Kim (PhD 2011, ECE), Cooperative Path Diversity in Multi-hop Wireless Networks.
12. Zhefeng Li (PhD 2010, ECE), Space-Time/Frequency Coded MIMO and Cooperative OFDM Systems.
13. Lu Zhang (PhD 2009, ECE), Decentralized Cooperative Communication.
14. Nabeel Khan (PhD 2009, ECE), Novel MAC Layer Design Methodologies for Wireless Sensor Networks.
15. Peng Wang (PhD 2009, ECE), Capacity Optimization of Mesh Networks.
16. Songjie Wei (PhD 2009, CIS), Denial of Service Attack.
17. Bo Gui, (PhD 2008, ECE), Cooperative OFDM Networking.
18. Vinay Sridhara (PhD 2007, ECE), Models and Methodologies for Realistic Propagation Simulation of Urban Mesh Networks.
19. Erinc Arikan (MS 2006, CIS), Attack Profiling for DDOS Benchmarks.
20. Dong Wang (PhD 2005, ECE), Theory and Practice of Space-Time Coding.
21. Wei Chen (PhD 2005, CIS), Designing an Extended Set of Coordination Mechanisms for Multiagent Systems.
22. Foster M. McGeary (PhD 2005, CIS), Structures Supporting the Organization of Firms among Sovereign Computational Agents.
23. Liangping Ma (PhD 2004, ECE), Signal Processing for Internet Congestion Control.
24. Hong Zhang (PhD 2004, ECE), Theory and Practice for Single Antenna Vector OFDM Systems.
25. Qiwei Huang (PhD 2004, CIS), Multimedia Gateway Call Routing and Scheduling.
26. Rui Liu (PhD 2004, CIS), Topology Control for Ad hoc Networks.
27. Malgorzata Steinder (PhD, 2003, CIS), Probabilistic Inference for Diagnosing Service Failures in Communication Systems.
28. Vasil Hnatyshin (PhD, 2003, CIS), Dynamic Bandwidth Distribution Techniques for Scalable Per-Flow QoS.
29. X. Ma (PhD 2000, CIS), Adaptive Broadcast Scheduling in Multi-hop Packet Radio Networks.

**INVITED
TALKS**

1. Research in Bio-Inspired Networking and Coordination, US Army Research Laboratory, Adelphi, Maryland, January 31, 2012.

2. MAC and Swarming Protocols for Underwater Networks, Temple University, November 9, 2011.
3. MAC and Swarming Protocols for Underwater Networks, Department of Computer Science, Drexel University, April 19, 2010.
4. MAC and Swarming Protocols for Underwater Networks, Department of Electrical and Computer Engineering, Old Dominion University, November 6, 2009.
5. MAC and Swarming Protocols for Underwater Networks, Department of Computer Science and Engineering, University of Connecticut, October 21, 2009.
6. MAC and Swarming Protocols for Underwater Networks, Naval Underwater Warfare Center, Newport, RI, October 8, 2008.
7. Issues of Delay, Jitter, and Spectrum Agility in Mesh Networks, National Tsing Hua University, Hsinchu, Taiwan, November 20, 2006.
8. Ad hoc Networking with Swarm Intelligence, US Army Research Laboratory, January 26, 2006.
9. Sensor Information Networking Architecture, HP Labs, July 21, 2004.
10. Ad hoc Networking with Swarm Intelligence, National Institute of Standards and Technology (NIST), May 17, 2004.
11. Ad hoc Networking with Swarm Intelligence, School of Electrical and Computer Engineering, Georgia Tech, April 27, 2004.
12. Ad hoc Networking with Swarm Intelligence, Department of Computer Science, Rutgers University, April 26, 2004.
13. Ad hoc Networking with Swarm Intelligence, School of Electrical and Computer Engineering, Purdue University, November 10, 2003.
14. Ad hoc Networking with Swarm Intelligence, School of Information Computer Science, University of California, Irvine, November 6, 2003.
15. Ad hoc Networking with Swarm Intelligence, Department of Computer Science, University of Texas at Dallas, October 21, 2003.
16. Ad hoc Networking with Swarm Intelligence, Department of Computer Science, SUNY Stony Brook, September 29, 2003.
17. Ad hoc Networking with Swarm Intelligence, School of Electrical and Computer Engineering, Cornell University, September 2, 2003.
18. Ad hoc Networking with Swarm Intelligence, Department of Electrical and Computer Engineering, University of Illinois, Urbana-Champaign, August 6, 2003.
19. Ad hoc and Sensor Networking Research, Naval Research Laboratory, Washington DC, May 15, 2002.
20. Sensor Information Networking Architecture, Department of Computer Science, University of Maryland Baltimore County, May 12, 2000.
21. Research in Network Control and Management, INRIA/LORIA, Nancy, France, August 23, 1999.

TUTORIAL LECTURES

1. Tutorial – Architectures, Control, and Management of Optical Internet, IEEE Globecom, Taipei, Taiwan, November 21, 2002.
2. Tutorial – Architectures, Control, and Management of Optical Internet, IFIP/IEEE Network Operations and Management Symposium, Florence, Italy, April 19, 2002.

3. Tutorial – Architectures, Control, and Management of IP-over-Optical Networks, IFIP/IEEE International Symposium on Integrated Network Management, Seattle, May 18, 2001.
4. Tutorial – Network-Level Information Models for Broadband Network Management, IFIP/IEEE International Symposium on Integrated Network Management, Boston, May 28, 1999.

VISITING SCHOLARS HOSTED

1. Prof. Ki-Il Kim, Gyeongsang National University, South Korea
2. Prof. Yang Liu, Guangdong University of Technology, China
3. Prof. Yongan Shu, Anhui University, China
4. Prof. Shengxing Liu, Xiamen University, China
5. Mr. Yan-ming Chiou, National Chung Cheng University, Taiwan
6. Prof. Kuo-Feng Ssu, National Cheng Kung University, Taiwan
7. Prof. Hewijin Jiau, National Cheng Kung University, Taiwan
8. Dr. I-Chun Chao, National Taiwan University, Taiwan
9. Prof. HyunGon Kim, Mokpo National University, South Korea
10. Prof. Il-Soon Roh, Eulji University, South Korea
11. Prof. You-Chiun Wang, National Sun Yat-Sen University, Taiwan
12. Prof. Kihyun Pyun, Chonbuk National University, South Korea
13. Prof. Yuh-Chung Lin, Tajen University, Taiwan
14. Dr. De-Kai Liu, Accton Technology, Taiwan
15. Prof. Gihwan Cho, Chonbuk National University, South Korea

UD SERVICE ACTIVITIES

1. University Service Activities:
 - Senator, University Faculty Senate, 2011-2013 and 2013-2015.
2. College of Engineering Service Activities:
 - Election Committee, 2016-present.
 - Chair, Faculty Recruiting Committee, Computer and IT Cluster, 2010-2011.
 - Member, Collaboration Committee, 2011-2012.
3. CIS Department Service Activities:
 - Member, Executive Committee, 2016-present.
 - Chair, Faculty Recruiting Committee, 2019-2020, 2018-2019, 2017-2018, 2014-2015, 2013-2014, 2009-2010, 2007-2008, 2006-2007.
 - Member, Graduate Admission Committee, 2016-2017.
 - Member, Graduate Committee, 2004-2005, Fall 2008, 2011-2012, and 2012-2013.
 - Member, Undergraduate Committee, 2005-2006.

PROFESSIONAL ACTIVITIES

1. NSF Panels:
 - NSF/CISE Cyber Physical Systems (CPS) Panel.
 - NSF/ENG Communications, Circuit, and Sensing Systems (CCSS) Panel.
 - NSF/CISE Networking Technology and Systems (NeTS) Panel.
 - NSF/CISE Faculty Early Career Development (CAREER) Panel.

2. Conference Track Chair:

- Co-Chair, Ad hoc and Sensor Networks Track, IEEE 67th Vehicular Technology Conference, VTC2008-Spring, Marina Bay, Singapore, May 11-14, 2008.

3. Editorial Boards:

- International Journal of Ad Hoc and Ubiquitous Computing (IJAHUC), 2004-present.
- Computer Networks (COMNET), Elsevier, 2012-2014.
- Journal of Mobile Multimedia (JMM), 2004-2014.
- Journal of Network and Systems Management (JNSM), 2002-2008.

4. Guest Editors:

- Special Issue on Advances in Theory and Applications of Wireless, Ad Hoc, and Sensor Networks, *International Journal of Sensor Networks*, Inderscience, Vol. 9, No. 3/4, 2011.
- Special issue on Vehicular Wireless Networks and Vehicular Intelligent Transportation Systems, *Journal of Information Science and Engineering*, Vol. 26, No. 3, May 2010.
- Special issue on Cross-Layer Design for Future Generation Wireless Networks, *Journal of Wireless Personal Communications*, Vol. 51, No. 3, November 2009, Springer.

5. Conference Session Chairs:

- Session NET01: Wireless Sensor and Mesh Networks I, IEEE Wireless Communications and Networking Conference (WCNC), Paris, France, April 1-4, 2012.
- Session NET25: Routing in Wireless Networks III, IEEE Wireless Communications and Networking Conference (WCNC), Cancun, Mexico, March 28-31, 2011.
- Session 4b: QoS-aware routing, 7th IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS), San Francisco, CA, November 8-12, 2010.
- Session 4G: Mesh Networks/Routing, 71st IEEE Vehicular Technology Conference (VTC-Spring) Taipei, Taiwan, May 16-19, 2010.

6. Conference Technical Program Committee (TPC):

- 27th International Conference on the Applications of Evolutionary Computation (EvoApplications), Aberystwyth, Wales, UK, April 3–5, 2024.
- 6th International Conference on Blockchain Technology and Applications (ICBTA), Xi'an, China, December 15-17, 2023.
- 5th International Congress on Blockchain and Applications (BLOCKCHAIN'23) (www.blockchain-congress.net), July 12–14, 2023, Guimarães, Portugal.
- 26th International Conference on the Applications of Evolutionary Computation (EvoApplications), Brno, Czech Republic, April 12–14, 2023.
- 15th World Conference on Information Security Education (WISE15), Copenhagen, Denmark, June 13–17, 2022.
- 31st International Conference on Computer Communication and Networks (ICCCN 2022), July 25–28, 2022, Waikiki Beach, HI, USA.
- International Congress on Blockchain and Applications (BLOCKCHAIN'22), L'Aquila, Italy, July 13–15, 2022.
- 4th IEEE International Conference on Blockchain (Blockchain 2021), December 6–8, 2021, Melbourne, Australia.
- 3rd International Congress on Blockchain and Applications, Salamanca, Spain, October 6th-8th, 2021.

- The 30th International Conference on Computer Communications and Networks (ICCCN), Athens, Greece, July 19-22, 2021.
- 24rd EvoApplications, the International Conference on the Applications of Evolutionary Computation, as part of EvoStar 2021, Seville, Spain, April 7-9, 2021.
- 23rd EvoApplications, the International Conference on the Applications of Evolutionary Computation, as part of EvoStar 2020, online, April 15-17, 2020.
- 12th World Conference on Information Security Education (WISE12), Lisbon, Portugal, June 25-27, 2019.
- 11th World Conference on Information Security Education (WISE11), 2018.
- 15th European Conference on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Parma, Italy, April 4-6, 2018.
- ACM Workshop on Parallel and Distributed Evolutionary Inspired Methods (PDEIM), in conjunction with GECCO 2017, Berlin, Germany, July 15-19, 2017.
- 14th European Conference on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Amsterdam, The Netherlands, April 19–21, 2017.
- 13th European Conference on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Porto, Portugal, March 30-April 1, 2016.
- 12th European Conference on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Copenhagen, Denmark, April 8-10, 2015.
- 11th European Conference on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Baeza, Spain, April 23-25, 2014.
- IEEE Globecom–Ad hoc and Sensor Networks Symposium, Atlanta, Georgia, December 9-13, 2013.
- Tenth IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS), Hangzhou, China, October 14-16, 2013.
- 2nd International Conference on Ubiquitous Context-Awareness and Wireless Sensor Network (UCAWSN), Jeju, Korea, July 15-17, 2013.
- 10th European Conference on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Vienna, Austria, April 3-5, 2013.
- IEEE Globecom–Cognitive Radio and Networks Symposium, Anaheim, California, December 3-7, 2012.
- 9th European Workshop on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Malaga, Spain, April 11-13, 2012.
- Fifth International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS), Seoul, Korea, June 30-July 2, 2011.
- IEEE International Conference on Communications (ICC), Adhoc, Sensor and Mesh Networking Symposium, Kyoto, Japan, June 5-9, 2011.
- 8th European Workshop on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Torino, Italy, April 27-29, 2011.
- Third International Workshop on Underwater Networks, (WUnderNet), held in conjunction with AINA 2011, Biopolis, Singapore, March 22-25, 2011.
- Second International Workshop on Underwater Networks, (WUnderNet), held in conjunction with IEEE ICC, Cape Town, South Africa, May 23, 2010.

- 7th European Workshop on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Istanbul, Turkey, April 7-9, 2010.
- International Workshop on Vehicular Communications, Networks, and Applications (VCNA), Kaohsiung, Taiwan, December 14-16, 2009.
- First International Workshop on Underwater Networks, (WUnderNet), held in conjunction with IEEE AINA, Bradford, UK, May 27, 2009.
- 6th European Workshop on the Application of Nature-Inspired Techniques for Telecommunication Networks and Distributed Systems (EvoCOMNET), Tuebingen, Germany, April 15-17, 2009.
- IEEE International Conference on Communications (ICC), Ad hoc and Sensor Networking Symposium, Dresden, Germany, June 14-18, 2009.
- 5th European Workshop on the Application of Nature-Inspired Techniques to Telecommunication Networks and Other Connected Systems (EvoCOMNET), Napoli, Italy, March 26–28, 2008.
- IFIP International Conference on Embedded and Ubiquitous Computing (EUC 2007), Taipei, Taiwan, December 17-20, 2007.
- 2nd IEEE Workshop on Automotive Networking and Applications (AutoNet), Washington DC, November 30, 2007.
- 2nd International Conference on Cognitive Radio Oriented Wireless Networks and Communications (CrownCom), Orlando, Florida, August 1-3, 2007.
- International Workshop on Towards Cognition in Wireless Networks (CogNet), in conjunction with IEEE ICC, Glasgow Scotland, June 24, 2007.
- 4th European Workshop on the Application of Nature-Inspired Techniques to Telecommunication Networks and Other Connected Systems (EvoCOMNET), Valencia, Spain, April 11–13, 2007.
- IEEE Consumer Communications and Networking Conference (CCNC), Workshop on Cognitive Radio Networks (CNR), January 11, 2007.
- IEEE Workshop on Networking Technologies for Software Defined Radio (SDR) Networks, held in conjunction with IEEE SECON 2006, Reston, VA, September 25, 2006.
- IEEE International Conference on Communications (ICC), Istanbul, Turkey, June 11–15, 2006.
- IEEE 20th International Conference on Advance Information Networking and Applications (AINA), Vienna, Austria, April 18–20, 2006.
- International Conference on Computer Communications and Networks (ICCCN), San Diego, California, October 17-19, 2005.
- The 2nd ACM International Workshop on Performance Evaluation of Wireless Ad Hoc, Sensor, and Ubiquitous Networks (PE-WASUN), Montreal, Canada, October 13, 2005.
- International Conference on Computer Communications and Networks (ICCCN), Chicago, Illinois, October 11-13, 2004.
- IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS), Fort Lauderdale, Florida, October 24-27, 2004.
- IFIP/IEEE International Conference on Management of Multimedia Networks and Services (MMNS) (2001, 2002, 2003, 2004)
- Workshop on Multihop Wireless Networks (MWN) (2004) (in conjunction with 23rd IPCCC)
- International Conference on Computer Communications and Networks (ICCCN), Dallas, Texas, October 20-22, 2003.

- IFIP/IEEE Network Operations and Management Symposium (NOMS) (2002)
 - IASTED International Conference on Network and Communication Systems (1998)
 - IASTED International Conference on Intelligent Information Management Systems (1996)
7. Paper Reviewer: IEEE Transactions on Computer, IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Transactions on Wireless Communications, IEEE Personal Communications, ACM Mobile Networks and Applications (MONET) Journal, ACM Mobile Computing and Communications Review, Computer Networks Journal, Journal of Network and Systems Management, Journal of Communications and Networks, International Journal of Parallel and Distributed Systems and Networks, Simulations: Transactions of the Society for Modeling and Simulation International, International Conference on Computer, Communications, and Control Technologies (CCCT), IEEE ICCCN, IEEE/IFIP MMNS, IEEE/IFIP NOMS, IEEE Infocom, IEEE Globecom, IEEE WCNC, IEEE ICC, IEEE MASS, World Multi-conference on Systemics, Cybernetics and Informatics, and Addison Wesley.
8. Proposal Reviewer: Army Research Office