Juntao Yao (U.S. Permanent Resident)

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Power electronics, electromagnetic compatibility, simulation, experiment automation Mobile: (+1) 669-290-5629

Education

- PhD, Electrical Engineering, University of Florida, 2017-2021, Advisor: Dr. Shuo Wang
  Thesis: Modeling and Reduction of Radiated Electromagnetic Interference in Power Converters
- MS, Electrical Engineering, Wuhan University, 2013-2016
  Thesis: Coordination Control of DC Microgrids with Photovoltaic and Battery
- BS, Electrical Engineering, Wuhan University, 2009-2013, GPA 3.66/4 (Ranked top 6%)
  Thesis: Compound Controller Design for Active Power Filters

Skills

- **Electronics and EMC**, power / consumer / automotive / avionics electronics, EMC compliance design (emissions, BCI, radiated immunity, transient immunity, and ESD), expertise in developing solutions involving semiconductors, transformers, grounding, shielding, filters, and layouts
- **SIPI**: PDN/VRM/package/PCB analysis, noise coupling, interference, transient response
- **High Speed I/O**: eye diagram, jitter, crosstalk, BER, and protocols e.g. USB, Ethernet, LVDS
- **RF and Microwave**, antenna theory, transmission line, scattering parameters
- **Electromagnetic Simulation** in ANSYS HFSS, SIwave, CST, PowerDC/SI, and ADS
- **Circuit Simulation** in LTSpice, MATLAB Simulink, Saber, PSIM, and SIMPLIS
- **PCB Design** with Altium Designer and Allegro
- **Hands-on** with VNA, impedance analyzer, spectrum analyzer, power analyzer, and oscilloscope
- **Programming** in Python, MATLAB, Verilog, C, JMP

High Speed I/O Design Coursework

- **High Speed Interface Techniques**, 3 quarter units (in progress)
  University of California, Santa Cruz – Silicon Valley Extension
  - Practical knowledge of chip-to-board high speed I/O (USB, Ethernet, LVDS, optical)
  - Transmission line theory, impedance matching, and termination methods to I/O design
  - Differential signaling, slew rate, BER, and interfacing techniques for multi-GHz I/O

Experience

Archer Aviation

- **Staff Hardware Design Engineer** 2025 - Present
  - Led EMC design, simulation, and validation for power electronics and avionics systems
  - Built EMI/EMC simulations for power / data interfaces, including emissions and susceptibility
  - Designed new module EMC, including noise mitigation, ESD, and lightning protection

Apple

- **Hardware Design Engineer** Jan. 2022 - Nov. 2024
  - Investigated noise coupling and CM/DM conversion in interfaces and developed mitigations
  - Designed EMC in high-speed / low-speed interfaces, and validated compliance
  - Led EMC and contributed to SIPI / HW/ SW integration to optimize performance and cost
  - Designed EMC in power converters and compute modules
  - Simulated resonance and power dissipation, and developed mitigation strategies
  - Optimized size and cost in EMC design, and validated in simulations and experiments
  - Developed Python-based automation with oscilloscope, signal generator, spectrum analyzer
- **PhD Intern** May. 2021 - Sep. 2021

- Built 3D EM simulation models of filters and PCBs, and investigated coupling mitigations
- Investigated component non-linear characteristics and the impact on EMI
- Predicted EMI based on noise source and filter modeling and simulations

University of Florida, Power Electronics and Electrical Power Lab, Research Assistant

- **EMI in Power Converters in Automotive Applications** Aug. 2018 - Apr. 2021
  Sponsored by ***Monolithic Power Systems, Inc. San Jose, CA, USA***
  - Developed conducted/radiated EMI models with noise sources, components, PCBs, antennas
  - Predicted EMI in automotive power converters
  - Developed EMI solutions by schematic and layout optimizations, and coupling mitigations

- **Radiated EMI in GaN IC Active Clamp Flyback Converters** Mar. 2018 - Oct. 2019
  Sponsored by ***Navitas Semiconductor, Inc. El Segundo, CA, USA***
  - Developed radiated EMI models of GaN IC-based active clamp flyback power adapters
  - Proposed radiated EMI solutions by shielding and grounding, filter, and layout optimizations
  - Analyzed and mitigated near field couplings' impact on radiated EMI

- **EMI in Flyback Power Adapters** Jan. 2017 - Dec. 2017
  - Developed conducted/radiated EMI models with noise sources, transformers, filters, antennas
  - Investigated VNA characterization techniques for transformers, chokes, and antennas
  - Investigated transformer winding balancing and shielding techniques for EMI reduction

Wuhan University, Center for Grid Power Electronics, Research Assistant

- **Simulation and Experiment Platform of DC Microgrids** Sep. 2014 - June 2016
  - Simulated a DC microgrid with grid-tied and DC/DC power converters, PVs, and batteries
  - Investigated the control strategy in grid-tied and standalone operation modes

- **Bidirectional Cascaded Multilevel Converter for Motor Drives** June 2013 - June 2015
  - Designed unidirectional and bidirectional power cell configurations in a hybrid power converter
  - Analyzed the control strategy of cascaded H-bridge multilevel inverters

- **Shunt Active Power Filter** Nov. 2012 - Aug. 2013
  Bachelor thesis (Province-wide honor)
  - Proposed a multi-internal-model based controller robust to grid frequency fluctuation
  - Built a simulation model of an active power filter

Publications, Selected

(30+ technical papers published in transactions / journals / conferences.)

1. **J. Yao**, S. Wang, and Z. Luo, "Modeling, Analysis, and Reduction of Radiated EMI Due to the Voltage across Input and Output Cables in an Automotive Non-isolated Power Converter," IEEE Transactions on Power Electronics, vol. 37, no. 5, pp. 5455-5465, 2022.
2. **J. Yao**, Y. Li, S. Wang, X. Huang, and X. Lyu, "Modeling and Reduction of Radiated EMI in a GaN IC-Based Active Clamp Flyback Adapter," IEEE Transactions on Power Electronics, vol. 36, no. 5, pp. 5440-5449, May 2021.
3. **J. Yao**, S. Wang, and H. Zhao, "Measurement Techniques of Common Mode Currents, Voltages, and Impedances in a Flyback Converter for Radiated EMI Diagnosis," IEEE Transactions on Electromagnetic Compatibility, vol. 61, no. 6, pp. 1997-2005, Dec. 2019.
4. **J. Yao**, A. McDowell, and J. Chiappe, "Modeling and Simulation of EMI Noise Source and Filter in Power Converters," in Apple Modeling and Simulation Conference, 2024.
5. **J. Yao** and S. Wang, "Modeling and Reduction of Radiated EMI in a Power Converter with Undesired Capacitive Couplings," in Apple Modeling and Simulation Conference, 2024.

Patents, Selected

- S. Wang, **J. Yao**, and Y. Li, "Common Mode (CM) Electromagnetic Interference (EMI) Filters for Reducing Radiated EMI in Power Converters," U.S. Patent 11,356,011, 2022. (With University of Florida)
- **J. Yao**, and A. McDowell, "Reconfigurable Battery Pack," U.S. Patent App. US18342065, 2023. (With Apple)
- M. Bhattacharya, and **J. Yao**, "Damping Filters for Reduced Electromagnetic Emissions," U.S. Patent App. US18453606, 2023. (With Apple)

Honors and Awards, Selected

- Nominee of the Alec Courtelis Award at the University of Florida, for research and academic excellence, supported by Prof. Shuo Wang and Prof. Hitomi Yamaguchi Greenslet, and nominated by the College of Engineering, 2021
- Best Presentation Award, Applied Power Electronics Conference (APEC), 2021
- Exceptional Bachelor Thesis in Hubei Province, China (Top 2%), 2013
- Honorable Mention, USA Mathematical Contest in Modeling/Interdisciplinary Contest in Modeling (USA ICM/MCM), 2012