Zhongyuan Zhao, Ph.D.

Curriculum Vitae

Dept. of Electrical and Computer Engineering
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EDUCATION

Ph.D.	Department of Computer Science and Engineering, University of Nebraska-Lincoln, 2019
	Dissertation: *Improving Spectrum Efficiency by Exploiting User and Channel Behaviors for Next Generation Wireless Networks*
M.Sc.	Department of Electronic Engineering, University of Electronic Science and Technology of China, 2009
B.Sc.	Department of Electronic Engineering, University of Electronic Science and Technology of China, 2006

PROFESSIONAL APPOINTMENT

Dec. 2019-	Postdoctoral Research Associate, Rice University
2013-2019	Research Assistant, University of Nebraska-Lincoln
2011-2013	Integration and Verification Engineer, Ericsson, Chengdu, China
2009-2011	Digital Signal Processing Software Engineer, ArrayComm, Chengdu, China

RELEVANT SKILLS

Quantitative	Probability and stochastic processes, statistics, machine (deep) learning, optimization.
Programming	Python (Tensorflow, PyTorch), Matlab, R, SAS, C/C++, Javascript, Assembly, Verilog, SQL, Scripting languages in Excel, Linux, and OSX.
Computing	Familiar with Linux & OSX; experienced in programming on GPU, DSP, FPGA, SoC, and high-performance computing cluster (HPCC).
Languages	Native in Chinese; Proficient in English.
Others	Technical writing and presentation, software development process.

PROFESSIONAL DESIGNATION

Member of Institute of Electrical and Electronics Engineers (IEEE), 2013-present

IEEE Communications Society
IEEE Signal Processing Society

RESEARCH EXPERIENCE

2019-Present Autonomous Networking for Multi-domain Operations, Houston, Texas, Advisor: Santiago Segerra

Develop machine learning techniques for wireless networks that are self-organized, robust, and resilient in near-peer adversarial environment. Machine learning with graphs/networks, combinatorial optimization, & multi-agent reinforcement learning.

2019-2019 Computational Biology for Drug Repurposing, Lincoln, Nebraska, Advisor: Thomas Helikar

Develop Python software to analyze human genome microarray data and molecular interaction network to facilitate drug repurposing for gene-related diseases.

2017-2019 Cognitive Secure Cloud Radio Access Network for Efficient Spectrum Sharing, Lincoln, Nebraska, Advisor: Mehmet Can Vuran

Build a city-wide cloud-radio access network testbed, and research in machine learning technologies for radio frequency signal processing and user classification.

2013-2017 Cog-TV: Business and Technical Analysis of Cognitive Radio TV Sets for Enhanced Spectrum Access, Lincoln, Nebraska, Advisor: Mehmet Can Vuran

Address various challenges in technology, network operation, business, and policy making for the next generation wireless networks to access the underutilized spectrum of legacy wireless systems in an efficient and cooperative manner.

2011-2013 Remote Radio Head in 4th Generation LTE Base-station (Ericsson), Chengdu, China

Conduct various testing (radio performance, environmental, and certification) and develop in-house test automation software in the development of LTE base-station.

2009-2011 Digital Signal Processing in 4th Generation Cellular Base-station (ArrayComm), Chengdu, China

Develop and optimize the air interface physical layer software of WiMAX and LTE base-stations on flagship multi-core digital signal processors.

2006-2009 Channelized Software Defined Radio Receiver, Chengdu, China

Develop the intermediate frequency sub-system of a channelized multi-antenna software-defined radio receiver for electronic reconnaissance.

PUBLICATIONS

Peer Reviewed Journal Articles

2021 **Zhongyuan Zhao**, Mehmet C. Vuran, Fujuan Guo, and Stephen Scott, "Deep-Waveform: A Learned OFDM Receiver Based on Deep Complex-Valued Convolutional Networks," in IEEE Journal on Selected Areas in Communications, vol. 39, no. 8, pp. 2407-2420, Aug.

2021 **Zhongyuan Zhao**, Mehmet C. Vuran, Baofeng Zhou, Mohammad M.R. Lunar, Zahra Aref, David P. Young, Warren Humphrey, Steve Goddard, Garhan Attebury, and Blake France, "A City-Wide Experimental Testbed for The Next Generation Wireless Networks," *Ad Hoc Networks*, Vol. 111, pp102305, Feb.

2019 Demet Batur, Jennifer Ryan, **Zhongyuan Zhao**, and Mehmet C. Vuran, "Dynamic Pricing of Wireless Internet Based on Usage and Stochastically Changing Capacity," *Manufacturing and Service Operations Management*, Published Online, Feb.

2019 **Zhongyuan Zhao**, Mehmet C. Vuran, Demet Batur, and Eylem Ekici, "Shades of White: Impacts of Population Dynamics and TV Viewership on Available TV Spectrum," *IEEE Transactions on Vehicular Technology*, Vol. 68, No. 3, pp2427-2442, Jan.

2018 Samil Tamel, Mehmet C. Vuran, Mohammad M. R. Lunar, **Zhongyuan Zhao**, Abdul Salam, Ronald K. Faller, and Cody Stolle, "Vehicle-to-Barrier Communication During Real-World Vehicle Crash Tests," *Computer Communications*, Vol 127, pp. 172-186, Sep.

2007 Haihong Tang, **Zhongyuan Zhao**, "DSP and CPLD-based Digital AC Soft Starter," *Automation Information*, (5), pp.53-55.

Conference Proceedings & Demo

2021 **Zhongyuan Zhao,** Gunjan Verma, Chirag Rao, Ananthram Swami, and Santiago Segarra, "Distributed Scheduling using Graph Neural Networks," Accepted to IEEE *International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2021)*, pp. 4720-4724, Toronto, Ontario, Canada (virtual conference), Jun. 6-11.

2019 **Zhongyuan Zhao**, Mehmet C. Vuran, Zahra Aref, David P. Young, Warren Humphrey, Steve Goddard, Garhan Attebury, Blake France, Baofeng Zhou, and Mohammad M. R. Lunar, "A City-Wide Experimental Testbed for Next Generation Wireless Networks," IEEE Int. *Balkan Conference on Communications and Networking (BalkanCom'19)*, Skopje, North Macedonia, Jun. 10-12.

2018 **Zhongyuan Zhao**, and Mehmet C. Vuran, "Modeling Aggregate Interference with Heterogeneous Secondary Users and Passive Primary Users for Dynamic Admission and Power Control in TV Spectrum," *IEEE Int. Balkan Conference on Communications and Networking (BalkanCom'18)*, Podgorica, Montenegro, Jun. 6-8.

2017 D. Rempe, M. Snyder, A. Pracht, A. Schwarz, T. Nguyen, M. Vostrez, **Z. Zhao**, and M. C. Vuran, "A Cognitive Radio TV Prototype For Effective TV Spectrum Sharing," *IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*, pp. 117-118, Baltimore, MD, March 6-9.

2014 **Zhongyuan Zhao**, Mehmet C. Vuran, Demet Batur, Eylem Ekici, "Ratings for Spectrum: Impacts of TV Viewership on TV Whitespace," *IEEE Global Communications Conference (GlobeCom'14)*, pp.941-947, Austin, TX, Dec. 8-12.

2009 Hongping Hu, **Zhongyuan Zhao**, "A Real-Time High Resolution Image Compression System Based on ADV212," *2nd International Congress on Image and Signal Processing (CISP'09)*, pp.1-4, Tianjin, China, Oct.

Manuscript Submitted

Zhongyuan Zhao, Gunjan Verma, Chirag Rao, Ananthram Swami, and Santiago Segarra, "Link Scheduling using Graph Neural Networks," *IEEE Journal of Selected Topics on Signal Processing*, submitted to.

Zhongyuan Zhao, Gunjan Verma, Ananthram Swami, and Santiago Segarra, "Delay-oriented Distributed Scheduling using Graph Neural Networks," IEEE *International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2022)*, submitted to.

Zhongyuan Zhao, Gunjan Verma, Ananthram Swami, and Santiago Segarra, "Distributed Link Sparsification for Scalable Scheduling using Graph Neural Networks," IEEE *International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2022)*, submitted to.

PATENTS

2016 **Zhongyuan Zhao**, Weixu Wang, Luping Pan, "PLL and Adaptive Compensation Method in PLL," International Patent, US9496881 B2, EP3047573 A4, CN105580278A, Issued Date: May.

2012 Zishu He, **Zhongyuan Zhao**, Jianzhong Zhang, Ting Chen, Kexin Jia, "Method and Apparatus for An Implementation of Polyphase Filter Structure," China, CN101958697B, Issued Date: Jul.

AWARDS

2006-2009 National Scholarship, UESTC (China)

2006 Outstanding Graduate, UESTC

2005 National 1st-class Prize, National Undergraduate Electronic Design Contests (China)

CONFERENCE PARTICIPATION

Demonstration & Poster

2021 **Zhongyuan Zhao,** Gunjan Verma, Chirag Rao, Ananthram Swami, and Santiago Segarra, "Distributed Scheduling using Graph Neural Networks," Accepted to IEEE *International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2021)*, pp. 4720-4724, Toronto, Ontario, Canada (virtual conference), June 6-11.

2017 D. Rempe, M. Snyder, A. Pracht, A. Schwarz, T. Nguyen, M. Vostrez, **Z. Zhao**, and M. C. Vuran, "A Cognitive Radio TV Prototype For Effective TV Spectrum Sharing," IEEE International Symposium on Dynamic Spectrum Access Networks, pp. 117-118, Baltimore, MD, March 6-9.

Papers

2014 **Zhongyuan Zhao**, Mehmet C. Vuran, Demet Batur, Eylem Ekici, "Ratings for Spectrum: Impacts of TV Viewership on TV Whitespace," IEEE Global Communications Conference, pp.941-947, Austin, TX, December 8-12.

TEACHING EXPERIENCE

University of Nebraska-Lincoln, Graduate Teaching Assistant

Data Structure and Algorithms (fall 2017, spring 2019)

Multi-Agent System (fall 2017)

University of Electronic Science and Technology of China, Teaching Assistant

Electronic Design Training Program (fall 2005 - summer 2007, 2-year program)

PROFESSIONAL SERVICE

Conference Activities

Technical Program Committee Member*, IEEE Vehicular Technology Conference 2020-Fall*

Peer Reviewer

IEEE Transactions on Wireless Communication
IEEE Transactions on Mobile Computing
IEEE Journal on Selected Areas in Communications
IEEE Communications Surveys and Tutorials
IEEE Transactions on Vehicular Technology
IEEE Transactions on Multimedia
The International Journal of Computer and Telecommunications Networking
Wireless Communications and Mobile Computing
IEEE InfoComm
IEEE ICC
IEEE GlobeCom
IEEE DySPAN
International Conference on Distributed Computing Systems
IEEE Vehicular Technology Conference

To Profession

Secretary, Graduate Student Association, Department of Computer Science and Engineering, University of Nebraska-Lincoln, 2017-2018

PROFESSIONAL DEVELOPMENT/CERTIFICATIONS

2018 Coursera 5-course specialization: Deep Learning, Specialization Certificate.

2018 Coursera 5-course specialization: Foundations of Management, 3/5 Certificates.

2017 Certificate of Completion, Institute for International Teaching Assistants, UNL.