

ZHANGYU GUAN

CONTACT INFORMATION

Northeastern University
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STATUS: US Permanent Resident (Green Card holder)

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)

State University of New York (SUNY) at Buffalo, USA **2009-2010**
Department of Electrical Engineering
Visiting Ph.D. Student
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

Associate Research Scientist - Northeastern University	Nov. 2016 - present
Part-time Lecturer - Northeastern University	Sept. 2017 - Dec. 2017
Part-time Lecturer - Northeastern University	Sept. 2016 - Dec. 2016
Postdoctoral Research Associate - Northeastern University	Sept. 2015 - Oct. 2016
Supervisor: Prof. Tommaso Melodia	
Assistant Profesor - Shandong University	March 2011 - Jan. 2015
Postdoctoral Research Associate - SUNY Buffalo	Nov. 2012 - Aug. 2015
Supervisor: Prof. Tommaso Melodia	
University Counselor - Shandong University	Aug. 2003 - Aug. 2005

RESEARCH INTERESTS

- **Internet of Things (IoT):** Software-defined Networking, Automated Modeling, Network Virtualization
- **Wireless Network Security:** LPI/LPD Networking, Cross-layer Learning of Heterogeneous Attacks, Cooperative Anti-jamming
- **Mobile Cloud Computing:** Pricing, Fog Computing
- **5G:** LTE Unlicensed, Massive MIMO, Visible Light Networking
- Multimedia Sensor Networks, Underwater Communication Networks, Ultrasonic Intra-body Area Networks

PUBLICATIONS

h-index: 10 (Google Scholar)

Working and Under Review

1. N. Cen, Z. Guan, T. Melodia, "Low-Power Multimedia Internet of Things Through Compressed Sensing based Multi-view Video Streaming", *IEEE Trans. on Mobile Computing*, under review, 2017.
2. Z. Guan, Hovannes Kulhandjian, Emrehan Demirors, Tommaso Melodia, "Distributed Channel Access through Stochastic Interference Modeling for Underwater Acoustic Networks", under revision for *IEEE/ACM Transactions on Networking*, 2017.
3. L. Bonati, Z. Guan, S. Basagni, T. Melodia, "Cooperative Anti-Jamming in Expeditionary Cyber Networks With Massive MIMO-Enabled Hotspots," working paper.
4. L. Bertizzolo, E. Demirors, N. Cen, F. Restuccia, Z. Guan, T. Melodia, "Spectrum Sharing Challenges in Next-generation Internet of Things," working paper, 2017.

Journals and Magazines

5. N. Cen, Jithin Jagannath, Simone Moretti, Z. Guan, Tommaso Melodia, "LANET: Visible-Light Ad Hoc Networks", *Ad Hoc Networks (Elsevier)*, in press, 2018.
6. 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: 1)
7. 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, Oct.-Dec. 2017. (Citations: 3)
8. 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, Aug. 2016. (Citations: 2)
9. 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, Oct. 2016. (Citations: 2)
10. 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: 4)
11. 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: 15)
12. 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, Feb. 2015. (Citations: 25)
13. 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: 8)
14. 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, Nov. 2014. (Citations: 6)

15. 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: 2)
16. 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, Aug. 2013. (Citations: 26)
17. 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: 14)

Conference Papers

18. 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.
19. 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.
20. 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.
21. 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: 29)
22. 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: 3)
23. 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: 8)
24. 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, Feb. 2015.
25. 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, Oct. 2014. (AR: 22%, Citations: 14)
26. 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: 8)
27. 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, Dec. 2013. (Citations: 7)
28. 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: 9)

29. 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, Nov. 2012. (Citations: 8)
30. 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: 39)
31. 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: 12)
32. 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: 34)
33. 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)
34. 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, Sept. 2008. (Citations: 8)
35. 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: 34)

Book Chapter

36. 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. T. Melodia, Z. Guan, WNOS: An Optimization-based Wireless Network Operating System, INV-18026, Nov. 11, 2017.
2. T. Melodia, Z. Guan, Method for Sharing of Unlicensed Radio Frequency Bands by Cellular LTE and WiFi Networks, US 9924372, Granted, March 2018.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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

1. “SwarmControl: Toward Elastic, Programmable, Optimized Tactical Swarm Networking,” **co-PI** (PI: Tommaso Melodia), Air Force Research Laboratory, 2018 - 2021.
2. “NeTS: Small: OpenBeam: Toward Practical Software-Defined Massive MIMO Networking With Collaborative Beamforming,” **co-PI** (PI: Tommaso Melodia), National Science Foundation (pending)
3. “SDIoBT: Software-Defined Internet of Battlefield Things With Distributed and Cognitive Autonomous Control,” **co-PI**, \$333,333, Army Research Office, 2017
4. “Distributed Optimization Theory in Cooperative Wireless Networks,” **PI**, National Natural Science Foundation of China (NSFC), 2012 - 2014
5. “Optimizing Cognitive and Cooperative Distributed Wireless Networks for Green Communications,” **PI**, Chinese Ministry of Education, 2012 - 2014
6. “Joint Spectrum and Energy Optimization in Wireless Networks Based on Non-convex Programming,” **PI**, Science and Technology Agency of Shandong Province, China, 2013 - 2015
7. “Distributed Communication Networking Based on Variational Inequality Theory,” **PI**, China Postdoctoral Science Foundation, 2012 - 2014
8. “Interference Management in Distributed Cooperative Wireless Networks,” **PI**, Shandong University Research Foundation, China, 2012 - 2013

HONORS & AWARDS

- 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
- Excellent University Counselor, Shandong University 2005

PROFESSIONAL ACTIVITIES AND SERVICES

Conference Organization

- Session Chair of “Heterogeneous Networks” for IEEE International Conference on Computer Communications (INFOCOM), Honolulu, HI, USA, 15-19 April 2018
- Session Chair of “Software Defined Networks I” for IEEE International Conference on Computer Communications (INFOCOM), Atlanta, GA, USA, May 1-4, 2017
- TPC Vice-chair for Information System (EDAS) for IEEE International Symposium on Local and Metropolitan Area Networks (LANMAN), Osaka, Japan, June 12-14, 2017
- TPC Co-chair for MOBIMEDIA Workshop on QoE-Aware Resource Allocation for Multimedia Transmission (QoE-RAMT), Chongqing, China, July, 2017
- Session Chair of “Resource Allocation I” and “Wireless Network Optimization” for IEEE International Conference on Computer Communications (INFOCOM), San Francisco, CA, USA, April 10-15, 2016

- Publicity Co-chair of IEEE International Conference on Communication Technology (ICCT), Chengdu, China, Sept. 2012
- Secretary General of IEEE International Conference on Communication Technology (ICCT), Jinan, China, Sept. 2011

Technical Program Committee Membership

- IEEE Infocom, 2016-2019
- IEEE MASS, 2017, 2018
- IEEE GLOBECOM, 2015-2018
- IEEE ICC, 2018
- IEEE MILCOM, 2016-2018
- IEEE PIMRC, 2013-2017
- IEEE ICNC, 2012-2018
- IEEE WCNC, 2012, 2014-2018
- IEEE VTC, 2011, 2015
- IEEE WONS, 2013-2014, 2016-2019
- IEEE IPCCC, 2015-2018
- IFIP NTMS, 2011-2012, 2014-2016, 2018
- European Conference on Networks and Communications (EuCNC), 2014-2017

Reviewer Activity

- **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

SCHOLARLY TALKS

- “WNOS: Toward an Optimization-based Wireless Network Operating System”, Wireless Network Seminar, Northeastern University, Jan. 26, 2018.
- “Toward Spectrally-efficient and Secure Cognitive Internet of Things (IoT)”, Invited Lecture 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, Sept. 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.

PROFESSIONAL MEMBERSHIP

- IEEE (Institute of Electrical and Electronics Engineers)
- IEEE Communications Society
- ACM (Association for Computing Machinery)

COURSES TAUGHT

- Spring 2019** Programmable Networks, University at Buffalo (Special Topics, for graduate students)
- Fall 2017** Fundamentals of Networks, Northeastern University, MA (EECE 2540, for undergraduate students)
- Fall 2016** Fundamentals of Networks, Northeastern University, MA (EECE 2540, for undergraduate students)
- Spring 2012** Digital Communications, Shandong University, China
- Fall 2011** Database: Principle and Application, Shandong University, China
- Fall 2011** Mobile Communication, Shandong University, China