Dr. Weisong Wang

Electrical Engineering
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Education

- Ph.D., Engineering, Louisiana Tech University — 2004
  M.Sc., Electrical Engineering (Microelectronics and MEMS)
- M.Eng., *with honors*, Mechatronics — 2000
  Donghua University, Shanghai, China
- B.Eng., *summa cum laude*, Mechatronics — 1997
  Donghua University, Shanghai, China

Professional Experience

- Associate Professor, Electrical Engineering, Wright State University - Lake Campus, Celina, OH — 8/2022–present
- Assistant Professor, Electrical Engineering, Wright State University - Lake Campus, Celina, OH — 1/2018–7/2022
- Research Engineer and Lecturer, Department of Electrical and Computer Engineering, Center of Excellence for Thin-Film Research and Surface Engineering (CETRASE), University of Dayton, Dayton, OH — 5/2013–12/2017
- Senior Engineer, Wafer level packaging and MEMS, Maxim Integrated Products, Dallas, TX — 7/2011–4/2013
- Research Scientist, Department of Astronomy/McDonald Observatory, University of Texas at Austin, Austin, TX — 10/2007–7/2011
- Postdoctoral Research Associate, Dept. of Electrical Engineering & Dept. of Materials Science and Engineering, Lehigh University, Bethlehem, PA — 10/2005–9/2007
- Research Assistant/Associate, Institute for Micromanufacturing, Louisiana Tech University, Ruston, LA — 9/2000–8/2005

Academic Awards

- Excellent Service Award, Wright State University - Lake Campus — 2021
- U.S. Air Force Research Lab Summer Faculty Fellowship Program — summer 2021
- Faculty of the Year Award, Wright State University - Lake Campus — 2020
- U.S. Air Force Research Lab Summer Faculty Fellowship Program — summer 2020
- Excellent Teaching Award, Wright State University - Lake Campus — 2019
- Best Poster Award, *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH USA — 2019
- Innovation Award for MEMS gyro technology transfer, product development and production release, Maxim Integrated Inc. — 2013
- Best Student Paper Award, *IEEE SENSORS 2005: the 4th IEEE conference on sensors*, Irvine, CA, USA — 2005
- Outstanding Graduate Student Award of Donghua University (top 2%) — 2000
- Outstanding Undergraduate Student Award of Shanghai (top 1%) — 1997
- College Academic Excellence Awards — 1993-2000

Teaching

◇ Wright State University - Lake Campus

- EGR 1010 Intro Math for Engineering Applications (1 time)
- EE 2000 Digital Electronics (4 times)
- EE 2000L Digital Electronics Lab (4 times)
- EE 2010 Circuit Analysis (7 times)
- EE 2010L Circuit Analysis Lab (7 times)
- EE 3210 Linear Systems I (4 times)
- EE 3310 Devices and Circuits (3 times)
- EE 3310L Devices and Circuits Lab (3 times)
- EE 4000 Linear Systems II (3 times)
- EE 4120 Industrial Control and Automation (2 times)
- EE 4210L Digital Communication Lab (1 time)
- EE 4130 Continuous Control Systems (1 time)
- EE 4130L Continuous Control Systems Lab (1 time)
- EE 4620L Digital Integrated Circuit Design Lab (1 time)

◇ University of Dayton, Department of Electrical and Computer Engineering

- EGR 103 Engineering Innovation (5 times)
- EGR 203 Electrical and Electronic Circuits (2 times)
- EGR 311 Principles of Nanotechnology (2 times)
- ECE 431 Multidisciplinary Design (senior capstones) I (8 times)
- ECE 432 Multidisciplinary Design (senior capstones) II (8 times)
- ECE 595 Micro-Electro-Mechanical Systems (MEMS) (3 times)

◇ Course/Program Development

- Developed online labs for EE4130L - Continuous Control Systems Lab 2020
- Worked with electrical engineering department at Dayton campus to reach the agreement to support transitioning from BSEE students from Lake campus to Dayton campus 2020
- Revised the course content and developed the twelve labs for EE 2010L – Circuit Analysis I Lab. Fall 2019

◇ Advising Students

- 5 undergraduate students: Senior design project - Water quality monitoring buoy for GLSMs 2020-2021
- 5 undergraduate students: Senior design project - Water quality monitoring buoy for GLSMs 2019-2020
- 4 undergraduate students: Senior design project - Autonomous material handling vehicle 2018-2019
- Mentored 5 minority undergraduate students in AFRL Minority Leadership program, University of Dayton 2016-2018

◇ Graduate Committee

- 1 Ph.D., University of Dayton 2020
- 1 Ph.D., University of Dayton 2018
- 1 M.S., University of Dayton 2017
- 1 Ph.D., University of Dayton 2016

Scholarship

◇ **Refereed Journals**

1. L. Li, E. Shin, H. Attariani, **W.S. Wang**, and G. Subramanyam,"Experimental demonstration of vanadium dioxide phase change thin film based tunable spiral inductors," *ECS Journal of Solid State Science and Technology*, 9, 2020
2. H. Attariani, **W.S. Wang**, and R. Galek,"A thermodynamically-consistant multiphysics framework for crystallization of phase change material," *Jornal of Crystal Growth*, April, 2020
3. L. Li, **W.S. Wang**, E.S. Shin, and G. Subramanyam,"Tunable inductors using integrated vanadium dioxide phase change thin films," *Advances in Condensed Matter Physics*, 2018:1-7, 2018.
4. E.S. Shin, K.C. Pan, **W.S. Wang**, G. Subramanyam, V. Vasilyev, K. Leedy, and T. Quach, "Tungsten-doped vanadium dioxide thin film based tunable antenna," *Materials Research Bulletin*, vol. 101, 2018.
5. C. Yakopcic, S. Wang, **W.S. Wang**, E.S. Shin, J. Boeckl, G. Subramanyam and T.M. Taha, "Filament formation in lithium niobate memristors supports neuromorphic programming capability," *Neural Computing and Applications*, vol. 30, no. 12, 2018.
6. C.P. Deen, M. Gully-Santiago, **W.S. Wang**, J. Pozderac, D.J. Mar and D.T. Jaffe, "A grism design review and the as-built performance of the silicon grisms for JWST-NIRCam," *Publications of the Astronomical Society of the Pacific*, vol. 129, no. 976, 2017.
7. S. Wang, **W.S. Wang**, E.S. Shin, Tony Quach and G. Subramanyam, "Tunable inductors using vanadium dioxide as the control material," *Microwave and optical technology letters*, vol. 59, no. 5, 2017.
8. S. Wang, **W.S. Wang**, C. Yakopcic, E.S. Shin, G. Subramanyam and T.M. Taha, "Experimental study of $LiNbO_3$ memristor for use in neuromorphic computing," *Microelectronic Engineering*, vol. 168, 2017.
9. S. Wang, **W.S. Wang**, C. Yakopcic, E.S. Shin, G. Subramanyam and T.M. Taha, "Reconfigurable neuromorphic crossbars based on titanium oxide memristors," *Electronics Letters*, vol. 53, no. 20, 2016.
10. K.C. Pan, **W.S. Wang**, E.S. Shin, K. Freeman, G. Subramanyam, "Vanadium oxide thin film variable resistor based RF switches," *IEEE Transactions on Electron Devices*, vol. 62, no. 9, 2015.
11. **W.S. Wang**, S. Tatic-Lucic, W. Brown, and R. Vinci, "Design of a bidirectional MEMS actuator with high actuation resolution, large driving force and power-free latching," *Microelectronic Engineering*, vol. 85, no. 3, 2008.
12. **W.S. Wang**, S. Tatic-Lucic, W. Brown, J. Iceman, S. Hyun, and R. Vinci, "Precision in-package positioning with a thermal inchworm," *Sensors and Actuators A*, vol. 142, no. 1, 2008.
13. **W.S. Wang** and J. Fang, "Variable focusing microlens chip for potential sensing applications," *IEEE Sensors Journal*, vol. 7, no. 1-2, 2007.
14. **W.S. Wang** and J. Fang, "Design, fabrication, and testing of micromachined tunable microlens," *Journal of Micromechanics and Microengineering*, vol. 16, no. 7, 2006.
15. **W.S. Wang**, J. Fang, and K. Varahramyan, "Compact variable-focusing microlens with integrated thermal actuator and sensor," *IEEE Photonics Technology Letters*, vol. 17, no. 12, 2005.
16. **W.S. Wang**, Z.M. Yao, J. Chen, and J. Fang, "Composite Elastic Magnet Film with Hard Magnetic Feature," *Journal of Micromechanics and Microengineering*, vol. 14, no. 10, 2004.

17. J. Chen, **W.S. Wang**, J. Fang, and K. Varahramyan, "Variable-focusing microlens with microfluidic chip," *Journal of Micromechanics and Microengineering*, vol. 14, no. 5, 2004.

◇ **Refereed Conferences**

18. N. Sepelak, K. Liddy, A. Islam, J. Brown, E. Heller, D. Dryden, E. Werner, **W.S. Wang**, A. Green, and K. Chabak, "High temperature operation of β-Ga_2O_3 self-aligned gate MOSFET in air," *Les Eastman Conference on High Performance Devices*, South Bend, Indiana, August 2021
19. G. Salcedo, A. Islam, M. Dietz, S. Cheema, K. Leedy, K. Liddy, A. Green, **W.S. Wang**, S. Salabuddin, K. Chabak, J. Sattler, "Towards the integration of $Hf_{0.8}Zr_{0.2}O_2$-based negative capacitance dielectric on β-Ga_2O_3 substrates," *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, 2021
20. A. Zaman, C. Yakopcic, S. Wang, E. Shin, **W.S. Wang**, T. Taha, G. Subramanyam, "Analysis of Lithium Niobate Memristor Devices for Neuromorphic Programability," *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, 2019 (Best Poster Award)
21. A. Zaman, **W.S. Wang**, and G. Subramanyam, "Modeling of memristor device & analysis of stability issues," *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, 2017.
22. L.Y. Li, **W.S. Wang**, E.S. Shin, T. Quach, and G. Subramanyam, "Design of tunable shunt and series interdigital capacitors based on vanadium dioxide thin film," *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, 2017.
23. C. Yakopcic, S. Wang, **W.S. Wang**, E.S. Shin, G. Subramanyam and T.M. Taha, "Methods for high resolution programming in lithium niobate memristors for neuromorphic hardware," *International Joint Conference on Neural Networks (IJCNN)*, Anchorage, AK, 2017.
24. E.S. Shin, K.C. Pan, **W.S. Wang**, G. Subramanyam, V. Vasilyev, K. Leedy and T. Quach, "Tungsten-doped vanadium oxide thin film based tunable antenna," *2nd International Conference on Advances in Functional Materials*, South Korea, 2016.
25. S. Wang, **W.S. Wang**, C. Yakopcic, E.S. Shin, R.S. Kim, G. Subramanyam and T.M. Taha, "Lithium based memristive device," *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, 2015.
26. **W.S. Wang**, M. Patterson, and G. Subramanyam, "Passive wireless platforms for chemical-biological sensors," *IEEE Engineering in Medicine & Biology Society Conference 2014*, Chicago, IL, Aug 26-30, 2014.
27. K.C. Pan, D. Brown, **W.S. Wang**, and G. Subramanyam, "Vanadium dioxide thin film series single-pole single throw switch," *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, Jun 25-27, 2014.
28. **W.S. Wang**, C. Yakopcic, E.S. Shin, T.M. Taha and G. Subramanyam, "Fabrication, characterization, and modeling of memristor devices," *IEEE National Aerospace & Electronics Conference (NAECON)*, Dayton, OH, Jun 25-27, 2014.
29. B. Moon, **W.S. Wang**, C. Park, I. Yuk, M. Chun, and D. Jaffe, "Immersion grating mount design for IGRINS and GMTNIRS," *SPIE Modern Technologies in Space- and Ground-based Telescopes and Instrumentation*, 845048, Amsterdam, Denmark, July 2012.
30. M. Gully-Santiago, **W.S. Wang**, C. Deen and D. Jaffe, "Near-infrared metrology of high-performance silicon immersion gratings," *SPIE Mondern Technologies in Space- and Ground-based Telescopes and Instrumentation*, 84502S, Amsterdam, Denmark, July 2012.

31. **W.S. Wang**, M. Gully-Santiago, C. Deen, D. Mar and D. Jaffe, "Manufacturing of silicon immersion gratings for infrared spectrometers," *SPIE Astronomical Telescopes and Instrumentation*, 7739-172, San Diego, CA, Jun 28-July 2, 2010.
32. M. Gully-Santiago, **W.S. Wang**, C. Deen, D. Kelly, T. P. Greene, J. Bacon, D. T. Jaffe, "High-performance silicon grisms for 1.2-8.0 μm: detailed resutls from the JWST-NIRCam device," *SPIE Astronomical Telescopes and Instrumentation*, 7739-173, San Diego, CA, Jun 28-July 2, 2010.
33. I.S. Yuk, D. T. Jaffe, S. Barnes, M.Y. Chun, C. Park, S. Lee, H. Lee, **W.S. Wang**, K.J. Park, S. Pak, J. Strubhar, C. Deen, H. Oh, et al., "Preliminary design of IGRINS (Immersion GRating INfrared Spectrograph)," *SPIE Astronomical Telescopes and Instrumentation*, 7735 , San Diego, CA, Jun 28-July 2, 2010.
34. S. Lee, I.S. Yuk, H. Lee, **W.S. Wang**, D. T. Jaffe, S. Barnes, M.Y. Chun, C. Park, S. Pak, J. Strubhar, C. Deen, M. Gully-Santiago, et al., "GMTNIRS (Giant Magellan Telescope near-infrared spectrograph): design concept," *SPIE Astronomical Telescopes and Instrumentation*, 7735, San Diego, CA, Jun 28-July 2, 2010.
35. D. Jaffe, **W.S. Wang**, J. Marsh, C. Deen, D. Kelly, and T. Greene, "Fabrication and test of silicon grisms for JWST-NIRCam," *SPIE Space Telescopes and Instrumentation I: Optical, Infrared, and Millimeter*, Marseille, France, Jun 23-28, 2008.
36. **W.S. Wang**, S. Tatic-Lucic, W. Brown, J. Iceman, S. Hyun, and R. Vinci, "Thermal inchworm for precision in-package positioning," *EuroSensors*, Sweden, 2006.
37. **W.S. Wang**, J. Fang, and K. Varahramyan, "Auto-tunable microlens chip for sensing applications," *IEEE Sensors*, Irvine, CA, Nov. 2005 (Best Paper Award).
38. **W.S. Wang**, J. Fang, and K. Varahramyan, "Controlling nanoparticle distribution in hydrogel by electrophoresis for gradient refractive index lens applications," *SPIE Photonics West*, San Jose, CA, Jan. 2005.
39. **W.S. Wang**, J. Chen, J. Fang, and K. Varahramyan, "Novel process to fabricate 3D microstructure joined with micro-channel for microfluidic applications," *SPIE Optics East*, Philadelphia, PA, Oct. 2004.
40. J. Chen, **W.S. Wang**, and J. Fang, "Design and fabrication of a variable-focusing microlens," *Texas MEMS Workshop V.*, Arlington, TX, May. 2003.
41. Z.M. Yao, J. Fang, J. Chen, and **W.S. Wang**, "The Investigation of Hard Magnetic Silicone Elastomer Thin Films," *Microfluidics, BioMEMS, and Medical Microsystems at SPIE Photonics West*, San Jose, CA, Jan. 2003.

◇ **Book Chapters**

42. J. Fang, **W.S. Wang**, and S.H. Zhao, "Fabrication of 3D microfluidic structures," *Encyclopedia of Microfluidics and Nanofluidics*, Springer, August 2008. ISBN 0387324682

Patents

◇ J. Fang, **W.S. Wang**, J. Chen, K. Varahramyan, R.A. Gunasekaran and M. Agarwal, "Wide-angle variable focus length lens system," *US patent 7,359,124* and *US patent 7,440,193*, 2008 (*Licensed by HoloChip Corp. for lens product commercialization)*

Grants

◇ PI, "Development of HfO_2 based ferroelectric materials for β-Ga_2O_3 transistors", Defense Associated Graduate Student Innovators (DAGSI) funded by Ohio Department of Higher Education (ODHE), \$63,231 2021

◇ PI, "High-k dielectric materials for ultra wide band gap transistors", Lake campus professional development grant, \$1200 2020

◇ PI, "2020 engineering study abroad program", WOEF Grant, \$3000 2019-2020

◇ PI, "Water quality monitoring buoy for GLSMs", WOEF Grant, \$1500 2019

- ◇ Co-PI, "Regional schools and university collaboration with STEM research and competitions", Lake campus professional development grant, $1200 2018
- ◇ PI, "Design and development of a customizable and low-cost water quality monitoring platform for Grand Lake St. Marys", Lake campus professional development grant, $2000 2018
- ◇ PI, "Autonomous vehicles for multi-vehicle team competition," WOEF Grant, $1500 2018
- ◇ PI, "Autonomous material handling vehicle," Lake campus student research grant, $500 2018
- ◇ Co-I, "Optimizing the performance and manufacturability of silicon diffractive optics," NASA Astronomy and Physics Research and Analysis, $670K 2009-2012
- ◇ Co-I, "Design study for the high resolution near-IR spectrograph for the Giant Magellan Telescope (GMT)," GMT project 2010-2011

Services

- ◇ Faculty Senate President, Wright State University - Lake Campus 2022
- ◇ Committee chair, Mechanical engineering faculty search committee, Wright State University Lake Campus 2020
- ◇ Committee co-chair, Electrical engineering faculty search committee, Wright State University - Lake Campus 2020
- ◇ Committee chair, Governance and Bylaws committee, Wright State University - Lake Campus 2019-2021
- ◇ Committee member, Lake Campus Ad-Hoc International Education Committee 2020
- ◇ Committee member, Library advisory committee, Wright State University since 2019
- ◇ Committee member, Library and IT committee, Wright State University - Lake Campus 2018-present
- ◇ Developed AAS in ECET for Lake Campus 2020-2021
- ◇ Developed study abroad program with Shanghai Normal University 2019
- ◇ Active Reviewer for *Scientific Reports*, *IEEE Transactions on Electron Devices*, *Journal of Applied Physics*, *Sensors and Actuators, B*, *IEEE Sensors Journal*, *IEEE Transactions on Nanotechnology*, *IEEE Journal of Microelectromechanical Systems*, *ECS Journal of Solid State Science and Technology*, *Sensors* and *Electronics* 2007-present
- ◇ Organizing committee member for International Workshop on Thin Films for Electronics, Electro-Optics, Energy & Sensors (TFE3S) 2015 (Suzhou, China), 2017 (Dayton, USA)
- ◇ ABET review coordinator for ECE senior capstone classes, University of Dayton 2016
- ◇ Mentor of Air Force Research Lab (AFRL) Minority Leaders Research Collaboration Program, University of Dayton 2013-2017
- ◇ Committee chair for IEEE Sensors Council Early Career (Young Professional) Award 2014
- ◇ Committee member for IEEE Sensors Council Early Career GOLD (Graduates of the Last Decade) Award 2009-2014
- ◇ Volunteer judge for Spirit of Innovation Awards - Conrad Foundation (aerospace exploration subcategory) 2011
- ◇ Volunteer tutor for middle school students whose both parents are visually impaired 1994-1996