

Shaoen Wu

Department Chair and Professor
Department of Information Technology
Director of Center for Applied Computing
Kennesaw State University

Overview

- **Administrative Experience:** 10+ years of progressive administration experience as Department Chair (managing 1,500+ students, 30+ faculty/staff and \$3.5+ million budget yearly), Center Director, Assistant Department Chair, Program Director and Coordinator, and Technical Manager.
- **Program Development/Enhancement:** Cybersecurity Graduate Program, Computer Science Graduate Program, Graduate Program Concentrations and Certificates, and Health Informatics Management Undergraduate Program, Applied Computer Science PhD Program, NSA/DHS CAE-CDE designation for Cybersecurity program, ABET and internal program reviews.
- **Research/Education Centers:** Founded the Center for Cybersecurity Research and Education; Directed the NSF/IUCRC – Security and Software Engineering Research Center and Center for Applied Computing.
- **Fund Raising and Sponsorship:** Raised \$2M+ in annual giving and industry affiliation.
- **Faculty/Staff/Student/Community Engagement:** Established “Department Social”, “Meeting Your Chair”, “IT Prospective Day”, and “Community Day”.
- **Publications:** 90+ refereed publications with 3 best paper awards including one from the prestigious IEEE Globecom, most of which are published at top-tier (IEEE Transactions) journals/conferences in the field.
- **Grants:** Funded \$3+ million and managed \$10+ million external grants including extremely competitive grants from NSF and NASA; featured once by the Illinois State University RedBird Scholar and twice by the annual Ball State University Research Magazine.
- **Professional Services:** Chair/Co-chair for 10+ international conferences/workshops; active editor for IEEE Transaction journals; technical program committee (TPC) member for 20+ international conferences; panelists for NSF and NASA proposal reviews; Steering Chair and the Vice President of North American of IEEE MMTC.
- **Institutional Services:** University Strategic Planning Committee; Advisory Council of Scholarship for the Associate Provost for Research; the Dean’s Faculty Advisory Committee; University Senate Committee; Faculty Council; Assistant Department Chair; Department Promotion and Tenure Committee Chair; Faculty Search Committee Chair. Featured for academic excellence (<https://magazine.bsu.edu/2019/12/02/shaoen-wu/>).

Employment and Appointment History

- **2022-present:** Department Chair and Professor, Department of Information Technology, Director of the Center for Applied Computing, Kennesaw State University
- **2020-2022:** State Farm Endowed Full Professor of Cybersecurity, School of Information Technology, Illinois State University
- **2020-2022:** Founding Director, Center for Cybersecurity Research and Education (Designated by NSA/DHS CAE-CD), Illinois State University
- **2018-2020:** Director, NSF I/UCRC: Security and Software Engineering Research Center, Ball State University
- **2017-2020:** Associate Professor (Early Promoted and Tenured) and Assistant Department Chair, Computer Science, Ball State University
- **2013-2017:** Assistant Professor, Computer Science, Ball State University
- **2009-2013:** Assistant Professor and IT Program Coordinator, School of Computing, Univ. of Southern Miss.
- **2008-2009:** Senior Staff Scientist, Chief Technology Office, ADTRAN, Inc.
- **2001-2004:** Member of Technical Staff and Technical Manager, Bell Laboratories, Lucent Technologies

Education

Auburn University Ph.D. in Computer Science and Software Engineering Advisor: <i>Dr. Saad Biaz</i>	Auburn, AI 2005-2008
University of Electronic Science and Technology of China M.S. in Control Theory and Engineering Advisor: <i>Prof. Lifeng Zhou</i>	Chengdu, China 1998-2001
Qingdao University of Science and Technology B.S. in Control Theory and Engineering	Qingdao, China 1994-1998

Research Interests

Crosscutting of AI and Cybersecurity

- Security of AI
Data Poisoning, Model Poisoning, AI Ethics and Regulations
- AI for Cybersecurity
Intelligent Software Vulnerability Detection, AI-based IoT Security; AI-enabled Wireless Security

Smart Internet of Things and Health

AI-Driven IoT Communications and Networking; Distributed Health Intelligence; Wireless Health Sensing

Grants (funded only)

External

- Lead PI, *NSF SpecEES*, Award# 1923712, “RUI: SpecEES: Collaborative Research: Enabling Secure, Energy-Efficient, and Smart In-Band Full Duplex Wireless”, \$750,000 (KSU share: \$250,000), 01/2020-12/2024
- PI, *Illinois Innovative Networks*, The Design, Development, and Deployment of A Mobil-based Child Vaccination Program for Underserved Communities in Illinois Using Novel Digital Analytics and AI Tools \$9,947, 09/2021-08/2022
- PI, *Lockheed Martin*, Improving the Generality and Robustness of Automated Software Vulnerability Detection with Deep Learning, \$37,490, 10/2020-02/2022
- PI, *Air Force Research Laboratory*, Automated Test Case Generation With Deep Learning, \$83,358, 08/2020-12/2021
- Lead PI, *NSF I/UCRC*, Award# 1464654, “Collaborative Research: I/UCRC Phase II: Security and Software Engineering Research Center (S2ERC)”, \$1,559,108, 05/2015-4/2020
- PI, *Lockheed Martin*, “S2ERC Member Affiliation”, \$40,000, 06/2019-5/2020
- PI, *Department of Homeland Security MIPR*, “S2ERC Member Affiliation”, \$150,000, 06/2017-5/2020
- PI, *NSF MRI*, Award# 1726017, “MRI: Acquisition of a GPU-Based Cloud Infrastructure for Inter-/Multi-Disciplinary Research and Education at a Primarily Undergraduate Institution”, \$260,000, Oct. 2017-Sept. 2020
- PI, *NSF S2ERC (Northrop Grumman and Cisco Systems)*, “Improving Software Security with Automated Vulnerability Analysis and Inference with Multi-Case Based Reasoning”, Amount: \$43,799.00, Duration: 05/2018-04/2019
- PI, *ARM*, “ARM/Keil Microcontroller Development Kit (MDK-ARM) Keil MDK-Flex Software License”, \$190,000, May 2016
- PI, *Cypress*, “PSoC4 CY8CKIT-042-BLE Bluetooth Low Energy (BLE) Pioneer Kit”, \$980, May 2016
- PI, *Dell*, “Dell Edge Gateway 5000 for IoT research”, \$1,553, March 2016
- Lead PI, *NSF ECCS*, Award# 1408165, “RUI: CCSS: Collaborative Research: Cooperative Unmanned Aerial Vehicles Enabled Scalable Mobile Panoramic Video Surveillance”, \$400,000 (\$223K:Ball State University, \$177K:University of Missouri) Sept. 2014-Aug. 2017
- PI, *NSF ECCS*, “REU Supplement, RUI: CCSS: Collaborative Research: Cooperative Unmanned Aerial Vehicles Enabled Scalable Mobile Panoramic Video Surveillance”, \$16,000, Jan. 2015-Dec. 2016
- PI, *NASA IN Space Grant Consortium*, “Autonomous Aerial Systems for Environmental Management”, \$30,600, May. 2014-April. 2015
- PI, *NSF SaTC*, “NSF/DIMACS Workshop for Aspiring PIs in Secure and Trustworthy Cyberspace”, \$500, Aug. 2014
- PI, *Intel Corp*, “Galileo Development Boards Gift”, \$600, March 2014

- Lead PI, *NSF OCI*, Award# 1041292, “Collaborative Research: CI-TEAM Demonstration Project: IT Quadra-S, Information Technology Workforce Training Initiative for Spectator Sports Safety and Security”, \$250,000, (\$191K:University of Southern Mississippi, \$59K:Auburn University) Sept. 2010-Aug. 2014
- PI, *NSF OCI*, Award# 1041292, “REU Supplement for CI-TEAM Demonstration Project”, \$16,000, Jan. 2012-Dec. 2012
- PI, *NASA MS Space Grant Consortium*, “Realtime Panoramic Video Stitching”, \$50,000, May. 2012-April. 2013
- PI, *NSF OCI*, Award# 1041292, “REU Supplement for CI-TEAM Demonstration Project”, \$16,000, Jan. 2011-Dec. 2011
- PI, *NASA MS Space Grant Consortium*, “Building Research Collaborations with NASA Glenn Research Center”, \$4,000, Feb. 2012
- Co-PI, *Microsoft Corp.*, “ERP/CRM for Small Business”, \$400,000, Jan. 2012-Dec. 2014

Internal

- PI, *Ball State University Digital Fellowship Lab*, “DSL Fellowship 2018”, \$12,000, May 2018-May 2019
- PI, *Ball State University Foundation*, “BSU Aspire Advance Research Grant”, \$15,000, June 2016-May 2017
- PI, *Ball State University Foundation*, “BSU Aspire Travel Grant”, \$400, June 2016-Sept 2016
- PI, *Ball State University Foundation*, “Aspire Junior Faculty Research Grant”, \$10,000, May 2014-April 2015
- PI, *Ball State University Foundation*, “New Faculty Development”, \$50,000, Sept. 2014-August 2016
- PI, *USM Research Foundation*, “New Faculty Development”, \$50,000, Sept. 2009-August. 2012
- PI, *USM VPR Office*, “Travel Grant to Office of Naval Research”, \$4,000, March. 2012
- PI, *USM VPR Office*, “Travel Grant to NSF”, \$4,000, Sept. 2011

Publications

Journal Papers (Refereed):

1. Islam, Md Jahidul, Anichur Rahman, Sumaiya Kabir, Md Razaul Karim, Uzzal Kumar Acharjee, Mostofa Kamal Nasir, Shahab S. Band, Mehdi Sookhak, and Shaoen Wu. “Blockchain-sdn based energy-aware and distributed secure architecture for IoTs in smart cities.” *IEEE Internet of Things Journal* (2021)

2. Qi Wang, Chang-song Yang, Shaoen Wu, "RFID aided SINS integrated navigation system for lane applications", *International Journal of Embedded Systems*, Vol. 14, No. 2, PP 185-193, 2021
3. Sun, Yajie, Tao Yin, Jian Yang, Zhiyu Cai, and Shaoen Wu. "Impact Force Reconstruction of Composite materials based on Improved Regularization Technology." *KSH Transactions on Internet and Information Systems (TIIS)*,15, no. 8 (2021): 2718-2731.
4. Fan, Qingwu, Shaoen Wu, Xingqi Zhou, Lanbo Li, and Zidong Wang. "A Genetic Algorithm Based on Auxiliary-Individual-Directed Crossover for Internet-of-Things Applications." *IEEE Internet of Things Journal* 8, no. 7 (2020): 5518-5530.
5. Fan, Qingwu, Huazheng Han, and Shaoen Wu. "Credibility analysis of water environment complaint report based on deep cross domain network." *Applied Intelligence* (2021): 1-13.
6. Wang, Qi, Chang-song Yang, and Shaoen Wu. "Application of vision aided strap-down integrated navigation in lane vehicles." *International Journal of Embedded Systems* 13, no. 1 (2020): 121-127.
7. Yajie Sun, Yanqing Yuan, Qi Wang, Sai Ji, Lihua Wang, and Shaoen Wu. "Impact Force Magnitude and Location Recognition of Composite Materials" *CMC-COMPUTERS MATERIALS & CONTINUA* 64, no. 3 (2020): 1647-1656.
8. Qingwu Fan, Xingqi Zhou, Shaoen Wu, Guanghuang Chen, "Identification of Heat Supply Network Pipeline Roughness Based on AIOX-GA", *IEEE Access*, Vol. 8, No. 1, Dec. 2020
9. Fan, Qingwu, Yiliang Guo, Shaoen Wu, and Xudong Liu. "Two-level diagnosis of heating pipe network leakage based on deep belief network." *IEEE Access* 7 (2019): 182983-182992.
10. Liang Zhang, Tao Zhang, Jinwu Tong, Shaoen Wu, "Online Calibration of Ultra-Short Baseline Installation Error in Dynamic Environment", *International Journal of Sensor Networks (IJSNET)*, Vol. 30, No. 4, July 2019
11. Jingjing Wang, Jie Shen, Wei Shi, Gang Qiao, Shaoen Wu, Xinjie Wang, "A Novel Energy-Efficient Contention-Based MAC Protocol Used for OA-UWSN", *Sensors*, Vol. 19, No. 1, Jan 2019
12. Hanqing Guo, Junhong Xu, Shangyue Zhu, Shaoen Wu, Honggang Wang, "In-band Full Duplex Wireless Communications and Networking for IoT Devices: Progress, Challenges and Opportunities", *Elsevier Future Generation Computer Systems Journal*, Vol. 92, PP 705-714, March 2019
13. Junhong Xu, Hanqing Guo, Shangyue Zhu, Shaoen Wu, "Automated Labeling in Robotic Autonomous Navigation Through Multi-Sensory Semi-Supervised Learning on Big Data", accepted by *IEEE Transaction on Big Data*, Jan. 2019
14. Dapeng Wu, Zhihao Zhang, Shaoen Wu, Jing Yang, Ruyan Wang, "Biologically Inspired Resource Allocation for Network Slices in 5G-Enabled Internet of Things", *IEEE Internet of Things Journal*, Vol. 99, Dec. 2018

15. Dapeng Wu, Shushan Si, Shaoen Wu, Ruyan Wang, "Dynamic Trust Relationships Aware Data Privacy Protection in Mobile Crowd-Sensing", *IEEE Internet of Things Journal*, Vol. 5, No.4, PP. 2958 - 2970, Aug. 2018
16. Ye Liu, Chenglin Fan, Qing Yang, Shaoen Wu, "Cross-layer Cooperative Multichannel Medium Access for Internet of Things", *Springer Nature Peer-to-Peer Networking and Applications*, Vol. 11, No. 3, pp 504-517, May. 2018.
17. Junhong Xu, Hanqing Guo, Shangyue Zhu, Shaoen Wu, "A Deep Residual Convolutional Neural Network For Facial Keypoint Detection with Missing Labels", *Elsevier Signal Processing Journal*, Vol. 44, PP. 384-391, March 2018
18. Shaoen Wu, Jacob Rendall, Matt Smith, Shangyue Zhu, Junhong Xu, Honggang Wang, Qing Yang, Pinle Qin, "Survey on Prediction Algorithms in Smart Homes", *IEEE Internet of Things Journal*, Vol.4, No.3, pp 636-644, June 2017
19. Lixing Song, Shaoen Wu, Qing Yang, Honggang Wang, "SIMPLEX: Symbol-level Information MultiPLEX", *IEEE Internet of Things Journal*, Vol.3, No.5, pp 757-766, Oct. 2016.
20. Xiaoming Li, Qing Yang, Xiaodong Lin, Shaoen Wu, Mike Wittie, "iTrust: Interpersonal Trust Measurements from Social Interactions", accepted by *IEEE Network Magazine*, Vol.30, no.4, pp 54-58, July 2016.
21. Qing Yang, Binhai Zhu, Shaoen Wu, "An Architecture of Cloud-Assisted Information Dissemination in Vehicular Networks", *IEEE Access*, Vol.4, pp 2764-2770, May 2016.
22. Yi Zhu, Chong Tang, Lixing Song, Shaoen Wu, Saad Biaz "Characteristic Analysis of 60 GHz Wireless Channels", *Telecommunication Systems Special Issue on Research Advance in Wireless and Mobile Computing*, Vol.60, no.1 , pp 179-186, Sept, 2015.
23. Shaoen Wu, Honggang Wang, Chan-Hyun Youn, "Visible Light Communication for 5G Wireless Networking Systems: From Fixed to Mobile Communications," *IEEE Network Magazine*, Vol.28, no.6, pp.41-45, Dec 2014.
24. Yi Zhu, Lixing Song, Shaoen Wu, Honggang Wang, Chonggang Wang, "Cooperative Stepwise Relaying and Combining for Multi-hop Vehicular Wireless Communication," *IEEE Transactions on Vehicular Technology*, vol.64, no.6, pp.2663-2671, June 2014.
25. Chong Tang, Lixing Song, Jagadeesh Balasubramani, Shaoen Wu, Saad Biaz, Qing Yang, Honggang Wang, "Comparative Investigation on CSMA/CA-Based Opportunistic Random Access for Internet of Things," *IEEE Internet of Things Journal*, vol.1, no.2, pp.171-179, April 2014.
26. Honggang Wang, Shaoen Wu, Min Chen, Wei Wang, "Security Protection between Users and Mobile Media Cloud," *IEEE Communication Magazine*, vol.52, no.3, pp.73-79, March 2014.

27. Chong Tang, Shaoen Wu, Honggang Wang, Wei Wang "Measurement Based Outdoor Link Level Investigation on IEEE 802.11 channels". *International Journal of Computer Theory and Engineering*, Vol. 4, No. 4, pp.546-550, August 2012.
28. Shaoen Wu, Saad Biaz "Rate Adaptation with Loss Diagnosis on IEEE 802.11 Networks", *International Journal of Communication Systems*, Vol. 25, No. 4, pp.515-528, April 2012
29. Hanyu Liu, Chong Tang, Shaoen Wu "Real-time Video Surveillance for Large Scenes", *IEEE COMSOC MMTTC E-Letter*, Vol. 6, No.9, Sep. 2011
30. Kun Hua, Wei Wang, Yin Yang, Shaoen Wu "Cross Layer QoS Provisioning for Cooperative Video Transmission", *IEEE COMSOC Multimedia Communications Technical Committee E-Letter*, Vol. 6, No.9, Sep. 2011
31. Shaoen Wu, Saad Biaz "Measurement based IEEE 802.11g Link Level Investigation", *International Journal of Computer Networks & Communications*, Vol. 3. No. 2, March 2011
32. Kehao Zhang, Alvin Lim, Shaoen Wu, Qing Yang "A High TCP Performance Rate Adaptation Algorithm for IEEE 802.11 Networks", *International Journal of Computer Networks & Communications*, Vol. 2, No. 6, Nov. 2010

Refereed Conference Proceeding Papers:

1. Yichen Gao, Shaoen Wu, Honggang Wang, "A Lightweight Deep Learning Solution for mmWave Human Activity Recognition in Smart Health based on Discrete Fourier Transformation", *IEEE International Conference on Communication (ICC)*, May 28 - June 1, 2023, Roman, Italy (Under Review)
2. Yichen Gao, Shaoen Wu, Noah Ziems, Honggang Wang, Mahmoud Daneshmand, "Human Health Activity Intelligence Based on mmWave Sensing and Attention Learning", *IEEE Global Communications Conference (GLOBECOM)*, Dec. 4- 8, 2022, Rio de Janeiro, Brazil
3. Noah Ziems, Shaoen Wu, "Automated Primary Hyperparathyroidism Screening with Neural Networks", *IEEE Global Communications Conference (GLOBECOM)*, Dec. 7- 11, 2021, Madrid, Spain
4. Noah Ziems, Shaoen Wu, "Security Vulnerability Detection Using Deep Learning Natural Language Processing", *IEEE INFOCOM – WKSHPs BigSecurity*, 10-13 May 2021, Virtual Online
5. Hangin Guo, Nan Zhang, Shaoen Wu, Qing Yang, "Deep Learning Driven Wireless Real-time Human Activity Recognition", *IEEE International Conference on Communications (ICC)*, 7-11 June 2020, Dublin, Ireland
6. Hanqing Guo, Shaoen Wu, Honggang Wang, Mahmoud Daneshmand, "DSIC: Deep Learning based Self-Interference Cancellation for In-Band Full Duplex Wireless", *IEEE Globecom 2019*, Dec. 9- 14, Waikoloa, HI, USA (**Best Paper Award**)

7. Hanqing Guo, Nan Zhang, Saeed Al-Qarni , Shaoen Wu, Honggang Wang, “Real-Time Indoor 3D Human Imaging Based on MIMO Radar Sensing?”, *IEEE International Conference on Multimedia and Expo (ICME)*, July 8-12, 2019, Shanghai, China
8. Qiwei Liu, Hanqing Guo, Junhong Xu, Aron Kageza, Saeed Al-Qarni , Shaoen Wu, Honggang Wang “Non-contact Non-invasive Heart and Respiration Rates Monitoring with MIMO Radar Sensing”, *IEEE Globecom 2018* Dec. 9-13, Abu Dhabi, UAE
9. Junhong Xu, Hanqing Guo, Shangyue Zhu, Shaoen Wu, “Avoidance of Manual Labeling in Robotic Autonomous Navigation Through Multi-Sensory Semi-Supervised Learning”, *IEEE Globecom 2018* Dec. 9-13, Abu Dhabi, UAE
10. Junhong Xu, Hanqing Guo, Shaoen Wu, “Indoor Multi-Sensory Self-Supervised Autonomous Mobile Robotic Navigation”, *IEEE ICII 2018* Oct 21-23, Bellevue, WA, USA
11. Zhouzhou Li, Hua Fang, Honggang Wang, Shaoen Wu, Mahmoud Daneshmand, “A New Efficient Scheme for Securely Growing WBAN Nodes”, *IEEE ICII 2018* Oct 21-23, Bellevue, WA, USA
12. Ola Felemban, Shaoen Wu, “Constrained Time-Critical Routing For Multiple Mobile Agents”, *The 14th International Wireless Communications and Mobile Computing Conference (IWCMC 2018)*, Limassol, Cyprus, June 25-29, 2018
13. Junhong Xu, Hanqing Guo, Aron Kageza, Shaoen Wu, “Removing Background with Semantic Segmentation Based on Ensemble Learning”, *11th EAI International Conference on Mobile Multimedia Communications (Mobimedia 2018)*, Qingdao, China. Jun 21-22, 2018
14. Shangyue Zhu, Hanqing Guo, Junhong Xu, Qiwei Liu, Shaoen Wu, “Indoor Human Activity Recognition Based on Ambient Radar with Signal Processing and Machine Learning”, *IEEE International Conference on Communications 2018 (ICC)*, Kansas City, MO, USA. May 20-24, 2018
15. Shangyue Zhu, Hanqing Guo, Junhong Xu, Shaoen Wu, “Distance Based User Localization and Tracking with Mechanical Ultrasonic Beamforming”, *2018 International Conference on Computing, Networking and Communications (ICNC)*, Maui, Hawaii, USA. March 5-8, 2018
16. Hanqing Guo, Junhong Xu, Shangyue Zhu, Shaoen Wu, “Realtime Software Defined Self-Interference Cancellation Based on Machine Learning for In-Band Full Duplex Wireless Communications”, *2018 International Conference on Computing, Networking and Communications (ICNC)*, Maui, Hawaii, USA. March 5-8, 2018
17. Honggang Wang, Tigang Jiang, Shaoen Wu, “Interference Mitigation for Wireless Body Area Networks with Fast Convergent Game”, *IEEE Global Communications Conference 2017 (GC'17)*, Singapore, Dec 4-8, 2017.
18. Shaoen Wu, Kelly Blair, Junhong Xu, Shangyue Zhu, Hanqing Guo, Kai Wang, Lei Cheng, “Real Time Video Stitching by Exploring Temporal and Spatial Fea-

- tures”, *10th EAI International Conference on Mobile Multimedia Communications*, Chongqing, China, June, 2017.
19. Junhong Xu, Shaoen Wu, Shangyue Zhu, Hanqing Guo, Honggang Wang, Qing Yang, “Masked Loss Residual Convolutional Neural Network For Facial Keypoint Detection”, *10th EAI International Conference on Mobile Multimedia Communications*, Chongqing, China, June, 2017.
 20. Shaoen Wu, Sudad H. Abed, Qing Yang, Honggang Wang, “IEEE 802.11 Traffic Measurement and Analysis”, *9th EAI International Conference on Mobile Multimedia Communications*, Xi’An, China, June, 2016.
 21. Guangchi Liu, Qing Yang, Honggang Wang, Shaoen Wu, Mike P. Wittie, “Uncovering the Mystery of Trust in An Online Social Network”, *2015 IEEE Conference on Communications and Network Security (CNS)*, Florence, Italy, Sept, 2015.
 22. Jin Wang, Honggang Wang, Shaoen Wu, Xiaodong Lin, Qing Yang, “Design and Implementation of Real-time Sobel Edge Detection on FPGA for Mobile Device Applications”, *ACM International Workshop on Mobility and MiddleWare Management in HetNets (MobiMWareHN 2015)*, Hangzhou, China, July, 2015.
 23. Lixing Song, Shaoen Wu, “AARC: Cross-layer Wireless Rate Control Driven by Fine-grained Channel Assessment”, *The 2015 IEEE International Conference on Communications (ICC)*, London, UK, June, 2015. 1)
 24. Ye Liu, Liu Hao, Qing Yang, Shaoen Wu , “RM-MAC: A Routing-Enhanced Multi-Channel MAC Protocol in Duty-Cycle Sensor Networks”, *The 2015 IEEE International Conference on Communications (ICC)*, London, UK, June, 2015.
 25. Lixing Song, Shaoen Wu, “Cross-layer Wireless Information Security”, *The 23rd International Conference on Computer Communications and Networks (IEEE ICCCN 2014)*, Shanghai, China, Aug., 2014.
 26. Shaoen Wu, Saad Biaz “Auto Bit Rate Adaptation with Transmission Failure Diagnosis for WLANs”, *The 23rd International Conference on Computer Communications and Networks (IEEE ICCCN 2014)*, Shanghai, China, Aug., 2014.
 27. Quanlong Li, Qing Yang, Shaoen Wu, “Multi-bit Sensing Based Target Localization (MSTL) Algorithm in Wireless Sensor Networks”, *The 23rd International Conference on Computer Communications and Networks (IEEE ICCCN 2014)*, Shanghai, China, Aug., 2014.
 28. Lixing Song, Shaoen Wu, Honggang Wang, Qing Yang, “Distributed MapReduce Engine with Fault Tolerance”, *The 2014 IEEE International Conference on Communications (ICC)*, Sydney, Australia, June, 2014.
 29. Yi Zhu, Chong Tang, Lixing Song, Qingmei Yao, Shaoen Wu, “Cooperative Binary Relaying and Combining for Multi-hop Wireless Communication”, *IEEE Global Communications Conference 2012 (GC’12)*, Anaheim, CA, Dec., 2012.
 30. Yi Zhu, Chong Tang, Lixing Song, Shaoen Wu and Saad Biaz “Analytical and Comparative Investigation of 60 GHz Wireless Channels”, *7th International Symposium on Wireless Pervasive Computing*, Dalian, China, July, 2012.

31. Hanyu Liu, Chong Tang, Shaoen Wu, Honggang Wang, “Real-time Video Surveillance for Large Scenes (Extended Version)”, *The 2011 International Conference on Wireless Communications & Signal Processing: WCSP 2011 Invited Session on Multimedia Communication Technology*, Nanjing, China, Nov. 2011.
32. Wei Wang, Honggang Wang, Kun Hua, Shaoen Wu, Feifei Gao, Xuewen Liao, Tigang Jiang, “Quality-Optimized Energy Neutrality with Link Layer Resource Allocation for Zero-Power Harvesting Wireless Communications”, *IEEE Globecom 2011*, Houston, Tx, Dec, 2011.
33. Qingmei Yao, Chong Tang, Shaoen Wu “Frame Fountain: Coding and Decoding MAC Frame”, *IEEE Globecom 2011 Workshop - IEEE Workshop on Multimedia Communications and Services*, Houston, Tx, Dec, 2011
34. Chong Tang, Shaoen Wu, Honggang Wang, Wei Wang “Measurement Based Outdoor Link Level Investigation on IEEE 802.11 channels”, *4th IEEE International Conference on Computer Science and Information Technology*, Chengdu, China, June 9-12, 2011
35. Lin Xing, Wei Wang, Shaoen Wu, Kun Hua, Honggang Wang “An Energy-Balanced Coding Redundancy Scheduling Approach to Support Quality of Service in Battery-Powered Multi-Hop Wireless Networks”, *44th Annual Simulation Symposium*, Boston, MA, April 2011 (**Best Paper Award**)
36. Kun Hua, Shaoen Wu, Honggang Wang and Wei Wang “Cognitive Cross-layer Design with QoS Provisioning for Cooperative Wireless Networking”, *44th Annual Simulation Symposium*, Boston, MA, April 2011
37. Shaoen Wu, Honggang Wang “Measurement Based Investigation of Indoor IEEE 802.11g Channel Dynamics”, *IEEE Global Communications Conferences*, Miami, USA, Dec. 2010.
38. Kun Hua, Honggang Wang, Wei wang, Shaoen Wu “Adaptive Data Compression in Wireless Body Sensor Networks”, *IEEE CSE*, Hong Kong, China, Dec. 2010
39. Kehao Zhang, Alvin Lim, Shaoen Wu “A Practical Rate Adaptation Algorithm for IEEE 802.11 Networks”, *CyberC 2010*, Oct. Huangshan, China
40. Honggang Wang, Wei Wang, Shaoen. Wu, Kun Hua, ”A Survey on the Cross-layer Design for Wireless Multimedia Sensor Networks”, in *Proc. the First International Workshop on Mobile Multimedia Networking in conjunction with Mobilware*, Jun. 2010.
41. Honggang Wang, Shaoen Wu “Intelligent Architecture Through A Supervised Learning Approach in Wireless Multimedia Sensor Networks” *43rd Annual Simulation Symposium*, Orlando, FL, USA, April 2010
42. Jonathan Z. Sun, Shaoen Wu, Shouhuai Xu “Assigning Applications to Servers: A Simulation Study”, *43rd Annual Simulation Symposium*, Orlando, FL, USA, April 2010

43. Lingyan Wang, Shaoen Wu “Protecting Location Privacy through Identify Diffusion”, *International Congress on Ultra Modern Telecommunications and Control Systems*, St.Petersburg, Russia, Oct. 2009
44. Ziwei Ren, Wenfan Li, Qingy Yang, Shaoen Wu, Lei Chen “Location Security in Geographic Ad Hoc Routing for VANETs”, *International Congress on Ultra Modern Telecommunications and Control Systems*, St.Petersburg, Russia, Oct. 2009
45. Shaoen Wu, Saad Biaz “Rate Adaptation Algorithms for IEEE 802.11 Networks: A Survey and comparison”, *IEEE symposium on Computers and Communications (ISCC)*, Morocco, July 2008
46. Shaoen Wu, Saad Biaz, “Effective Rate Adaptation Algorithm for IEEE 802.11 WLAN Networks”, *IFIP Networking*, Singapore, May 2008.
47. Shaoen Wu, Saad Biaz, “OTLR: Opportunistic Transmission with Loss Recovery for WLANs”, *IEEE Wireless Communications & Networking Conference (WCNC)*, Las Vegas, March 2008.
48. Shaoen Wu, Saad Biaz “Loss Differentiated Rate Adaptation in Wireless Networks”, *IEEE Wireless Communications & Networking Conference (WCNC)*, Las Vegas, March 2008.
49. Shaoen Wu, Saad Biaz “Differentiate Frame Loss in Rate Adaptation for WLANs”, *IEEE Conference On Networking (ICON) 2007*, Adelaide, South Australia (accepted but withdrawn)
50. Yiming Ji, Saad Biaz, Shaoen Wu, Bing Qi “Optimal Sniffers Deployment On Wireless Indoor Localization”, *16th International Conference on Computer Communications and Networks*, Honolulu, Hawaii, USA, 2007
51. Shaoen Wu, Saad Biaz “A Relaxed Probing Rate Adaptation in IEEE 802.11 WLANs”, *International Conference on Wireless Information Networks and Systems (WINSYS)*, Barcelona, Spain, July 2007
52. Shaoen Wu, Saad Biaz, Bing Qi, Kehao Zhang “BARA: A Sender Based Rate Adaptation for Wireless Networks”, *ACM Southeast Conference (ACMSE)*, NC, USA, 2007
53. Bing Qi, Saad Biaz, Shaoen Wu, Yiming Ji “An Interference-Aware Routing Metric in Multi-radio Multi-hop Networks” *ACM Southeast Conference*, NC, USA, 2007
54. Bing Qi, Saad Biaz, Shaoen Wu, Yiming Ji “Evaluation of Multi-radio Extensions to DSR for Wireless Multi-hop Networks”, *International Conference on Wireless Information Networks and Systems*, Barcelona, Spain, 2007
55. Shaoen Wu, Saad Biaz, Yiming Ji, Bing Qi “BaseStation Assisted TCP: A Simple Way to Improve Wireless TCP”, *International Conference on Embedded and Ubiquitous Computing (EUC)*, August 2006
56. Yiming Ji, Saad Biaz, Shaoen Wu, Bing Qi “Impact of Building Environment on the Performance of Dynamic Indoor Localization”, *IEEE WAMICON*, FL, USA, 2006

57. Yiming Ji, Saad Biaz, Bing Qi, Shaoen Wu “Realistic Radio Range Irregularity Model and Its Impact on Localization for Wireless Sensor Networks”, *IEEE WCNM*, WH, China, 2005
58. Yiming Ji, Saad Biaz, Bing Qi, Shaoen Wu “Dynamic Signal Strength Estimates for Indoor Wireless Communications”, *IEEE WCNM*, WH, China, 2005

Book Chapters:

1. Lei Chen, Shaoen Wu, Yiming Ji, Ming Yang. “Mobile and Handheld Security”, *Handheld Computing for Mobile Commerce: Applications, Concepts and Technologies*, Information Science Reference

Industry Research Labs Technical Reports (non-refereed):

Note: these reports were done when I worked at ADTRAN Inc. and they were not published because of commercial confidentiality.

1. Shaoen Wu, “Shared and Prioritized Queuing and Scheduling for Triple-play Service”, Huntsville, AL, USA, August 2009
2. Shaoen Wu, “Virtual MIMO Circuits for Copper Communications”, Huntsville, AL, USA, April 2009
3. Shaoen Wu, “Traffic Scheduling in Fiber-Copper Hybrid Switching”, Huntsville, AL, USA, Jan 2009
4. Shaoen Wu, “Implementation and Verification of a Discrete Event Simulator on Parallel Computing”, Huntsville, AL, USA, Oct. 2008

Invited Talks

- “*Self-driving Robots Based on End-to-End Deep Learning*”, Chengdu, China, Nov 2021
- “*Deep Learning Driven Human Activity Recognition based on Radar Sensing*”, Keynote on EAI MobileMedia, Guiyang, China, July 2021
- “*The Challenges and Opportunities of Future Internet of Things*”, Tongji University, Shanghai, China, July 2019
- “*Intelligent Full-Duplex Wireless*”, Nanjing University of Post and Telecommunication, Nanjing, China, July 2019
- “*The Future of Internet of Things*”, Nanjing University of Information Science & Technology, Nanjing, China, July 2019
- “*The Challenges and Opportunities of Future Internet of Things*”, Fuzhou University, Fuzhou, China, July 2019
- “*Wireless Imaging with Radar and Deep Learning*”, Chongqing University of Post and Telecommunication, Chongqing, China, July 2019

- “*Next Generation of Internet of Things*”, Nanjing University of Post and Telecommunication, Nanjing, China, July 2018
- “*Deep Learning Full Duplex Wireless*”, Chongqing University of Post and Telecommunication, Chongqing, China, July 2018
- “*Autonomous Robotic Navigation*”, Nanjing University of Information Science & Technology, June 2018
- “*Deep Learning Full Duplex Wireless*”, Nanjing Post and Telecommunication University, Nanjing, China, June 2018
- “*Intelligent Internet of Intelligent Things*”, Qingdao University of Science and Technology, Qingdao, China, July 2017
- “*Deep Learning Based Human Activity Recognition*”, Nanjing Post and Telecommunication University, June 2017
- “*Smart Device Assisted Mobile User Recognition*”, Chongqing Post and Telecommunication University, Chongqing, China, Oct 2016
- “*Gesture based Mobile User Authentication*”, University of Electronic Science and Technology of China, Chengdu, China, July 2016
- “*Wireless Information Security*”, North University of China, Taiyuan, Shanxi, China, July. 2015
- “*Embracing Internet of Things*”, IEEE EnCON 2014, Indianapolis, IN, USA, Nov. 2014
- “*Wireless Channel Rate Adaptation*”, Huazhong University of Science and Technology, Wuhan, China, July 2013
- “*Wireless Channel Rate Adaptation*”, Bowie State University, Bowie, MD, USA, August 2012
- “*Efficient Wireless Rate Adaptation*”, Beijing University of Technology, Beijing, China, July 2012
- “*Rate Adaptation on Wireless Channel Dynamics*”, Texas Southern University, Houston, TX, USA, May 2012
- “*Wireless Channel Rate Adaptation*”, University of West Florida, Pensacola, FL, USA, April 2012
- “*Loss Differentiated Channel Rate Adaptation*”, Baylor University, Waco, Tx, USA, March 2012
- “*Wireless Channel Rate Adaptation*”, Northern Kentucky University, Highland Heights, KY USA, July 2012
- “*The Future of Wireless and Mobile Networking*”, Qingdao University of Science and Technology, Qingdao, China, Sept. 2011
- “*Loss Differentiated Rate Adaptation*”, University of Electronic Science and Technology of China, Chengdu, China, July 2011

- “*Rate Adaptation in Wireless Communications*”, Chongqing University, Chongqing, China, June 2011
- “*Multi-hop Wireless Networking*”, Xi Dian University, Xi’An, China, June 2011
- “*Multi-hop Wireless Networking*”, University of Massachusetts Dartmouth, Dartmouth, MA, April 2011
- “*Wireless Sensor Network in Ocean Research*”, Gulf Coast Research Laboratory, Ocean Spring, MS, March 2011
- *IEEE Global Communications Conference*, Miami, FL, USA, Dec. 2010

Professional Affiliations

- *Senior Member*, IEEE
- *Member*, ACM
- *Member*, International Society for Modeling & Simulation (SCS)
- *Member*, IEEE Computer Society
- *Member*, IEEE MMTC Services and Publicity Board

Professional Services

- *Area Editor*: EAI Transactions on Mobile Communications and Applications
- *Editorship*:
 - IEEE Transaction on Multimedia (ToMM), 2019-Present
 - IEEE Internet of Things Journal (IoTJ), 2016-Present
 - IEEE Communications Society, Multimedia Communications Technical Committee Frontier, 2014-Present
 - Elsevier Digital Communication and Networks
 - Transactions on Computer and Communication Networks, 2011-Present
 - Journal of Multimedia Information System, 2014-Present
- *Guest Editorship*: Wiley: Security and Communication Networks, Special Issue on Security and Networking for Cyber-Physical Systems, 2015-2016
- *General Chair*: 11th EAI/ACM International Conference on Mobile Multimedia Communications
- *Technical Program Committee Chair*:
 - The 2021 IEEE Global Communications Conference: *Communications Software and Multimedia Symposium*
 - Tenth IEEE International Workshop on Wireless Mesh and Ad Hoc Networks (Workshop of ICCCN 2016)
 - 8th International Conference on Mobile Multimedia Communications (2015)
 - Annual Simulation Symposium (2010, 2011, 2012, 2013)

- International Congress on Ultra Modern Telecommunications and Control Systems 2009 workshop
- First International Workshop on Mobile Multimedia Networking (2010)
- *Student Program Chair:* IEEE International Conference on Multimedia and Expo (ICME) 2019
- *Demo/Workshop Chair:*
 - IEEE International Conference on Industry Internet of Things (ICII) 2018
 - IEEE International Conference on Information Reuse and Integration for Data Science 2021
- *Publicity Chair:* Annual Simulation Symposium 2009
- *Technical Program Committee Member:*
 - IEEE Infocom (2016-2019)
 - IEEE Globecom (2010–2023)
 - IEEE ICC (2013–2023)
 - IEEE ICCCN (2013–2017)
 - TENSYPMP 2015 (IEEE Region 10 Technical Symposium 2015)
 - IEEE Consumer Communications and Networking Conference 2013
 - IEEE International Conference on Communication Technology 2013
 - IEEE Wireless Communications and Networking Conference (2013, 2014)
 - IEEE International Workshop on Network Forensics, Security and Privacy (NFSP 2013)
 - IEEE IEEE International Conference on Computer and Information Technology 2012
 - IEEE International Conference on Computing, Networking and Communications 2012
 - International Conference on Connected Vehicles & Expo (ICCVE) (2012–2014)
 - IADIS Telecommunications, Networks and Systems 2011
 - 1st International Conference on Simulation and Modeling Methodologies, Technologies and Applications;
 - International ICST Conference on Mobile Lightweight Wireless Systems 2008
 - IADIS Theory and Practice in Modern Computing 2012;
- *Regular Reviewer:*
 - IEEE Transaction on Vehicular Technology
 - IEEE Internet of Things Journal
 - IEEE Communication Magazine

- IEEE Systems Journal
 - IEEE Communication Letter
 - Elsevier Ad Hoc Networks
 - ACM Mobile Computing and Communications Review
 - IEEE Journal on Selected Areas in Communications (JSAC)
 - EURASIP Journal on Wireless Communications and Networking
 - Mobile Networks and Applications;
 - KSII Transactions on Internet and Information Systems
- *Panelists:* National Science Foundation

Patents

- “Universal vehicle communication & management system”. Application number: 11/162501
- “One number shared between PHS and home landline”. Owned by Bell Labs, Lucent Technologies Inc.

Awards

- IEEE International Conference on Information Reuse and Integration for Data Science 2021, Outstanding Service Award
- IEEE Globecom 2019 Best Paper Award
- International Conference on Industry Internet of Things 2019 Service Award
- International Conference on Industry Internet of Things 2018 Service Award
- International Conference on Computing, Networking and Communications 2018 Outstanding Service Award
- Indiana East Central Regional Science Fair Service Award
- Ball State University Research Magazine Featured Person
- 44th Annual Simulation Symposium (ANSS2011) Best Paper Award
- IEEE Symposium on Computers and Communications (ISCC) 2008 Best Paper Award
- First Place in Auburn University Graduate Student Research Forum 2007
- Vodafone-US Foundation Wireless Research Fellow 2005-2008

Students

- **Thesis/Dissertation Committee Chair:**

PhD students (2): Jia He (2020), Qingmei Yao (2014)

MS Students (22):

- **In Progress:** Yichen Gao, Yongshuai Wu
- **2021:** Yubai Zhang
- **2020:** Arko, Ernest
- **2019:** Hanqing Guo
- **2018:** Junhong Xue
- **2017:** Shangyu Zhu (*Now PhD Student at Notre Dame*); Yuhang Zhang; Israa Mishkhal; Ola Felemban; Xianliang Dai
- **2016:** Sudad Abed; Rania Alkhazaali; Zhuozhou Fu; Ran An
- **2014:** Lixing Song (*Now Assistant Professor at Rose-Hulman Institute of Technology*); Jun Sun
- **2013:** Yi Zhu (*Now Senior Staff Engineer at Palo Alto Networks*); Kejia Lin (*Now Interface Engineer at Rady Children's Hospital-San Diego*)
- **2012:** Chong Tang (*Now Research Scientist with Walmart Research Lab*)
- **2011:** Song Tan (*Now Senior Software Engineer at The MathWorks*); Hanyu Liu (*Now Software Engineer with LinkedIn*); Steven Johnson
- **2010:** Biju Bajracharya (*Now Assistant Professor with Ball State University*)

Honors (13): Myesha Choudhury (In progress), Lance Carter (In progress), Usama Nadeem (In progress), Awais Nadeem (In progress), Dillon Harding (2021), Devon Current (2019), Tara Williams (2017), Kelly Blair (2016), Jessica Lohse (2016), Jacob Roeland (2014), Mindy Mendiola (2013), Benjamin Knaus (2013), Kerim Pereira (2012)

- **Thesis/Dissertation Committee Member:**

PhD: Paul Froffitt (2020), Zhouzhou Li (i2019), Chaoyang Zhang (2016), Jinhfang Huang (2016), Haoni Li (2013), Yi Yang (2012)

MS: Arthur Parsons (2018), Jacob Rendall (2017), Iman Hussein (2017), Hua Sun (2011), ShengAi Jin (2012)

- **Research Mentor for Undergraduates:**

- **2021-2022:** Myesha Choudhury; Lance Carter; Usama Nadeem; Awais Nadeem; Dillon Harding; Evan Hazzard; Daniel Dinh; Allie High
- **2020:** Myesha Choudhury; Usama Nadeem; Awais Nadeem; Evan Hazzard; Daniel Dinh; Allie High
- **2019:** Julian Price; Clay Reber; Ryan Sims; Jordan Riley; Jacob Hahn; Devon Current; Will English; Toni Tull-Nunn; Erin Loehr; Taneaia Reed; Williams Morgan

- **2018:** Timothy Skinner; Alexandria Southern; David James; Max Dryer; Rachel McDaniel; Qiwei Liu; Jacob Hahn
- **2017:** Nathan Peterson; Toan Tran; Kevin McMinn; Shawn Keys; Wenjun Shi; Qiwei Liu
- **2013:** Gordon Pettey

Institutional Services

- Director, Center for Applied Computing
- Founding Director, Center for Security Research and Education
- Director, Security and Software Engineering Research Center (an NSF I/UCRC)
- Founding Director, Institute of Interdisciplinary Computing
- Director, Intelligent Computing and Communication Systems Lab
- Senior Advisor, Digital Scholarship Fellowship Lab
- Member, Scholarship Advisory Council of Vice Provost for Research
- Member, Dean’s Faculty Advisory Board
- Member, University Senate
- Member, Faculty Council
- Member, College P&T Committee
- Assistant Department Chair
- Chair, Department P&T Committee
- Chair, Department Graduate Program Task Force
- Member, Department Program Self-Study Committee
- Secretary, Department Curriculum Committee
- Member, Faculty Search Committee

Research Statement

Shaoen Wu

My current research lies in the crosscutting of AI and Cybersecurity, in addition to Internet of Things and Smart Health, with prior strong record and success in in Cyber Physical System security, Autonomous System and Wireless.

1 Current Research Work and Future Agenda

In recent years, my research has transitioned into the following areas.

AI for Cybersecurity: While I am continuing my research on the wireless information security to design more efficient and effective solutions to generate key bits from wireless channel, especially by using deep learning approaches, my group has been working on using deep learning to recognize, localize and describe potential software vulnerabilities and intrusion attacks with grants funded by Cisco, DoD and Lockheed Martin. In addition, we are using machine learning and other AI algorithms for network and system intrusion detection with the equipment donated by NVIDIA recently. Last but not least, we are working on IoT security with AI tools and algorithms as well.

Security of AI: My group is investigating the data and model poisoning attacks to AI models, and proposing blockchain-based solutions to defend AI systems from those attacks. Another research focus is designing hash-type AI models to address model reverse-engineering attacks. One more focus is the AI ethics, regulations and data authenticity.

Smart and Connected Health: Traditional healthcare uses many expensive or inconvenient medical devices to collect vital signs and lab results. My group is exploring wireless sensing based non-invasive and non-contact solutions to obtain health data while providing preliminary diagnosis. The solutions use wireless signal processing and deep machine learning to identify even slight variations on or inside our bodies. Another focus is on designing distributed machine learning models to push the computation to health records to keep the patient privacy required by laws and regulations.

Intelligent Internet of Smart Things: With the fast development of big data analytics, my group is working on the third generation of IoT, *intelligent IoT*, which is featured by the analysis of big sensor data from “things” for high-level intelligence. For example, we derive the traffic situation and plan optimal transportation routes from video or wireless sensor measurements deployed at a lot of locations. Meanwhile, my group also works on the intelligence at both the edge smart “things” and the cloud central big data analytics. We are addressing many new research challenges, such as wireless sensor data analytics for future smart edge “things” based on deep learning, and distributed IoT deep learning frameworks to achieve both the edge and the cloud intelligence.

2 Previous Research Work

In the past, my research work focused on (1) wireless networking and mobile computing, (2) information security, and (3) cyber-physical systems.

Deep Wireless Networking: I am also taking deep machine learning into my traditional research domain—wireless communications and networking. We are designing deep learning driven wireless in-band duplex communications. With deep learning, we have obtained breakthrough in cancelling self-interference that is the key factor blocking the duplex wireless. We are developing a prototype of

this solution to evaluate its networking performance in real environments. We also plan to use deep learning to address rate adaptation and routing problems in wireless domain.

Opportunistic Media Access: Wireless channels confront random and temporal variations. For the sake of channel utilization, users at good channel conditions should be favored for transmission. We have developed an opportunistic transmission protocol that allows a user to successively transmit a number of frames in proportion to its bit rate (channel condition) to achieve temporal fairness and improve channel utilization. Moreover, the successive transmission is supported with a loss differentiation capability that accordingly adjusts the remaining number of frames and the bit rate in case of a failure during transmission.

Wireless Information Security: Wireless information security has a bottleneck on the rate in generating key bits from wireless channel reciprocity. We proposed a cross-layer solution that can generate key bits at the level of wireless signal symbols, which improves the key generation rate by orders of magnitude from literature solutions that normally work at frame level.

Panoramic Realtime Video Stitching for Sports Video Surveillance: For the safety and security of thousands of sports spectators, sponsored by the NSF, we proposed and developed a realtime video stitching solution to achieve panoramic video surveillance. This solution provides a unified and complete view of the sports stadium and surroundings. The stitching of the realtime video streams from multiple surveillance cameras occurs at a fast speed on an embedded system thanks to an innovative parallel pipeline algorithm.

Autonomous Systems: My group has been working on autonomous driving and navigation with the sponsorship from NVIDIA for over a year with some exciting outcomes. We are designing sensor fusion based deep learning solutions to navigate robots in unfamiliar environments for various missions such as moving from classroom to hallway. We are looking into the future for deep learning based autonomous navigation and driving of a swarm of robots or UAVs.

3 Funding Plan

My research has been substantively funded by federal agencies and industry sponsors with about \$4M external grants with me being the PI. My funding sponsors include NSF and NASA, DoD, Lockheed Martin, Intel, Cisco, NVIDIA, Dell, ARM, Cypress and Microsoft. As research center directors, I have also managed over \$10M research grants.. I will keep seeking grants from these sponsors and also expand collaborations with others.

Teaching Statement

Shaoen Wu

To me, one most rewarding thing in faculty career is the opportunity to educate and mentor students. I always endeavor to inspire students' passion through teaching by connecting the lecture to cutting-edge research and daily life practice. It is part of my belief that caring for students and engaging them as collaborative authors of classes can improve their performance. I also proactively exploit my working experience in industry to educate students the attitudes, the approaches and the core to learn in each course. My teaching philosophy and approaches are highly appraised by my students: all of my courses are of evaluation over 4.0 out of 5 with an average of 4.6.

Courses: In the past years, I have offered both undergraduate and graduate courses including *Introduction to Cybersecurity*, *Topics in Cybersecurity*, *Practical Cryptograph and Security*, *Computer Security and Administration*, *Network Security*, *Computer Networks*, *Wireless and Mobile Communication and Networking*, *Operating Systems*, *Internetwork Design* and *Senior Project*. My academic and industrial background also prepared me to teach a broad range of courses in Information Technology and Systems.

Hands-on Approach: Hands-on is believed a key to the success of education in science, engineering and technology disciplines. It is important for students to gain skills, solidify theory, discover problems, and obtain higher levels of achievement, reasoning and problem-solving skills. I designed hands-on projects for all my courses. These projects were designed from my industry experience and ongoing research projects. Therefore, students understand that they work to solve problems in “real world”, not spending their time on something useless. I also do my best to mentor them with my strong hands-on experience gained in industry.

Integration of Research and Teaching: Part of my teaching philosophy is to integrate the research into the teaching for two reasons. *First*, the engagement of students in delicately prepared research projects can provide a vision of relationship between the knowledge imparted in courses and the practical problems. Understanding and solving the research challenges in the real world can also promote their interests to learn necessary knowledge and skills in courses. Meanwhile, they can see their contributions to our society. *Second*, integration of cutting-edge research observations and progress into course content can keep students updated of the latest advance in the field and cultivate their interest in pursuing advanced study. I have involved more than tens of undergraduate students directly in my research projects and enhanced the curricula of four courses with research outcomes.

Attitude Training: I believe one's attitude toward learning is more important than a specific piece of knowledge. Just as a Chinese proverb says, “Give a man a fish; you have fed him for today. Teach a man to fish; and you have fed him for a lifetime”. Part of my first lecture of each course was devoted to the talk of cultivating a proactive, courageous and open-mind learning attitude. Some of assignments and projects are deliberately designed to challenge students of the courage to confront and work on difficult tasks. In exit surveys, my students highly evaluated this training and appreciated my extra effort in it.

Active Learning: Engagement of students in teaching is a key factor to their outcomes. I have adopted various techniques of active learning in my teaching such as flip-flop instruction, peer instruction, small group discussion, and preview questions and case studies, which have significantly improved learning outcomes.