Yuan Xing

Address: 305 Fryklund Hall, Menomonie, Wisconsin, 54751 Webpage:
https://www.uwstout.edu/directory/xingy Work Phone:715-232-1606 ◇ Email: xingy@uwstout.edu

EDUCATION

Ph.D., Electrical and Computer Engineering *August 2016 - May 2020*
Baylor University

M.S., Electrical and Computer Engineering *August 2014 - May 2016*
University of Rochester

B.A., Telecommunication Engineering *August 2010 - May 2014*
Beijing Jiaotong University

EMPLOYMENT EXPERIENCE

Assistant Professor, Engineering & Technology Department *August 2020 - Present*
University of Wisconsin-Stout

Teaching and Research Assistant, Department of ECE *August 2016 - May 2020*
Baylor University

Research Assistant, Department of ECE *August 2015 - May 2016*
University of Rochester

TEACHING & RESEARCH INTERESTS

Artificial Intelligent(AI) System Design, Deep Learning, Machine Learning, Industry 4.0, Smart Manufacuturing, Digital Signal Processing, Programming

FUNDING RESEARCH

- University of Wisconsin System Innovative Grant, "A Human-Centered Collaborative Approach to Designing an Energy-Efficient Wireless Sensor(AI methods)," $175000, PI *January 2024*
- Freshwater Collaborative of Wisconsin, "Developing an easy-to-apply, integrated approach to modeling freshwater contamination with AI approach," $116832, Co-PI *September 2022 - December 2023*
- Tommy Thompson Leadership Scholarship, "Design and Implement an IoHT Ecosystem to Fight COVID-19 with AI approach," $60000, Co-PI *September 2021 - September 2022*
- Wisys Spark Grant, "AI Wireless Power Transfer System," $9160, PI *March 2021 - March 2022*
- UW Stout Startup research funding, "AI Wireless Power Transfer," $3500, PI *November 2020*

RESEARCH EXPERIENCE

Deep Learning Models for Energy-efficient Wireless Sensor Networks in farmland

- Applied Deep Neural Network algorithm to analyze the data from wireless sensor networks in real-time
- Utilized Deep Reinforcement Learning for prediction and making decisions for the farm.

Deep Learning Model for Wisconsin Health Systems

- Designed the COVID-19 fast diagnosis system with Deep Neural Network
- Optimized the reaction speed of the designed system with the lightweight Deep Neural Network model

Hyperspectral Images Processing in Airborne System with Deep Learning

- Implemented the hyperspectral camera in the airborne system
- Analyzed the images to detect the trajectory of the groundwater on the farm with Deep Neural Network

AI Simultaneous Wireless Information and Power Transfer(SWIPT) Systems

- Optimized user-fairness optimization problem for multiple sensors with Deep Neural Network
- Applied Deep Reinforcement Learning to determine the best sequence to charge the wireless sensors.
- Deployed the Deep Learning algorithms in SWIPT robots.

Low-data One-shot Learning Drug Design System

- Utilized One-shot Learning and Reinforcement Learning to generate molecules with desired properties
- Trained Deep Learning model with the small dataset

Multiple Users 5G System Optimization with Deep Neural Network

- Applied Deep Q-Network to decide the optimal power allocation and subcarrier assignment
- Adjusted the data dissemination strategies timely to energy-efficiently deliver data to multiple users

Dynamic Spectrum Access in 4G system with Deep Reinforcement Learning

- Modeled the multiple secondary users multi-channel dynamic spectrum access system.
- Applied Deep Deterministic Policy Gradient to predict the channel status and achieved high precision

Multiple Armed Bandits with Wireless Power Transfer

- Modeled a transmit pattern selection problem as a Multiple Armed Bandit problem
- Proposed the Hierarchical Arm Refinement Algorithm based on UCB Algorithm

Deep Learning Wireless Power Transfer Optimization

- Maximized the harvested power at the harvester through very limited power feedback
- Trained Deep Neural Network to find the optimal transmit strategy at the transmitter

Wireless Multimedia Delivery System

- Simulated IEEE 802.11ax in MATLAB to validate theoretical development of techniques
- Performed the experiments with USRP to evaluate the network

Underwater Sensor Network Coding Scheme Design

- Invented Dynamic Fountain Code and saved **15%** transmission energy than other coding schemes

TEACHING EXPERIENCE

- CEE-205 Circuit Design and Analysis *Spring 2022*
- CEE-225 Digital Logic Design *Fall 2020 - Fall 2024*
- CEE-235 Signal and System *Spring 2021 - Spring 2024*
- CEE-325 Digital System Design *Spring 2023 - Spring 2024*
- CEE-425 Computer Network *Fall 2020 - Fall 2024*
- CEE-435 Digital Signal Processing *Fall 2020 - Spring 2023*
- CEE-445 Wireless Communication *Spring 2021 - Spring 2024*
- ET-341 Electrical and Mechanical Interface Devices *Fall 2024*

PROFESSIONAL ACTIVITIES

Conference Presentation

- Oceans' 17 MTS/IEEE Conference, Anchorage, AK *September 2017*
- 2018 IEEE 88th Vehicular Technology Conference, Chicago, IL *August 2018*

- 2021 IEEE CCWC(Best presenter), Virtual Conference *January 2021*
- 2021 IEEE IEMTRONICS(Best presenter), Virtual Conference *April 2021*
- 2022 IEEE CCWC, Virtual Conference *January 2022*
- 2023 IEEE CCWC, Virtual Conference *January 2023*
- 2024 IEEE CCWC, Conference, Las Vegas, NV *January 2024*
- 2024 IEEE UEMCON, Conference, Yorktown Heights, NY *October 2024*

Student Supervision

- Timothy Lu
  - Independent study: Advanced Wireless Communication Systems. *Spring 2021*
- Young Riley
  - Independent study: Advanced Far-field Wireless Power Transfer Systems. *Summer 2021*
- Brandon Cedarblade, James Stevenson, Jenah Call, Jackson Butler
  - Capstone Design: Wireless power transfer robot. *Spring, Fall 2021*
- Cole Glassing , Wesley Larrabee, Nue Thao
  - Capstone Design: The vision-based advanced Quadcopter Drone *Fall 2021*
- Preston Leigh
  - Stout Student research grant: Self-Driving Cars Implementations *Summer 2022*
- Sam Koland, Michael Witt, Jack Lonn
  - DKC3 programming competition *Fall 2022*
- Sam Koland
  - FCW grant student worker: Hyperspectral image processing *Fall 2022, Spring 2023*
- Micheal Witt
  - Stout Student research grant: Digital signal processing in Mycelium network *Fall 2023, Spring 2024*

Referee for

- GlobalSIP 2017 *June 2017*
- IEE ICC 2018 *December 2017*
- IEEE Communication Letters *May 2017, December 2019*
- IEEE CCWC conference *2021-2024*
- IEEE IEMTRONICS conference *2021,2024*

PROFESSIONAL MEMBERSHIP

IEEE CCWC Technical Committee *January 2021, 2022, 2023, 2024*
IEEE IEMTRONICS Technical Committee *April 2021,2024*
IEEE IEMCON Technical Committee *September 2021*
IEEE IEMCON Session Chair - Digital Image Processing *September 2021*
IEEE UEMCON Technical Committee *October 2022*

JOURNALS & CONFERENCES PUBLICATIONS

- **Y. Xing**, A. Verma, Z. Zeng, C. Liu, T. Lee, D. Hou, H. Pan, S. Edwards. "Cluster-Based Genetic Algorithm Path Planning for Cooperative UGV and UAV Operations in Energy-efficient Wireless Sensor Networks. *In 2024 IEEE 15th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON) (pp. 58-65). IEEE.*
- **Y. Xing**, Z. Zeng, A. Verma, C. Liu, T. Lee, D. Hou, H. Pan, S. Edwards, W. Stehr. "Optimizing Grass Selection for Beef Cattle Using Multi-Armed Bandit Algorithms: A Data-Driven Approach to Enhance Growth Through Rumination Analysis." *In 2024 IEEE 15th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON) (pp. 7-12). IEEE.*
- **Y. Xing**, Z. Zeng, C. Liu, A. Verma, T. Lee, D. Hou, H. Pan, S. Edwards. "Optimizing Sleep Schedules for Energy-Efficient Agricultural Wireless Sensor Networks Using Deep Reinforcement Learning",

In 2024 IEEE 15th Annual Ubiquitous Computing, Electronics & Mobile Communication Conference (UEMCON) (pp. 66-72). IEEE.

- **Y. Xing**, J. Hou, J. Liu, A. Verma, H. Yuan. "Deep Learning and Game Theory for AI-Enabled Human-Robot Collaboration System Design in Industry 4.0", *Proc. IEEE 2024 CCWC*.
- **Y. Xing**, A. Verma. "Optimize Path Planning for Drone-Based Wireless Power Transfer System by Categorized Reinforcement Learning", *Proc. IEEE 2023 CCWC*.
- **Y. Xing**, R. Young, G. Nguyen, M. Lefebvre, T. Zhao, H. Pan, L. Dong. "Optimal Path Planning for Wireless Power Transfer Robot Using Area Division Deep Reinforcement Learning", *Wireless Power Transfer 2022*.
- **Y. Xing**, R. Young, G. Nguyen, M. Lefebvre. "Optimize Mobile Wireless Power Transfer by Finite State Machine Reinforcement Learning", *Proc. 2022 IEEE CCWC*.
- **Y. Xing**, H. Yuan, C. Carson. "Optimize Path Planning for UAV COVID-19 Test Kits Delivery System by Hybrid Reinforcement Learning", *Proc. 2022 IEEE CCWC*.
- **Y. Xing**, R. Young, G. Nguyen, M. Lefebvre. "Optimization of Transmission Strategy for Wireless Power Transfer Using Multi-Armed Bandit Algorithm", *Proc. IEEE 2021 IEMCON*. Virtual Conference.
- **Y. Xing**, H. Pan, B. Xu, T. Zhao, C. Tapparello, W. Shi, X. Liu, T. Zhao, T. Lu. "Optimal Wireless Information and Power Transfer Using Deep Q-Network", *Proc. Hindawi Wireless Power Transfer*.
- **Y. Xing**, H.Pan, B. Xu, T. Zhao, C. Tapparello, Y. Qian. "Multiuser Data Dissemination in OFDMA System Based on Deep Q-Network", *Proc. IEEE 2021 IEMTRONICS*. Virtual Conference.
- **Y. Xing**, Y. Qian, W. Shi, X. Liu, T. Zhao, C. Tapparello. "Deep Learning for Optimized Multiuser OFDMA Energy-Efficient Wireless Transmission", *Proc. IEEE 2021 CCWC*. Virtual Conference.
- **Y. Xing**, Y. Qian and L. Dong. "A Multi-Armed Bandit Approach to Wireless Information and Power Transfer", in *Proc. IEEE Communication Letters* 24.4 (2020): 886-889.
- **Y. Xing** and C. Tapparello,. "Dynamic fountain codes for energy efficient data dissemination in underwater sensor networks", in *Proc. of IEEE OCEANS–Anchorage*. Anchorage, USA. Sep. 2017.
- **Y. Xing** and L. Dong,. "Passive radio-frequency energy harvesting through wireless information transmission", in *Proc. of IEEE Distributed Computing in Sensor Systems(DCOSS)*. Ottawa, Canada. Jun. 2017.
- **Y. Xing**, Y. Qian and L. Dong,. "Deep learning for optimized wireless transmission to multiple RF energy harvesters", in *Proc. IEEE 88th Vehicular Technology Conference(VTC Fall)*. Chicago, USA. Sep. 2018.
- Y. Tian, Z. Zeng, **Y. Xing**. "A Review of Discrete Element Method Applications in Soil–Plant Interactions: Challenges and Opportunities", *Proc. Agriculture Journal 14 (9), 1486*.
- P. Leigh, **Y. Xing**. "Evaluation of Multiple Convolutional Neural Networks in Training the NVIDIA JetBot", *IEEE UEMCON 2022*.
- Y. Qian, **Y. Xing**, and L. Dong,. "Deep Learning for a Low-data Drug Design System", *Proc. IEEE Healthcom 2020*.
- Y. Qian, **Y. Xing** and L. Dong,. "Deep Learning for Radio-Frequency Energy Harvesting with Multiple Wireless Transmitters", in *Proc. IEEE 88th Vehicular Technology Conference(VTC Fall)*. Chicago, USA. Sep. 2018.
- Y. Qian, **Y. Xing** and L. Dong,. "Wireless transmission design with neural network for radio-frequency energy harvesting", in *Proc. IEEE Wireless Communications and Networking Conference (WCNC)*, Barcelona, Spain. Apr. 2018.
- L. Dong, Y. Qian, **Y. Xing**. "Dynamic spectrum access and sharing through actor-critic deep reinforcement learning", *EURASIP Journal on Wireless Communication and Networking 2022*.
- W. Shi, X. Liu, **Y. Xing**. "Internet of Things Applied on Assistive Robotics", *Proc. International Journal on Engineering, Science and Technology* 3(1), 67-71.

SKILLS

Software: Python, MATLAB, Verilog, VHDL, Assembly language, C

Devices: Wireless Open Access Research Platform, Universal Software Radio Peripheral, Jetson Nano, Raspberry Pi, Digilent Basys 3 Artix-7 FPGA Trainer Board.