

ZHANGYU GUAN

CONTACT INFORMATION

221 Davis Hall, University at Buffalo, Buffalo, NY 14260

Phone: (716) 645-1147

E-mail: guan@buffalo.edu

Webpage: <http://www.acsu.buffalo.edu/~guan>

EDUCATIONAL BACKGROUND

Shandong University, Jinan, China

2005-2010

School of Information Science and Engineering

Ph.D. in Information and Communication System

Thesis: “*Cross-layer Design Based on Game Theory in Cognitive and Cooperative Wireless Networks*”

Advisor: Prof. Dongfeng Yuan, Prof. Tommaso Melodia (Joint Advisor)

University at Buffalo, The State University of New York, USA

2009-2010

Department of Electrical Engineering

Visiting Ph.D. Student

Thesis: “*Dynamic Spectrum Management in Cognitive and Cooperative Wireless Networks*”

Advisor: Prof. Tommaso Melodia

Shandong University, Jinan, China

1999-2003

School of Information Science and Engineering

B.S. in Communication Engineering

Thesis: “*Short Range Wireless Data Communication*”

Advisor: Prof. Yongsheng Fu

EMPLOYMENT HISTORY

Assistant Professor

August 2018 - present

Dept. of Electrical Engineering

University at Buffalo, The State University of New York

Associate Research Scientist

November 2016 - August 2018

Dept. of Electrical and Computer Engineering

Northeastern University

Advisor: Prof. Tommaso Melodia

Postdoctoral Research Associate

September 2015 - October 2016

Dept. of Electrical and Computer Engineering

Northeastern University

Advisor: Prof. Tommaso Melodia

Assistant Professor

March 2011 - January 2015

School of Information Science and Engineering

Shandong University, China

Postdoctoral Research Associate

November 2012 - August 2015

Dept. of Electrical Engineering

University at Buffalo, The State University of New York

Advisor: Prof. Tommaso Melodia

University Counselor

August 2003 - August 2005

Shandong University, China

RESEARCH INTERESTS

- **Zero-Touch Theories and Algorithms:** Software-defined Networking, Digital Twin/AI/ML for/by Wireless, Operating System for Wireless Networks
- **New Spectrum Technologies for NextG Networks:** Spectrum Coexistence, mmWave/THz-band Networking, Airborne Networks
- **Wireless Network Security:** Protocol Jamming/Anti-jamming, Protocol-agnostic Sensing
- **Testbed for Future Networks:** NeXT (Digital Twin-Enabled Multi-Fidelity Network Simulator), UnionLabs (Cloud-based Platform for Testbed Sharing)
- **Printable RFID, Chipless RFID**

PUBLICATIONS

Citations: 949 (Google Scholar), H-Index: 18

Supervised graduate students are underlined

Papers Under Review

1. J. Hu, S. K. Moorthy, A. Harindranath, N. Mastronarde, E. S. Bentley, S. Pudlewski, and **Z. Guan**, “A Mobility-Resilient Spectrum Sharing Framework for Operating Wireless UAVs in the 6 GHz Band,” *IEEE/ACM Transactions on Networking*, major revision, December 2022.
2. S. K. Moorthy, N. Mastronarde, E. S. Bentley, M. Medley, and **Z. Guan**, “OSWireless: Hiding the Specification Complexity for Zero-Touch Software-Defined Wireless Networks,” (*Elsevier*) *Computer Networks*, under review, January 2023.
3. S. K. Moorthy, N. Mastronarde, S. Pudlewski, E. S. Bentley, **Z. Guan**, “Swarm UAV Networking With Collaborative Beamforming and Automated ESN Learning in the Presence of Unknown Blockages,” (*Elsevier*) *Computer Networks*, under review, January 2023.
4. M. McManus, Y. Cui, J. Zhang, J. Hu, S. K. Moorthy, N. Mastronarde, E. S. Bentley, M. Medley, **Z. Guan**, “Digital Twin-Enabled Domain Adaptation for Zero-Touch UAV Networks: Survey and Challenges,” *IEEE Communications Surveys & Tutorials*, under review, January 2023 (arXiv:2301.03359)

Journals and Magazines

Since joining UB

5. S. K. Moorthy, **Z. Guan**, “Beam Learning in MmWave/THz-band Drone Networks Under In-Flight Mobility Uncertainties,” *IEEE Transactions on Mobile Computing*, vol. 21, no. 6, pp. 1945-1957, June 2022. (Citations: 17)
6. S. K. Moorthy, M. Mcmanus, **Z. Guan**, “ESN Reinforcement Learning for Spectrum and Flight Control in THz-Enabled Drone Networks,” *IEEE/ACM Transactions on Networking*, vol. 30, no. 2, pp. 782-795, April 2022. (Citations: 2)
7. N. Cen, **Z. Guan**, T. Melodia, “Compressed Sensing based Low-Power Multi-view Video Coding and Transmission in Wireless Multi-path Multi-hop Networks,” *IEEE Transactions on Mobile Computing*, vol. 21, no. 9, pp. 3122-3137, September 2022. (Citations: 1)
8. **Z. Guan**, L. Bertizzolo, E. Demirors, T. Melodia, “WNOS: Enabling Principled Software-Defined Wireless Networking,” *IEEE/ACM Transactions on Networking*, vol. 29, no. 3, pp. 1391-1407, June 2021. (Citations: 5)

9. **Z. Guan**, H. Kulhandjian, T. Melodia, "Stochastic Channel Access in Underwater Networks With Statistical Interference Modeling," *IEEE Transactions on Mobile Computing*, vol. 20, no. 10, pp. 3020-3033, October 2021. (Citations: 4)
10. L. Bonati, S. D'Oro, L. Bertizzolo, E. Demirors, **Z. Guan**, S. Basagni, T. Melodia, "CellOS: Zero-touch Softwarized Open Cellular Networks," *Computer Networks (Elsevier)*, vol. 180, pp. 1-13, October 2020. (Citations: 27)
11. **Z. Guan**, N. Cen, T. Melodia, S. Pudlewski, "Joint Power, Association and Flight Control for Massive-MIMO Self-Organizing Flying Drones," *IEEE/ACM Transactions on Networking*, vol. 28, no. 4, pp. 1491-1505, August 2020. (Citations: 13)
12. N. Cen, Jithin Jagannath, Simone Moretti, **Z. Guan**, Tommaso Melodia, "LANET: Visible-Light Ad Hoc Networks", *Ad Hoc Networks (Elsevier)*, vol. 84, pp. 107-123, 2019. (Citations: 35)

Prior to joining UB

13. N. Cen, **Z. Guan**, T. Melodia, "Inter-view Motion Compensated Joint Decoding of Compressive-Sampled Multi-view Video Streaming," *IEEE Transactions on Multimedia*, vol. 19, no. 6, pp. 1117-1126, June 2017. (Citations: 13)
14. **Z. Guan** and T. Melodia, "The Value of Cooperation: Minimizing User Costs in Multi-broker Mobile Cloud Computing Networks," *IEEE Transactions on Cloud Computing*, vol. 5, no. 4, pp. 780-791, October-December 2017. (Citations: 23)
15. L. Zhang, **Z. Guan**, and T. Melodia, "United Against the Enemy: Anti-jamming Based on Cross-layer Cooperation in Wireless Networks," *IEEE Transactions on Wireless Communications*, vol. 15, no. 8, pp. 5733-5747, August 2016. (Citations: 41)
16. **Z. Guan**, G. Enrico Santagati, and T. Melodia, "Distributed Algorithms For Joint Channel Access and Rate Control in Ultrasonic Intra-body Networks," *IEEE/ACM Transactions on Networking*, vol. 24, no. 5, pp. 3109-3122, October 2016. (Citations: 10)
17. **Z. Guan**, T. Melodia, D. Yuan, and D. Pados, "Distributed Resource Management for Cognitive Ad Hoc Networks with Cooperative Relays," *IEEE/ACM Transactions on Networking*, vol. 24, no. 3, pp. 1675-1689, June 2016. (Citations: 22)
18. **Z. Guan**, T. Melodia, and G. Scutari, "To Transmit or Not to Transmit? Distributed Queueing Games for Infrastructureless Wireless Networks," *IEEE/ACM Transactions on Networking*, vol. 24, no. 2, pp. 1153-1166, April 2016. (Citations: 20)
19. S. Pudlewski, N. Cen, **Z. Guan**, and T. Melodia, "Video Transmission over Lossy Wireless Networks: A Cross-layer Perspective," *IEEE Journal on Selected Topics in Signal Processing*, vol. 9, no. 1, pp. 6-22, February 2015. (Citations: 70)
20. **Z. Guan** and T. Melodia, "Cloud-assisted Smart-camera Networks for Energy-efficient 3D Video Streaming," *IEEE Computer*, vol. 47, no. 5, pp. 60-66, May 2014. (Citations: 12)
21. **Z. Guan**, D. Yuan, H. Zhang, and L. Ding, "Cooperative Bargaining Solution for Efficient and Fair Spectrum Management in Cognitive Wireless Networks," *International Journal of Communication Systems*, vol. 27, no. 11, pp. 3441-3459, November 2014. (Citations: 10)
22. Jiali Xu, **Z. Guan**, "Joint Relay Selection and Cognitive Spectrum Access Based on Genetic Algorithm in Cooperative Wireless Networks," *The Journal of New Industrialization*, vol. 5, 2014 (in Chinese). (Citations: 6)
23. **Z. Guan**, T. Melodia, and D. Yuan, "Jointly Optimal Rate Control and Relay Selection for Cooperative Wireless Video Streaming," *IEEE/ACM Transactions on Networking*, vol. 21, no. 4, pp. 1173-1186, August 2013. (Citations: 38)

24. **Z. Guan**, D. Yuan, and H. Zhang, “Optimal and Fair Resource Allocation for Multiuser Wireless Multimedia Transmissions,” *EURASIP Journal on Wireless Communications and Networking*, 2009. (Citations: 13)

Conference and Workshop Papers

Since joining UB

25. N. Mishra, Y. V. Iyengar, A. C. Raikar, N. Thomas, S. K. Moorthy, J. Hu, Z. Zhao, N. Mastronarde, E. S. Bentley, M. Medley, and **Z. Guan**, “Demo: Scaling Out srsRAN Through Interfacing Wirelessly srsENB With srsEPC,” in *Proc. of IEEE International Conference on Computer Communications (INFOCOM)*, New York area, USA, 17-20 May, 2023.
26. J. Hu, M. McManus, S. K. Moorthy, Y. Cui, **Z. Guan**, N. Mastronarde, E. S. Bentley, and M. Medley, “NeXT: A Software-Defined Testbed with Integrated Optimization, Simulation and Experimentation,” in *Proc. of IEEE Future Networks World Forum (FNWF): WS5: Federated Testbed as a Service for Future Networks: Challenges & the State of the Art*, Montreal, Canada, 12-14 October 2022. (**Best Paper Award First Runner-up**)
27. S. K. Moorthy, **Z. Guan**, N. Mastronarde, E. S. Bentley, M. Medley, “OSWireless: Enhancing Automation for Optimizing Intent-Driven Software-Defined Wireless Networks,” in *Proc. of IEEE International Conference on Mobile Ad-Hoc and Smart Systems (MASS)*, Denver, Colorado, October 2022. (AR: 29%, Citations: 1)
28. M. McManus, **Z. Guan**, N. Mastronarde, S. Zou, “On the Source-to-Target Gap of Robust Double Deep Q-Learning in Digital Twin-Enabled Wireless Networks,” in *Proc. of SPIE Conference Big Data IV: Learning, Analytics, and Applications*, Orlando, Florida, April 2022. (Citations: 4)
29. S. K. Moorthy, A. Harindranath, M. McManus, **Z. Guan**, N. Mastronarde, E. S. Bentley, M. Medley, “A Middleware for Digital Twin-Enabled Flying Network Simulations Using UBSim and UB-ANC,” in *Proc. of IEEE DCROSS Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE)*, LA, California, June 2022. (Citations: 1)
30. N. Mastronarde, D. Russell, **Z. Guan**, G. Sklivanitis, E. S. Bentley, M. Medley, “RF-SITL: A Software-in-the-loop Channel Emulator for UAV Swarm Networks”, in *Proc. of IEEE WoWMoM Workshop on Wireless Networking, Planning, and Computing for UAV Swarms (SwarmNet)*, June 14-17, 2022, Belfast, United Kingdom. (Citations: 2)
31. S. K. Moorthy, Chencheng Lu, **Z. Guan**, N. Mastronarde, George Sklivanitis, Dimitris Pados, E. S. Bentley, M. Medley, “CloudRAFT: A Cloud-based Framework for Remote Experimentation for Mobile Networks,” in *Proc. of IEEE International Workshop on Communication and Networking for Swarms Robotics (RoboCom)*, January 2022. (Citations: 5)
32. Jiangqi Hu, Sabarish Krishna Moorthy, Ankush Harindranath, **Z. Guan**, N. Mastronarde, E. S. Bentley, and S. Pudlewski, “SwarmShare: Mobility-Resilient Spectrum Sharing for Swarm UAV Networking in the 6 GHz Band,” in *Proc. of IEEE International Conference on Sensing, Communication and Networking (SECON)*, Virtual Conference, July 2021. (Citations: 3)
33. Sabarish Krishna Moorthy, **Z. Guan**, S. Pudlewski, E. S. Bentley, “FlyBeam: Echo State Learning for Joint Flight and Beamforming Control in Wireless UAV Networks,” in *Proc. of IEEE International Conference on Communications (ICC)*, Virtual/Montreal, Canada, 14-24 June, 2021. (Citations: 2)
34. M. McManus, **Z. Guan**, E. S. Bentley, S. Pudlewski, “Experimental Analysis of Cross-Layer Sensing for Protocol-Agnostic Packet Boundary Recognition,” in *Proc. of IEEE INFOCOM Workshop on Wireless Sensor, Robot and UAV Networks (WiSARN)*, Virtual Conference, May 2021. (Citations: 1)

35. Sabarish Krishna Moorthy, **Z. Guan**, “FlyTera: Echo State Learning for Joint Access and Flight Control in THz-enabled Drone Networks,” in *Proc. of IEEE International Conference on Sensing, Communication and Networking (SECON)*, Como, Italy, June 2020. (AR: 28%, Citations: 11)
36. Sabarish Krishna Moorthy, **Z. Guan**, “LeTera: Stochastic Beam Control Through ESN Learning in Terahertz-Band Wireless UAV Networks,” in *Proc. of IEEE INFOCOM Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE)*, Toronto, Canada, July 2020. (**Best Paper Award Runner-Up**) (Citations: 5)
37. A. Anand, R. S. Suresh Kumar, F. Malandra, Z. Sun, **Z. Guan**, “UBSpot: A Universal Broad-band Flying Hotspot Experimental Testbed Toward Programmable Aerial-Ground Wireless Networks,” in *Proc. of IEEE Internet of Things (IoT) Summit at Radio & Wireless Week (RWW2020)*, San Antonio, Texas, USA, 26-27 January 2020. (Citations: 3)
38. **Z. Guan** and Tejas Kulkarni, “On the Effects of Mobility Uncertainties on Wireless Communications Between Flying Drones in the mmWave/THz Bands,” in *Proc. of IEEE INFOCOM Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE)*, Paris, France, 29 April - 2 May 2019. (Citations: 27)
39. L. Bertizzolo, S. D’Oro, L. Ferranti, L. Bonati, E. Demirors, **Z. Guan**, T. Melodia, S. Pudlewski, “SwarmControl: An Automated Distributed Control Framework for Self-Optimizing Drone Networks,” in *Proc. of IEEE Conference on Computer Communications (INFOCOM)*, Toronto, Canada, July 2020. (AR: 20%, Citations: 38)
40. L. Bertizzolo, E. Demirors, **Z. Guan**, T. Melodia, “CoBeam: Beamforming-based Spectrum Sharing With Zero Cross-Technology Signaling for 5G Wireless Networks,” in *Proc. of IEEE Conference on Computer Communications (INFOCOM)*, Toronto, Canada, July 2020. (AR: 20%, Citations: 8)
41. N. Cen, N. Dave, E. Demirors, **Z. Guan**, T. Melodia, “LiBeam: Throughput-Optimal Cooperative Beamforming for Indoor Visible Light Networks,” in *Proc. of IEEE Conference on Computer Communications (INFOCOM)*, Paris, France, 29 April - 2 May 2019. (AR: 19.7%, Citations: 14)

Prior to joining UB

42. **Z. Guan**, Nan Cen, T. Melodia, Scott Pudlewski, “Self-Organizing Flying Drones with Massive MIMO Networking,” in *Proc. of Mediterranean Ad Hoc Networking Workshop (Med-Hoc-Net)*, Capri, Italy, June 2018. (Citations: 14)
43. **Z. Guan**, L. Bertizzolo, E. Demirors, and T. Melodia, “WNOS: An Optimization-based Wireless Network Operating System,” in *Proc. of ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc)*, Los Angeles, USA, June 2018. (AR: 16%, Citations: 17)
44. **Z. Guan**, L. Bertizzolo, E. Demirors, and T. Melodia, “Demo Abstract: WNOS: Software-defined Generation of Distributed Optimal Control Programs for Wireless Networks,” in *Proc. of IEEE Conference on Computer Communications (INFOCOM)*, Honolulu, HI, April 2018.
45. **Z. Guan** and T. Melodia, “CU-LTE: Spectrally-Efficient and Fair Coexistence between LTE and Wi-Fi in Unlicensed Bands,” *Proc. of IEEE Conference on Computer Communications (INFOCOM)*, San Francisco, CA, April 2016. (AR: 18.25%, Citations: 123)
46. N. Cen, **Z. Guan**, and T. Melodia, “Multiview Video Streaming Based on Compressed Sensing: Architecture Design and Network Optimization,” in *Proc. of ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc)*, Hangzhou, China, June 2015. (AR: 14.8%, Citations: 11)
47. **Z. Guan**, G. Enrico Santagati, and T. Melodia, “Ultrasonic Intra-body Networking: Interference Modeling, Stochastic Channel Access and Rate Control,” in *Proc. of IEEE Conference on Computer Communications (INFOCOM)*, Hong Kong S.A.R., PRC, April 2015. (AR: 19%, Citations: 11)

48. J. Shi, **Z. Guan**, C. Qiao, T. Melodia, D. Koutsonikolas, and G. Challen, "Crowdsourcing Access Network Spectrum Allocation Using Smartphones," Poster in *ACM International Workshop on Mobile Computing Systems and Applications (HotMobile)*, Santa Fe, New Mexico, February 2015.
49. J. Shi, **Z. Guan**, C. Qiao, T. Melodia, D. Koutsonikolas, and G. Challen, "Crowdsourcing Access Network Spectrum Allocation Using Smartphones," in *Proc. of ACM Workshop on Hot Topics in Networks (HotNets)*, Los Angeles, California, USA, October 2014. (AR: 22%, Citations: 30)
50. L. Zhang, **Z. Guan**, T. Melodia, "Cooperative Anti-jamming for Infrastructure-less Wireless Networks with Stochastic Relaying," in *Proc. of IEEE International Conference on Computer Communications (INFOCOM)*, Toronto, Canada, April 2014. (AR: 19.4%, Citations: 20)
51. N. Cen, **Z. Guan**, and T. Melodia, "Joint Decoding of Independently Encoded Compressive Multi-view Video Streams," in *Proc. of Picture Coding Symposium (PCS)*, San Jose, CA, December 2013. (Citations: 11)
52. **Z. Guan**, T. Melodia, and G. Scutari, "Distributed Queuing Games in Interference-limited Wireless Networks," in *Proc. of IEEE International Conference on Communications (ICC)*, Budapest, Hungary, June 2013. (Citations: 12)
53. **Z. Guan**, T. Melodia, and D. Yuan, "Stochastic Channel Access for Underwater Acoustic Networks with Spatial and Temporal Interference Uncertainty," in *Proc. of ACM International Conference on UnderWater Networks and Systems (WUWNet)*, Los Angeles, CA, USA, November 2012. (Citations: 16)
54. **Z. Guan**, T. Melodia, D. Yuan, and D. A. Pados, "Distributed Spectrum Management and Relay Selection in Interference-Limited Cooperative Wireless Networks," in *Proc. of ACM International Conference on Mobile Computing and Networking (MobiCom)*, Las Vegas, Nevada, USA, September 2011. (AR: 13.6%, Citations: 44)
55. **Z. Guan**, T. Melodia, and D. Yuan, "Optimizing Cooperative Video Streaming in Wireless Networks," in *Proc. of IEEE International Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON)*, Salt Lake City, Utah, June 2011. (AR: 28%, Citations: 15)
56. **Z. Guan**, L. Ding, T. Melodia, and D. Yuan, "On the Effect of Cooperative Relaying on the Performance of Video Streaming Applications in Cognitive Radio Networks," in *Proc. of IEEE International Conference on Communications (ICC)*, Kyoto, Japan, June 2011. (Citations: 39)
57. **Z. Guan**, D. Yuan, and H. Zhang, "Co-opetition Strategy for Collaborative Multiuser Multimedia Resource Allocation," in *Proc. of IEEE Intl. Conf. on Communications (ICC)*, Dresden, Germany, June 2009. (Citations: 4)
58. **Z. Guan**, D. Yuan, and H. Zhang, "Novel Coopetition Paradigm Based on Bargaining Theory for Collaborative Multimedia Resource Management," in *Proc. of IEEE Personal, Indoor and Mobile Radio Communications Symposium (PIMRC)*, Cannes, France, September 2008. (Citations: 10)
59. Q. Jin, D. Yuan, and **Z. Guan**, "Distributed Geometric-Programming-Based Power Control in Cellular Cognitive Radio Networks," in *Proc. of IEEE Vehicular Technology Conference (VTC2009-Spring)*, Barcelona, Spain, April 2009. (Citations: 37)

Book Chapter

60. **Z. Guan**, "Multiuser Multimedia Radio Resource Management Based on Game Theory," in **Cross-layer Design in Wireless Communication Networks: From Theory to Applications (in Chinese)**, Haixia Zhang, Dongfeng Yuan, Yanbo Ma, The People Post and Telecommunications Press, pp. 24-56, 2010.

PATENT APPLICATIONS

1. I. Dhopeswar, Z. Guan, D. J. Harrison, RFID Antenna, RFID Tag and Method for Fabricating Such RFID Antenna, Submitted to UB Technology Transfer Office and ARMOR-IIMAK, January 2023.
2. T. Melodia, Z. Guan, Distributed Wireless Network Operating System, US 11240137, Granted, February 2022.
3. T. Melodia, Z. Guan, Method for Sharing of Unlicensed Radio Frequency Bands by Cellular LTE and WiFi Networks, US 9924372, Granted, March 2018.
4. Z. Guan, T. Melodia, A Medium Access Control Scheme for Ultrasonic Communications in the Human Body Based on Second Order Statistics, PCT/US14/58486, September 2014.
5. D. Yuan, J. Zheng, Q. Jin, Z. Guan, and W. Liu, *A Novel Inverse Method for Control Message Parsing*, No. ZL200710015217.X, China Invention Patent.
6. D. Yuan, F. Chen, K. Zhao, B. Wei, Y. Chong, Z. Guan, and Q. Miao, *An Adaptive Rate Control Method for Wireless Video Monitoring*, No. ZL200910014708.1, China Invention Patent.
7. D. Yuan, B. Wei, K. Zhao, Y. Chong, F. Chen, Z. Guan, and Q. Miao, *A Novel Design Method of HPI Time Sequence Conversion Circuit for ARM and Video Encoder Chip Connection*, No. ZL200910014500.x, China Invention Patent.
8. D. Yuan, Y. Chong, K. Zhao, B. Wei, Z. Shi, Z. Guan, and Q. Miao, *A Novel Design Method of Real Time Video Monitoring Terminal*, No. ZL200910014708.1, China Invention Patent.

SPONSORED RESEARCH

Since joining UB (Total as PI: \$2.1M, My Share: \$1.84M, Total: \$3.96M)

1. “Chipless RFID Production Technologies,” **PI**, New York State Office of Science Technology and Academic Research (NYSTAR), total \$50,000 (my share 100%), September 2022 - August 2023.
2. “Collaborative Research: SWIFT: Decentralized Intelligent Spectrum Sharing in UAV Networks (DISH-uNET) via Hardware-software Co-design,” **PI at University at Buffalo** (Lead Institution: The University of Utah), NSF, total \$750,000 (UB share 25%, my share 25%), October 2022 - September 2025.
3. “Modeling, Simulation, and Emulation of InfoNets with the UB-ANC Emulator,” **co-PI**, AFRL, total \$900,000 (my share 33.3%), September 2022 - December 2024 (PI: Nicholas Mastronarde).
4. “ZTSwarm: Toolchain Development for Digital Twin-Assisted Zero Touch Swarm Control,” **PI**, AFRL, total \$1.2M (my share 67%), January 2023 - December 2024 (co-PI: Nicholas Mastronarde, Karthik Dantu).
5. “DEEPMission: Digital twin-Enabled nEtworking and Planning for Mission-Driven Autonomous UAV Systems,” **PI**, AFRL & PAR Government Systems Corporation, total \$285,000 (my share 34%), February 2022 - February 2023 (co-PI: Nicholas Mastronarde, Karthik Dantu).
6. “Scenario Development and Digital Twin Construction Towards Zero-Touch Automation of NextG Networks,” **PI**, AFRL Visiting Faculty Research Program (VFRP), total \$22,024 (my share 100%), May 2022 - August 2022.
7. “New RFID Production Technologies,” **PI**, ARMOR-IIMAK, total \$79,658 (my share 34%), July 2021 - December 2022 (co-PI: Nicholas Mastronarde, Filippo Malandra).
8. “New RFID Production Technologies,” **PI**, New York State Office of Science Technology and Academic Research (NYSTAR), total \$50,000 (my share 100%), July 2021 - December 2022.

9. "SwarmControl-AI: AI-Enabled Autonomous Control of Swarm UAV Networks," **PI**, AFRL Visiting Faculty Research Program (VFRP) Award, total \$18,540 (my share 100%), May 2021 - August 2021.
10. "OVERCOME: Internet Service Delivered via CBRS to a Historic, Under-resourced Community Adjacent to the Buffalo Niagara Medical Campus Known as the Fruit Belt Neighborhood", **co-PI**, US Ignite/Schmidt Futures, April 2021 - March 2022, total \$300,000 (my share \$7000).
11. "Extension: DeepWave: Automated Radio Signal and Protocol Classification Through Deep Learning for Waveform Vulnerability Discovery," **PI**, total \$241,752 (my share 50%), Air Force Research Laboratory (AFRL), 2020 - 2021, (co-PI: Nicholas Mastronarde).
12. "SwarmAPI: An Evolved Network Abstraction for Automating the Design of Swarm Control Programs," **PI**, AFRL Visiting Faculty Research Program (VFRP) Extension Grant, total \$10,000 (my share 100%), September 2020 - November 2020.
13. "SwarmAPI: An Evolved Network Abstraction for Automating the Design of Swarm Control Programs," **PI**, AFRL Visiting Faculty Research Program (VFRP) Award, total \$11,700 (my share 100%), May 2020 - July 2020.
14. "Toward Elastic, Programmable, Optimized Tactical Swarm Networking," **PI**, subcontract from Northeastern University, total \$19,957 (my share 100%), May-August 2020.
15. "DeepWave: Automated Radio Signal and Protocol Classification Through Deep Learning for Waveform Vulnerability Discovery," **PI**, Air Force Research Laboratory (AFRL), total \$100,000 (my share 100%), 2020-2021.
16. "Wireless Network Security in the Presence of Advanced Protocol Attacks," **PI**, AFRL Visiting Faculty Research Program (VFRP) Extension Grant, total \$10,000 (my share 100%), September 2019 - Oct. 2019.
17. "Wireless Network Security in the Presence of Advanced Protocol Attacks," **PI**, AFRL Visiting Faculty Research Program (VFRP) Award, total \$16,498 (my share 100%), May 2019 - July 2019.
18. "Student Travel Grant for 2019 IEEE International Conference on Sensing, Communication and Networking (IEEE SECON)", **PI**, total \$7,000 (my share 100%), NSF, April 2019 - March 2020.

HONORS & AWARDS

- Best Paper Award First Runner-up, IEEE Future Networks World Forum (FNWF), Montreal, Canada 2022
- IEEE CTU Connecting the Unconnected Challenge Prize: Technical Proof of Concept 2nd Place (out of 200+ groups) 2021
- Best Paper Award Runner-Up, IEEE INFOCOM Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE), Toronto, Canada 2020
- Distinguished TPC Member Award, IEEE International Conference on Computer Communications (INFOCOM) 2018
- Outstanding Reviewer Award, Elsevier Journal on Ad Hoc Networks 2014
- Award for Science and Technology Progress (1st Class), Shandong Province, China 2013
- Shandong Natural Science Award (2nd Class), Shandong Province, China 2012
- AMD Excellent Research Scholarship, Shandong University 2009
- Excellent Social Practice Scholarship (for project of "wireless multimedia monitoring system development"), Shandong University 2007

PROFESSIONAL ACTIVITIES AND SERVICES

Leadership Positions

- Technical Program Committee Chair, IEEE Consumer Communications & Networking Conference (CCNC), Las Vegas, NV, USA, January 2025
- Technical Program Committee Vice Chair, IEEE Consumer Communications & Networking Conference (CCNC), Las Vegas, NV, USA, January 2024
- Chair for Information System (EDAS) for IEEE Consumer Communications & Networking Conference (CCNC) 2021 - 2023
- Technical Program Committee Co-Chair, 6th IEEE International Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE), LA, California, May 2022
- Organizing Committee Chair, 4th Buffalo Day for 5G and Wireless Internet of Things, Buffalo, NY, Nov. 2022
- Student Travel Award Co-Chair, ACM/IEEE Cyber-Physical Systems and Internet-of-Things Week, May 3-6, 2022.
- Technical Program Committee Co-Chair, 2nd IEEE International Workshop on Communication and Networking for Swarms Robotics (RoboCom), Las Vegas, NV, USA, January 2022
- Technical Program Committee Co-Chair, IEEE Workshop on Federated Testbed Towards Future Networks: Challenges & State of the Art 2021
- Technical Program Committee Chair, IEEE DCOSS Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE), July 2021
- Publicity Co-Chair, IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob), Oct. 2021
- Organizing Committee Chair, 3rd Buffalo Day for 5G and Wireless Internet of Things, Buffalo, NY, Nov. 2021
- Technical Program Committee Co-Chair for IEEE INFOCOM Workshop on Wireless Sensor, Robot and UAV Networks (WiSARN 2021), 10-13 May 2021, Virtual Conference
- Workshop Co-Chair for International Conference on Distributed Computing in Sensor Systems (DCOSS 2021), Coral Bay, Pafos, Cyprus June 7 – 9, 2021
- General Co-Chair, 1st IEEE International Workshop on Communication and Networking for Swarms Robotics (RoboCom), January 2021, Virtual Conference
- Organizing Committee Chair, 2nd Buffalo Day for 5G and Wireless Internet of Things, Nov. 20, 2020, Virtual Event
- Student Travel Grants Chair, IEEE Sensor, Mesh and Ad Hoc Communications and Networks (SECON), Como, Italy, June 2020
- Technical Program Committee Chair, IEEE INFOCOM Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE), Beijing, China, April 2020
- Organizing Committee Chair, 1st Buffalo Day for 5G and Wireless Internet of Things, Nov. 22, 2019
- Student Travel Grants Chair, IEEE Sensor, Mesh and Ad Hoc Communications and Networks (SECON), Boston, June 2019
- Technical Program Committee Vice-chair for Information System (EDAS) for IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN), Osaka, Japan, June 12-14, 2017
- Technical Program Committee Chair for MOBIMEDIA Workshop on QoE-Aware Resource Allocation for Multimedia Transmission (QoE-RAMT), Chongqing, China, July, 2017

Associate Editor

- Guest Editor for MDPI Drones Special Issue “Mobile Fog and Edge Computing in Drone Swarms”, September 2020
- Computer Networks (Elsevier), September 2019 - present

Technical Program Committee Membership

- IEEE INFOCOM 2016-2023
- IEEE MASS, 2017-2019, 2021-2023
- IEEE/ACM IWQoS 2020-2023
- IEEE GLOBECOM, 2015-2022
- IEEE ICC, 2018-2023
- IEEE MILCOM, 2016-2019, 2021, 2022
- IEEE PIMRC, 2013-2017, 2020-2023
- IEEE ICNC, 2012-2020
- IEEE WCNC, 2012, 2014-2023
- IEEE VTC, 2011, 2015, 2021
- IEEE WONS, 2013-2014, 2016-2023
- IEEE IPCCC, 2015-2022
- IFIP NTMS, 2011-2012, 2014-2016, 2018-2020
- IEEE SwarmNet, 2019-2022
- IEEE MSN 2021
- ACM MobiArch 2022

Reviewer Activity

- **Proposals:** SUNY IITG - Innovative Instructional Technology Grants, NSF Review Panelist
- **IEEE Journals:** IEEE Communications Magazine, IEEE Network Magazine, IEEE Journal on Selected Areas in Communications, IEEE/ACM Transactions on Networking, IEEE Transactions on Wireless Communications, IEEE Transactions on Multimedia, IEEE Transactions on Circuits and Systems for Video Technology, IEEE Transactions on Signal Processing, IEEE Transactions on Mobile Computing, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Computers, IEEE Transactions on Vehicular Technology, IEEE Transactions on Industrial Informatics, IEEE Systems Journal, Journal of Sensors, IEEE Wireless Communications Letters, IEEE Communications Letters
- **Elsevier Journals:** Elsevier Journal on Ad Hoc Networks (*2014 Outstanding Reviewer Award*), Elsevier Journal on Computer Networks
- **Wiley Journals:** International Journal of Communication Systems, Transactions on Emerging Telecommunications Technologies
- **Other Journals:** EURASIP Journal on Advances in Signal Processing, Chinese Journal on Communications, Chinese Journal of Electronics, Science China (Information Sciences)
- **Conferences:** INFOCOM, SECON, MASS, ICC, GLOBECOM, PIMRC, NTMS, WUWNet, MILCOM, WCNC, MSN, Networking

Departmental, School and University Services

- Study-abroad Program Advisor for the Department of Electrical Engineering Since September 2021
- Member of University Committee on 5G 2019-2020
- Open House for High School Students October 2018, April 2019, May 2019, November 2019

- | | |
|---|--------------|
| | October 2021 |
| • Open House for Newly Admitted Undergraduate Students | March 2019 |
| • MS Thesis Committee Member for Christopher Tjahjadi-Lopez (Advisor: Prof. Josep Jornet) | May 2019 |
| • MS Thesis Committee Member for Viswajith Singamaneni (Advisor: Prof. Josep Jornet) | May 2019 |
| • Judge for SEAS Graduate Student Poster Competition | April 2019 |
| • Judge for Department of Electrical Engineering Poster Competition | March 2019 |

STUDENT SUPERVISION

Ph.D. Students

- **Sabarish Krishna Moorthy**
Topic: Zero-Touch NextG Networks, New Spectrum Technologies
Started January 2019, anticipated graduation: May 2023
- **Jiangqi Hu**
Topic: AI/ML for Wireless, New Spectrum Technologies
Started August 2019, anticipated graduation: September 2024
- **Maxwell Mcmanus**
DoD National Defense Science and Engineering Graduate (NDSEG) Fellowship
Topic: Digital Twin for Wireless, Wireless Network Security
Started January 2020, anticipated graduation: September 2024
- **Liam Liu**
Started August 2022, anticipated graduation: May 2027
- **Yuqing Cui**
Topic: Parallel/Distributed Multi-Agent Reinforcement Learning for Networked Flying Vehicles
Started January 2023, anticipated graduation: December 2027
- **Zhaoxi (Josh) Zhang**
Topic: Large-Scale Realtime Digital Twin Construction and Network Simulation
Co-advised with Dr. Nicholas Mastronarde
Started January 2023, anticipated graduation: December 2027
- **Sidharth Santhinivas**
Topic: Hardware-Software Co-Design for Vehicular Networks
Started January 2023, anticipated graduation: December 2027

Thesis M.S. Students

- **Zhaoxi (Josh) Zhang** (started January 2022, joined University at Buffalo as Ph.D. student)
- **Yuqing Cui** (started January 2022, joined University at Buffalo as Ph.D. student)
- **Ishita Dhopeswar** (started January 2022, joined Tarana Wireless)
- **Zhiyuan Zhao** (started January 2022, joined Northrop Grumman)
- **Ankush Hari** (graduated May 2021, joined Qualcomm)
- **Chencheng Lu** (graduated May 2021, joined Automotive Robotics Incorporated)
- **Ranjith Samuel Suresh Kumar** (graduated January 2021, joined Esensors)

SCHOLARLY TALKS

- “Digital Twin-Enabled Domain Adaptation for Zero-Touch UAV Networks,” Invited talk, Northrop Grumman, April 2023
- “ZTSwarm: Toolchain Development for Digital Twin-Enabled Zero-Touch Swarm Control,” Invited talk to AFRL & USSOCOM, November 17, 2022.
- “Intelligent Spectrum Sharing and Flight Control in THz-Enabled UAV Networks,” Invited talk, Northeastern University, October 2022.
- “Towards Zero-Touch Automated Swarm UAV Networking,” Invited talk, AFRL, August 9, 2022.
- “SwarmControl: An Automated Distributed Control Framework for Self-Optimizing Drone Networks,” Invited talk at Moog Inc., August 1, 2022.
- “Cloud-based Remote Experimentation for Future Networks: Challenges and Lessons Learned,” IEEE Future Networks Testbed Requirements, Challenges, and Opportunities Workshop, February 7, 2022.
- “Towards Zero-Touch NextG Networks Through Digital Twin: Sensing, Softwarization and Learning,” Invited talk at 2021 Western New York Image and Signal Processing Workshop, October 22, 2021.
- “Enabling Zero-Touch NextG Networks: A Software-Defined Networking Perspective,” University at Buffalo, September 13, 2021.
- “Towards Zero-Touch NextG Wireless Networks: Enabling Technologies and Challenges,” Air Force Research Laboratory (AFRL), August 9, 2021.
- “Towards Principled Programmable Wireless Networks with Optimized Spectrum Coexistence”, NSF Spectrum Innovation Initiative Workshop, January 6, 2021.
- “Towards End-to-End Radio Frequency Sensing for Secure Wireless Networking in the Presence of Advanced DoS Attacks”, Air Force Research Laboratory (AFRL), August 19, 2020.
- “Automating the Design of Autonomous Cross-Layer Control Programs for Swarm UAV Networks”, Air Force Research Laboratory (AFRL), July 9, 2020.
- “Wireless Network Security in the Presence of Advanced Protocol Attacks”, Air Force Research Laboratory (AFRL), August 9, 2019.
- “On the Effects of Mobility Uncertainties on Wireless Communications Between Flying Drones in the mmWave/THz Bands,” IEEE INFOCOM Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE), April 2019.
- “WNOS: Toward an Optimization-based Wireless Network Operating System”, Wireless Network Seminar, Northeastern University, January 26, 2018.
- “Toward Spectrally-efficient and Secure Cognitive Internet of Things (IoT)”, Invited Talk on Undergraduate Course “Wireless Networking Technologies: Design & Simulation”, Northeastern University, MA, June 5, 2017.
- “CU-LTE: Spectrally-efficient and Fair Coexistence between LTE and Wi-Fi in Unlicensed Bands,” Presentation on IEEE Conference on Computer Communications (INFOCOM), San Francisco, CA, April 14, 2016.
- “Logarithmic Expectation of the Sum of Exponential Random Variables for Wireless Communication Performance Evaluation,” Presentation on IEEE VTC-Spring, September 2015.

- “Software-defined, Cognitive and Cooperative Wireless Networks,” Wireless Networks and Embedded Systems Lab (WiNES) Workshop, Northeastern University, July 2015.
- “To Transmit or Not to Transmit? Distributed Queueing Games for Infrastructureless Wireless Networks,” Invited Seminar, Northeastern University, April 2015.
- “On the Effect of Cooperative Relaying on the Performance of Video Streaming Applications in Cognitive Radio Networks,” Presentation on IEEE ICC, June 2011.
- “Cross-layer Design Based on Game Theory in Cognitive and Cooperative Wireless Networks,” Invited Seminar, Shandong University, China, October 2010.

COURSES TAUGHT

Spring 2023	EE 434/534: Principles of Networking, University at Buffalo (for undergraduate/graduate students, enrollment: 65)
Fall 2022	EE 701: The Internet of Things: From Technology to Applications, University at Buffalo (for graduate students, enrollment: 24, instructor rating: 4.9)
Spring 2022	EE 434/534: Principles of Networking, University at Buffalo (for undergraduate/graduate students, enrollment: 47, instructor rating: 4.7 (434)/4.8 (534))
Fall 2021	EE 701: The Internet of Things: From Technology to Applications, University at Buffalo (for graduate students, enrollment: 18, instructor rating: 5.0)
Spring 2021	EE 434/534: Principles of Networking, University at Buffalo (for undergraduate/graduate students, enrollment: 42, instructor rating: 4.4 (434)/4.9 (534))
Fall 2020	EE 701: The Internet of Things: From Technology to Applications, University at Buffalo (for graduate students, enrollment: 12, instructor rating: 4.8)
Spring 2020	EE 459/559: Programmable Networks, University at Buffalo (for undergraduate/graduate students, enrollment: 27, instructor rating: N/A)
Fall 2019	EE 701: The Internet of Things: From Technology to Applications, University at Buffalo (for graduate students, enrollment: 25, instructor rating: 4.8)
Spring 2019	EE 459/559: Programmable Networks, University at Buffalo (for undergraduate/graduate students, enrollment: 24, instructor rating: 4.0 (459)/4.8 (559))

PROFESSIONAL MEMBERSHIP

- IEEE (Institute of Electrical and Electronics Engineers)
- IEEE Communications Society
- IEEE INGR Testbed Roadmap Working Group