

# Zhi (Jackie) Yao, Ph.D.

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## PERSONAL SUMMARY

- 2019 Luis W. Alvarez postdoctoral fellow, Lawrence Berkeley National Laboratory, Computing Sciences
- Combined proficiency in electromagnetics, microwave circuits and components, multi-scale computational modeling, scientific programming of complex physics, and domain science of magnetism, circuit quantum electrodynamics, and microelectronic device design
- 8+ years of experience working on interdisciplinary technologies spanning electrical engineering, computational sciences, mechanical engineering, and material science

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## EDUCATION

### University of California, Los Angeles (UCLA)

Ph.D. in Electrical & Computer Engineering, GPA: 3.98/4.0 Jun. 2014 - Dec. 2017

M.S. in Electrical & Computer Engineering (*Best Thesis*), GPA: 4.0/4.0 Sep. 2012 - Jun. 2014

### Zhejiang University, Hangzhou, China

B.S. in Electrical Engineering: Photonics (*Honors College*), GPA: 3.94/4.0 Aug. 2008 - Jun. 2012

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## KEY SKILLS

- Deep understanding of electromagnetic (EM) waves, acoustic waves, magnetic materials, piezoelectric materials, and wave-material interactions
- Envision and create experiments to validate numerical design
- Proficiency in Matlab, C++ and Python
- Wireless communications, antenna phased array, beamforming, antenna anechoic chamber test
- RF/microwave systems, RF circuit design, PCB fabrication and characterization
- Vector network analyzer (VNA), spectrum analyzer, on-wafer IC test, electromagnet, etc.
- Skills in MEMS and sensors
- Skills in deep reinforcement learning (DRL), data analysis, MPI/OpenMP
- Full-wave and circuit simulation in CST, ANSYS HFSS, ADS, and Comsol
- Competent writing and communication skills, public speaking ability
- Multidisciplinary project management skill set, as well as tenacity to lead and accomplish projects

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## EXPERIENCE

### Luis W. Alvarez Postdoctoral Fellow in Computing Sciences

Nov. 2019 - present

Lawrence Berkeley National Laboratory, *Supervisor: Dr. Ann Almgren*

Berkeley, CA

- Device modeling in Co-Design frameworks of Beyond-Moore microelectronic circuits and systems, including magnetoelectric spin-orbit logic-in-memory components, ferroelectric transistors and carbon nano-tube sensors.

- Model and design of quantum computing testbed, focusing on the interaction between microwave photons, superconducting qubits and magnetic spins.
- Development of a software Artemis, for incorporating multiple physics in new electronic structures, under the framework of AMReX, with features of massively parallel computing on GPUs and block-structured adaptive mesh refinement (AMR).
- Quantum transduction testbed design and artificial intelligence (AI) -driven optimization.

#### **Postdoctoral Researcher**

Jan. 2018 - Sep. 2019

UCLA, ECE Dept., *Advisers: Prof. Yuanxun Ethan Wang & Prof. Tatsuo Itoh* Los Angeles, CA

- Experience envisioning and creating high-frequency experiments to validate designs, including MEMS-loaded non-reciprocal RF devices, electrically small antennas, magnetic field receivers, etc.
- Development of modeling to solve complex multiphysics problems involving electromagnetics, non-linear magnetics, and acoustics, with emphasis on underwater applications.
- Ability to incorporate numerical algorithms to largely increase computational capability, with validated accuracy and up to 1000 times improvement of simulation speed over traditional methods.
- Lead, execute and report entire projects to federal agencies such as NSF and DARPA.

#### **Intern**

Jun. 2016 - Sep. 2016

QUALCOMM, Inc. Corporate Research & Development, *Supervisor: Dr. Allen Tran* San Diego, CA

- Constructed a 60 GHz antenna scanner that reduces the scanning area requirement by at least 50%.
- Anechoic chamber test of antenna phased arrays for 5G application.
- Developed Python codes for electromagnetic wave data processing in antenna characterization.
- Design and optimization of phone antennas, which over-perform commercial antennas in terms of radiation efficiency and cross coupling.

#### **Graduate Student Researcher**

Sep. 2012 - Dec. 2017

UCLA, Center Translational Applic. Nano Multiferroic Sys. (TANMS) Los Angeles, CA

*Adviser: Prof. Yuanxun Ethan Wang*

- Proposed and implemented miniaturized magneto-electric antennas with sizes at least 100 times smaller than state-of-art antennas without performance degradation.
- Experimentally characterized the bulk acoustic resonance performance of the antenna by on-wafer measurement, showing a quality factor of 700.
- Created multi-physics, multi-scale computational modeling to describe the multiple physics phenomena in miniature circuitry, such as acoustic filters, magneto-electric antennas, etc.
- Demonstrated numerically that the magneto-electric antenna can lead to high performance with low profile, e.g. radiation efficiency 10 dB higher and impedance matching 50 dB better than traditional dipole-based antennas, with a diameter  $10^{-3}$  of EM wavelength.
- Active collaboration with multidisciplinary researchers to promote simulation-based design of RF & microwave devices.
- Design, prototype, and test of nonlinear devices based on magnetic thin films and parametric effects.
- Collaborated closely with industry, such as Raytheon and Northrop Grumman, to determine/refine the devices' market potential.

#### **Undergraduate Student Researcher**

Jul. 2011 - May. 2012

UC Davis, Microwave/Millimeter Wave Tech. Group

Davis, CA

*Adviser: Prof. Neville C. Luhmann, Jr.*

- Designed a  $1 \times 9$  wide-band antipodal Vivaldi antenna array with an element gain above 8 dBi throughout Ka band, for a true time delay phased array transmitter.
- Characterized the phase array transmitter in anechoic chamber and VNA network analyzer.

## GRANTS

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Co-Investigator	DOE, 2021 - 2024. \$6M (Lead PI: Ramamoorthy Ramesh) <i>Codesign of Ultra-Low-Voltage Beyond CMOS Microelectronics</i>
Key Personnel	DOE, 2021 - 2024. \$5.1M (Lead PI: Maurice Garcia-Sciveres) <i>Co-Design and Integration of Nano-Sensors on CMOS</i>
Key Personnel	LDRD, LBNL. 2021 - 2023. \$440K (Lead PI: Andrew J. Nonaka) <i>The ARTEMIS Code for Microelectronics</i>
Principal Investigator	LDRD, LBNL. 2019 - 2021. \$360K <i>Engineering Wave-Material Interactions for Innovative Electronics Applications</i>
Key Personnel	TANMS ERC, NSF. 2018 - 2019. \$60K <i>Multiferroic Antenna for Biomedical Implant Antenna Applications</i>
Key Personnel	M3IC, DARPA. 2017 - 2020. \$3.2M <i>Modeling of Nonlinear Magnetism with a Multiscale, Unconditionally Stable Time-Domain Solver Unifying Electrodynamics, Elastodynamics &amp; Spin Dynamics</i>
Principal Investigator	Innovation Fellowship, Qualcomm Inc., Corporate Research & Development 2015 - 2016. \$100K <i>Bulk Acoustic Wave Resonators for Antenna Applications through Multiferroic Coupling</i>

## AWARDS AND HONORS

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- Luis W. Alvarez Postdoctoral Fellowship  
Lawrence Berkeley National Laboratory, 2019 - 2021
- Rising Star in EECS  
Rising Stars Academic Career Workshop for Women, UIUC, Urbana-Champaign, 2019
- Rising Star in Engineering  
Asian Deans' Forum, Seoul, Korea, 2019
- Postdoctoral Fellowship  
Institute for Digital Research and Education (IDRE), UCLA, 2019
- USNC-URSI Travel Fellowship  
U.S. National Committee for the International Union of Radio Science, 2018
- 1<sup>st</sup> Place Award in Best Student Paper Competition, selection rate 1/390  
IEEE International Microwave Symposium (IMS), 2017
- Finalist of Three-Minute Thesis Contest (waived in conflict to Best Paper Competition)  
IEEE International Microwave Symposium (IMS), 2017
- Doctoral Research Scholarship  
IEEE Antennas and Propagation Society (AP-S), 2017
- Qualcomm Innovation Fellowship (QInF)  
Qualcomm Technologies Inc. Corporate Research & Development, San Diego, CA, 2015-2016
- PhD Sponsorship Initiative & Travel Grant  
IEEE International Microwave Symposium (IMS), 2016

- 1<sup>st</sup> Place Award & Graduate Preliminary Exam Fellowship  
Electrical Engineering Department, UCLA, Los Angeles, CA, 2014
- Outstanding Master's Research Award  
Electrical Engineering Department, UCLA, Los Angeles, CA, 2014
- Department Fellowship for Entering Doctoral Students  
Electrical and Computer Engineering Department, UCLA, Los Angeles, CA, 2012 - 2013
- First Class Scholarship for Outstanding Students  
Zhejiang University, China, 2009, 2010, 2011
- China National Scholarship for Undergraduate Students  
Ministry of Education, China, 2009

## SYNERGISTIC ACTIVITIES

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### Committee Service

- Committee Member Microwave Control Materials & Devices Committee (MTT - 13),  
- IEEE Microwave Theory & Techniques Society, 2019 - present
- Committee Member Field Theory and Computational EM Committee (MTT - 1),  
- IEEE Microwave Theory & Techniques Society, 2019 - present
- Member Women in Microwave (WIM), 2018 - present
- Member Institute for Digital Research & Education (IDRE)  
- Early Career Researchers Community, UCLA, 2018 - 2019

### Editorial Board

- Associate Editor Journal on Multiscale & Multiphysics Computational Techniques (J-MMCT)  
IEEE, 2019 - present

### Journal Review

- Reviewer IEEE Transactions on Circuits and Systems II: Express Briefs (2019 - present)
- Reviewer IEEE Transaction on Antennas and Propagation (2014 - present)
- Reviewer IEEE Journal on Multiscale and Multiphysics Comput. Tech. (2016 - present)
- Reviewer IEEE Transaction on Magnetics (2018 - present)
- Reviewer Journal of Alloys and Compounds (2018 - present)

### Conference Organization

- Symposium Organizer Minisymposium “*Electromagnetic Multiscale and Multiphysics Coupling: Applications, Adaptivity, and Accuracy*”  
- 2021 SIAM Conference on Computational Science and Engineering (CSE21)
- Co-Chair Session THP-A4.2P “*RCS*”  
Antennas and Propagation Symposium (2018)

## PUBLICATIONS

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- [1] P. Kumar, R. Jambunathan, Y. Zeng, A. Nonaka, S. Griffin, R. Ramesh, **Z. Yao**, “Coupling between microwave photons and nanomagnet magnons,” Under preparation.

- [2] P. Kumar, A. Nonaka, R. Jambunathan, S. Salahuddin, R. Ramesh, **Z. Yao**, “Phase field modeling of ferromagnetic negative-capacitance field-effect transistors,” Under preparation.
- [3] **Z. Yao**, D. Ladiges, K. Lee, A. Banerjee, A. Nonaka, I. Siddiqi, J. Carter, “Monte Carlo simulation on heat guiding using ballistic phonon transport in quantum phononic nanostructures,” Under preparation.
- [4] **Z. Yao**, S. Tiwari, J. Schneider, R. N. Candler, G. P. Carman, and Y. E. Wang, “Enhanced planar antenna efficiency through magnetic thin-films,” *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, in press, Nov. 2021.
- [5] J. Rivera, **Z. Yao**, et al., “Verification testing of multi-dynamical solver for multiferroic antennas,” *Proceedings of 2021 International Applied Computational Electromagnetics Society Symposium (ACES)*, pp. 1-4, Sep. 2021.
- [6] **Z. Yao**, R. Jambunathan, Y. Zeng and A. Nonaka, “A massively parallel time-domain coupled electrodynamics-micromagnetics solver,” arXiv preprint arXiv:2103.12819, *International Journal of High Performance Computing Applications (IJHPCA)*, in press, Aug. 2021.
- [7] M. G. Bautista, **Z. Yao**, A. Butko, M. Kiran and M. Metcalf, “Towards automated superconducting circuit calibration using deep reinforcement learning,” *Proceedings of 2021 IEEE Computer Society Annual Symposium on VLSI (ISVLSI)*, pp. 462-467, Jul. 2021.
- [8] W. Gu, K. Luong, **Z. Yao**, H. Cui and Y. E. Wang, “Ferromagnetic resonance enhanced electrically small antennas,” *IEEE Transactions on Antennas and Propagation*, pp. 8304-8314, Jun. 2021.
- [9] T. Lu, J. D. Schneider, X. Zou, S. Tiwari, **Z. Yao**, G.P. Carman, R. N. Candler, Y. E. Wang, “Lamb wave resonator loaded non-reciprocal RF devices,” *Proceedings of IEEE/MTT-S International Microwave Symposium (IMS)*, pp. 516-519, Oct. 2020.
- [10] A. Acosta, K. Fitzell, J. D. Schneider, C. Dong, **Z. Yao**, R. Sheil, Y. E. Wang, G. P. Carman, N. X. Sun, and J. P. Chang, “Underlayer effect on the soft magnetic, high frequency, and magnetostrictive properties of FeGa thin films,” *Journal of Applied Physics*, 128, 013903, Jul. 2020.
- [11] A. Acosta, K. Fitzell, J. D. Schneider, C. Dong, **Z. Yao**, Y. E. Wang, G. P. Carman, N. X. Sun, and J. P. Chang, “Enhancing the soft magnetic properties of FeGa with a non-magnetic underlayer for microwave applications,” *Applied Physics Letters*, 116, 222404, Jun. 2020.
- [12] K.Q.T. Luong, W. Gu, F. Fereidoony, L. Yeung, **Z. Yao**, and Y. E. Wang, “Resonant precession modulation based magnetic field receivers,” arXiv preprint arXiv:2001.08059, 2020.
- [13] **Z. Yao**, S. Tiwari, T. Lu, J. Rivera, K. Luong, R. N. Candler, G. P. Carman and Y. E. Wang, “Modeling of multiple dynamics in the radiation of bulk acoustic wave (BAW) antennas,” *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, vol. 5, pp. 7-20, Dec. 2019.
- [14] J. D. Schneider, J. P. Domann, M. K. Panduranga, S. Tiwari, P. Shirazi, **Z. Yao**, et al., “Experimental demonstration and operating principles of a multiferroic antenna,” *Journal of Applied Physics*, vol. 126, 224104, Dec. 2019.
- [15] **Z. Yao**, H. Cui, R. U. Tok and Y. E. Wang, “3D multiscale unconditionally stable time-domain modeling of nonlinear RF thin film magnetic devices,” *Proceedings of IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting*, pp. 1059-1060, Jul. 2019.

- [16] H. Cui, **Z. Yao** and Y. E. Wang, "Coupling electromagnetic waves to spin waves: a physics-based nonlinear circuit model for frequency-selective limiters," *IEEE Transactions on Microwave Theory and Techniques*, vol. 67, pp. 3221-3229, Jun. 2019.
- [17] T. Lu, J. D. Schneider, **Z. Yao**, G. Carman and Y. E. Wang, "Nonlinear surface acoustic wave grating for parametric amplification," *Proceedings of IEEE Radio and Wireless Symposium (RWS)*, pp. 1-3, 2019.
- [18] H. Cui, **Z. Yao**, C. Tao, Y. E. Wang, "Nonlinear equivalent-circuit model for thin-film magnetic material based RF devices," *Proceedings of IEEE MTT-S International Microwave Workshop Series on Advanced Materials and Processes for RF&THz Applications (IMWS-AMP)*, pp. 1-3, Jul. 2018.
- [19] **Z. Yao**, H. Cui, T. Itoh, and Y. E. Wang, "Multiphysics time-domain modeling of nonlinear permeability in thin-film magnetic material," *Proceedings of IEEE International Microwave Symposium (IMS)*, pp. 208-211, Jun. 2018.
- [20] **Z. Yao**, R. U. Tok, T. Itoh and Y. E. Wang, "A multiscale, unconditionally stable time-domain (MUST) solver unifying electrodynamics and micromagnetics," *IEEE Transactions on Microwave Theory and Techniques*, vol. 66, pp (99): 1-14, May 2018.
- [21] **Z. Yao** and Y. E. Wang, "3D modeling of BAW-based multiferroic antennas," *Proceedings of IEEE International Symposium on Antennas and Propagation. & USNC/URSI National Radio Science Meeting (APS/URSI)*, pp. 1125-1126, Jul. 2017.
- [22] (*Best Student Paper*) **Z. Yao** and Y. E. Wang, "3D unconditionally stable FDTD modeling of micromagnetics and electrodynamics," *Proceedings of IEEE International Microwave Symposium (IMS)*, pp. 12-15. Jun. 2017.
- [23] **Z. Yao** and Y. E. Wang, "3D ADI-FDTD modeling of platform reduction with thin film ferromagnetic material," *Proceedings of IEEE APS/URSI*, pp. 2019-2020, Jun. 2016.
- [24] **Z. Yao**, Y. E. Wang, et al., "Bulk acoustic wave mediated multiferroic antennas: architecture and performance bound," *IEEE Transactions on Antennas and Propagation*, vol. 63, pp. 3335-3344, Aug. 2015.
- [25] **Z. Yao** and Y. E. Wang, "Bulk acoustic wave mediated multiferroic antennas near ferromagnetic resonance," *Proceedings of IEEE APS/URSI*, pp. 1832-1833, Jul. 2015.
- [26] **Z. Yao**, Q. Xu and Y. E. Wang, "FDTD analysis of platform effect reduction with thin film ferrite," *Proceedings of IEEE Radio and Wireless Symposium*, pp. 59-61, Jan. 2015.
- [27] **Z. Yao** and Y. E. Wang, "Dynamic analysis of acoustic wave mediated multiferroic radiation via FDTD methods," *Proceedings of IEEE APS/URSI*, pp. 731-732, Jul. 2014.

## CONFERENCE PRESENTATIONS

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- [1] **Z. Yao**, Revathi Jambunathan, Y. Zeng, A. Nonaka, A. Almgren, "Exascale-Enabled Physical Modeling for Next-Generation Microelectronics," 2021 Women in HPC Workshop in Supercomputing (SC21), Nov. 14-19, 2021.
- [2] (*Invited*) **Z. Yao**, "Exascale-Enabled Physical Modeling for Post-Moore Devices," San Jose State University Physics and Astronomy Department Seminar, Oct. 14, 2021.
- [3] **Z. Yao**, R. Jambunathan, A. Nonaka and A. Almgren, "Exascale-Enabled Physical Modeling for Next-Generation Electronics," Minisymposium for 2021 SIAM Conference on Computational Science and Engineering (CSE21), Mar. 1-5, 2021.

- [4] **Z. Yao**, “Exascale-Enabled Physical Modeling for Next-Generation Microelectronics,” 2021 CS Postdoc Symposium, LBNL, Feb. 12, 2021.
- [5] **Z. Yao**, “Exascale-Enabled Physical Modeling for Next-Generation Microelectronics Design,” Advanced Quantum Testbed (AQT) weekly meeting, Jan. 21, 2021.
- [6] (*Invited*) **Z. Yao**, H. Cui, R. U. Tok, and Y. E. Wang, “3D multiscale unconditionally stable time-domain modeling of nonlinear RF thin film magnetic devices,” 2019 IEEE International Symp. Antennas Propag. & USNC National Radio Science Meeting (APS/URSI), Atlanta, Georgia, USA, Jul. 7-12, 2019.
- [7] **Z. Yao**, H. Cui, and Y. E. Wang, “3D finite-difference time-domain (FDTD) modeling of nonlinear RF thin film magnetic devices,” 2019 IEEE International Microwave Symp. (IMS), Boston, MA, Jun. 2-7, 2019.
- [8] H. Cui, **Z. Yao**, and Y. E. Wang, “Coupling electromagnetic waves to spin waves: a compact model for frequency selective limiters,” 2019 IEEE International Microwave Symp. (IMS), Boston, MA, Jun. 2-7, 2019.
- [9] J. D. Schneider, *et al.*, “A piezoelectric driven magnetostrictive device for communicating in the near field,” SPIE Smart Structures and Materials + NDE and Health Monitoring, Denver, CO, USA, Mar. 3-7, 2019.
- [10] (*Invited*) **Z. Yao**, “Engineering wave-material interactions for innovative electronic applications,” Caltech Department of Electrical Engineering Seminar, Pasadena, CA, USA, Feb 5, 2019.
- [11] (*Invited*) **Z. Yao**, *et al.*, “Architecture and modeling of multiferroic antennas,” 2019 TANMS Annual Research Strategy Meeting, Los Angeles, CA, USA, Jan. 29-30, 2019.
- [12] T. Lu, J. D. Schneider, **Z. Yao** and Y. E. Wang, “Nonlinear surface acoustic wave grating for parametric amplification,” 2019 IEEE Radio and Wireless Symposium (RWS), Orlando, FL, USA, Jan. 20-23, 2019.
- [13] J. D. Schneider, *et al.*, “Experimental / Numerical demonstration and validation of a multiferroic antenna at low frequencies,” IEEE Inter. Magnetism Conf. (INTERMAG) and the Conference on Magnetism and Magnetic Materials (MMM), Washington DC, USA, Jan. 14-18, 2019.
- [14] (*Best presentation award*) K. Fitzell, J. D. Schneider, **Z. Yao**, J. Hu, N. Virushabadoss, *et al.* “Giant magnetostriction and low loss in FeGa/NiFe nanolaminates for strain-mediated multiferroic micro-antenna applications,” 65<sup>th</sup> American Vacuum Society Conference, Long Beach, CA, Oct. 21-26, 2018.
- [15] **Z. Yao**, H. Cui, R. U. Tok and Y. E. Wang, “Nonlinear magnetic modeling for RF applications,” 2018 APS/URSI, Boston, MA, Jul. 8-13, 2018.
- [16] **Z. Yao**, H. Cui, T. Itoh and Y. E. Wang, “Multiphysics time-domain modeling of nonlinear permeability in thin-film magnetic material,” 2018 IEEE International Microwave Symp. (IMS), Philadelphia, PA, Jun. 10-15, 2018.
- [17] (*Invited*) Q. Wang, J. P. Domann, **Z. Yao**, *et al.*, “Broadband antenna using strain-mediated spin Hall nano-oscillator,” 2018 IEEE INTERMAG, Singapore, Apr. 23-27, 2018.
- [18] (*Invited*) **Z. Yao** and Y. E. Wang, “An unconditionally stable time-domain solver unifying electrodynamics and micromagnetics,” 2018 IEEE International Conference on Computational Electromagnetics (ICCEM), Chengdu, China, Mar. 26-28, 2018.
- [19] (*Invited*) **Z. Yao**, *et al.* “A multiscale, unconditionally stable multiphysics time-domain (MUST) solver unifying electrodynamics, elastodynamics and spin dynamics,” 2018 TANMS Annual Research Strategy Meeting, Los Angeles, CA, USA, Jan. 30-31, 2018.

- [20] **Z. Yao**, R. U. Tok, T. Itoh and Y. E. Wang, “An unconditionally stable time-domain solver unifying electrodynamics and micromagnetics,” 2018 U.S. National Committee (USNC) of the International Union of Radio Science (URSI), Boulder, CO, USA, Jan. 4-7, 2018.
- [21] **Z. Yao** and Y. E. Wang, “3D modeling of BAW-based multiferroic antennas,” 2017 IEEE APS/URSI, San Diego, CA, USA, Jul. 9-14, 2017.
- [22] (*Best Student Paper*) **Z. Yao** and Y. E. Wang, “3D unconditionally stable FDTD modeling of micromagnetics and electrodynamics,” 2017 IEEE IMS, Honolulu, HI, USA, Jun. 4-9, 2017.
- [23] **Z. Yao** and Y. E. Wang, “3D ADI-FDTD modeling of platform reduction with thin film ferromagnetic material,” 2016 IEEE APS/URSI, Fajardo, Puerto Rico, Jun. 26-Jul. 1, 2016.
- [24] S. Tiwari, P. Nordeen, Q. Xu, **Z. Yao**, Y. E. Wang, G. P. Carman, et al., “Ferromagnetic resonance in bulk-acoustic wave multiferroic devices,” Solid State Sensors, Actuators, and Microsystems Workshop (Hilton Head), Hilton Head Island, SC, USA, Jun. 5-9, 2016.
- [25] **Z. Yao** and Y. E. Wang, “TANMS dynamic modeling of bulk acoustic wave mediated antenna,” 2015 XXIV International Materials Research Congress, Cancun, Mexico, Aug. 16-20, 2015.
- [26] **Z. Yao** and Y. E. Wang, “Bulk acoustic wave mediated multiferroic antennas near ferromagnetic resonance,” 2015 IEEE International Symposium on Antennas and Propagation (APS) & North American Radio Science Meeting, Vancouver, BC, Canada, Jul. 19-25, 2015.
- [27] **Z. Yao**, Q. Xu, and Y. E. Wang, “FDTD analysis of platform effect reduction with thin film ferrite,” IEEE Radio and Wireless Symposium (RWS), San Diego, CA, USA, Jan. 25-28, 2015.
- [28] **Z. Yao**, Q. Xu, X. Yang and Y. E. Wang, “TANMS dynamic modeling of bulk acoustic wave based multiferroic thin film,” 2014 XXIII International Materials Research Congress, Cancun, Mexico, Aug. 17-21, 2014.
- [29] **Z. Yao** and Y. E. Wang, “Dynamic Analysis of Acoustic Wave Mediated Multiferroic Radiation via FDTD Methods,” 2014 IEEE APS/URSI, Memphis, TN, USA, Jul. 6-11, 2014.

## TEACHING EXPERIENCE

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Mentor	Sustainable Research Pathways (SRP) Summer Program Lawrence Berkeley National Lab, 2021, 2022 (scheduled)
Guest Lecturer	ECE 261 - Microwave & Millimeter Wave Circuits (graduate level) Electrical Engineering Department University of California, Los Angeles – Los Angeles, CA, 2019
Guest Lecturer	ECE 162A - Wireless Communication Links & Antennas Electrical Engineering Department University of California, Los Angeles – Los Angeles, CA, 2019
Guest Lecturer	ECE 266 - Computational Methods for Electromagnetics (graduate level) Electrical Engineering Department University of California, Los Angeles – Los Angeles, CA, 2018, 2019
Mentor	Undergraduate Research Program TANMS Engineering Research Center (ERC) University of California, Los Angeles – Los Angeles, CA, 2015, 2017, 2019
Teaching Assistant	ECE 101B - Electromagnetic Waves Electrical Engineering Department University of California, Los Angeles – Los Angeles, CA, 2014, 2015



## PATENTS

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- [1] M. Metcalf, M. Kiran, A. Butko, G. Huang, H. Chen, **Z. Yao**, "Reinforcement learning for quantum network control", US Provisional Application FILED, Nov. 9, 2021.
- [2] A. E Sepulveda, G. P. Carman, J. Hu, J. D. Schneider, E. Wu, **Z. Yao**, S. Tiwari, W. Yan, "Extremely electrically small antennas based on multiferroics," U.S. Provisional Patent App. 17/168, 048, Aug. 5, 2021.