

Jie Zhu

zhu797@purdue.edu • [+1 \(765\) 409-7020](tel:+1(765)409-7020) • [LinkedIn: jie-zhu-em](#) • [Google Scholar](#)

HIGHLIGHTS

- Researcher in *computational electromagnetics, quantum optics, nanophotonics, and probabilistic computing*.
- Practical knowledge of *numerical linear algebra, signal integrity, RF engineering, quantum computing, semiconductor devices, and nanofabrication*.
- Graduate instructor of ECE 20001 Electrical Engineering Fundamentals I.

EDUCATION

Purdue University | *West Lafayette, IN* Aug. 2018 - Present

- Ph.D. in Electrical and Computer Engineering (GPA 4.0/4.0).
- Co-advisors: Prof. Weng Cho Chew and Prof. Peter Bermel.
- Thesis: Physical Implementations of Unconventional Computing Frameworks via Electromagnetics.

Fudan University | *Shanghai, China* Sep. 2014 - Jun. 2018

- B.E. in Electronic Engineering.
- Received First Prize of the Scholarship (top 3%).

WORK EXPERIENCE

Intern, Synopsys | *Sunnyvale, CA* May 2023 - Dec. 2023

- Developed matrix compression techniques and matrix equation solvers with C++ for an electromagnetics-based signal integrity solution.
- Surveyed the latest technologies and provided input for future solvers.

Intern, Schlumberger-Doll Research Center | *Cambridge, MA* May 2019 - Aug. 2019

- Developed a graphical user interface with Python and upgraded a finite element method code for electromagnetic responses of oil casing.
- Provided data to benchmark inverse algorithms for estimating distance to nearby casing.

TECHNICAL SKILLS

- **Programming Language** C++, MATLAB, PYTHON, VHDL, C#, HTML
- **Modeling Software/Package** HSPICE, MEEP, MPB, S4, CST, HFSS, COMSOL, FEKO
- **Algorithms** Finite Difference Method, Finite Element Method, Integral Equation, Partial Element Equivalent Circuit, Fast Multiple Method, Hierarchical Matrix

TEACHING EXPERIENCE

ECE 20001 Electrical Engineering Fundamentals I | *Graduate Instructor and Lead TA* 6 semesters, Present

- Teach weekly lectures to 500+ student.
- Lead a team of 30+ TAs.
- Teach weekly recitation classes.
- Design homework and exam problems.

ENGR 103 Introduction to Research Pathways | *Teaching Assistant* Fall 2021

- Help students develop professional skills, i.e., writing resume, email etiquette, presentation skills, etc.
- Guided first year engineering students to find research opportunities.

ECE 604 Electromagnetic Field Theory | *Teaching Assistant*

Fall 2018 - Fall 2023

- Substitute for lectures.
- Prepare homework solutions and exams.

PROFESSIONAL ACTIVITIES

College of Engineering Undergraduate Research Office | *Graduate Assistant & Mentor*

May 2023 - Aug. 2022

- Organized two campus-wide research fellowship programs.
- Provided technical and general research support to undergraduate researchers.
- Help undergraduates improve writing and presentation skills.

Research Mentorship | *Graduate Mentor*

Jan. 2021 - Present

- Mentored 9 undergraduate researchers.

nanoHUB | *Educational Resources Contributor*

- S4 Tutorial. <https://nanohub.org/resources/34915>. (4k+ views).
- nanoHUB IGNITE 2021 - Nanophotonics Challenge. <https://nanohub.org/resources/34926>.

AWARDS AND RECOGNITIONS

2024 | *Purdue Engineering 2024 Dean's Teaching Fellowship.*

2023 | *Honorable Mention, IEEE AP-S Student Paper Competition.*

2023 | *College of Engineering Magoon Award to outstanding teaching assistants.*

2022 | *SURF Graduate Mentor Award.*

PUBLICATIONS

Journal Articles

- [1] J. Song, Z. He, C. Shen, **J. Zhu**, Z. Qi, X. Sun, Y. Zhang, J. Liu, X. Zhang, X. Ruan, *et al.*, "Design of all-oxide multilayers with high-temperature stability toward future thermophotovoltaic applications," *Advanced Materials Interfaces*, p. 2300733, 2024. DOI: [10.1002/admi.202300733](https://doi.org/10.1002/admi.202300733).
- [2] C. Lee, D. Kortge, **J. Zhu**, J. Song, H. Wang, X. Ruan, and P. Bermel, "Temperature-dependent optical dispersion spectra for a single CeO₂ thin-film layer in UV-vis and its reflection and transmission in the IR region," *Journal of Optics*, vol. 25, no. 8, p. 085901, 2023. DOI: [10.1088/2040-8986/acd861](https://doi.org/10.1088/2040-8986/acd861).
- [3] D.-Y. Na, T. E. Roth, **J. Zhu**, W. C. Chew, and C. J. Ryu, "Numerical framework for modeling quantum electromagnetic systems involving finite-sized lossy dielectric objects in free space," *Physical Review A*, vol. 107, no. 6, p. 063702, 2023. DOI: [10.1103/PhysRevA.107.063702](https://doi.org/10.1103/PhysRevA.107.063702).
- [4] V. Singhal, **J. Zhu**, J. Song, H. Wang, and P. Bermel, "Tri-phase photonic crystal emitter for thermophotovoltaic systems," *Applied Physics Letters*, vol. 123, no. 13, 2023. DOI: [10.1063/5.0157860](https://doi.org/10.1063/5.0157860).
- [5] **J. Zhu**, T. E. Roth, D.-Y. Na, and W. C. Chew, "Generalized Helmholtz decomposition for modal analysis of electromagnetic problems in inhomogeneous media," *IEEE Journal on Multiscale and Multiphysics Computational Techniques*, 2023. DOI: [10.1109/JMMCT.2023.3305008](https://doi.org/10.1109/JMMCT.2023.3305008).
- [6] **J. Zhu**, Z. Xie, and P. Bermel, "Numerical simulation of probabilistic computing to NP-complete number theory problems," *Journal of Photonics for Energy*, vol. 13, no. 2, pp. 028501–028501, 2023. DOI: [10.1117/1.JPE.13.028501](https://doi.org/10.1117/1.JPE.13.028501).

- [7] Z. Wang, D. Kortge, Z. He, J. Song, **J. Zhu**, C. Lee, H. Wang, and P. Bermel, “Selective emitter materials and designs for high-temperature thermophotovoltaic applications,” *Solar Energy Materials and Solar Cells*, vol. 238, p. 111 554, 2022. DOI: [10.1016/j.solmat.2021.111554](https://doi.org/10.1016/j.solmat.2021.111554).
- [8] D.-Y. Na, **J. Zhu**, and W. C. Chew, “Diagonalization of the Hamiltonian for finite-sized dispersive media: Canonical quantization with numerical mode decomposition,” *Physical Review A*, vol. 103, no. 6, p. 063 707, 2021. DOI: [10.1103/PhysRevA.103.063707](https://doi.org/10.1103/PhysRevA.103.063707).
- [9] D.-Y. Na, **J. Zhu**, W. C. Chew, and F. L. Teixeira, “Quantum information preserving computational electromagnetics,” *Physical Review A*, vol. 102, no. 1, p. 013 711, 2020. DOI: [10.1103/PhysRevA.102.013711](https://doi.org/10.1103/PhysRevA.102.013711).
- [10] Z. Wang, D. Kortge, **J. Zhu**, Z. Zhou, H. Torsina, C. Lee, and P. Bermel, “Lightweight, passive radiative cooling to enhance concentrating photovoltaics,” *Joule*, vol. 4, no. 12, pp. 2702–2717, 2020. DOI: [10.1016/j.joule.2020.10.004](https://doi.org/10.1016/j.joule.2020.10.004).

Conference Proceedings

- [11] **J. Zhu**, D.-Y. Na, and W. C. Chew, “Investigating quantum entanglement using canonical quantization and scattering theory,” in *2024 USNC-URSI National Radio Science Meeting*, 2024.
- [12] **J. Zhu**, T. E. Roth, W. C. Chew, and D.-Y. Na, “Generalized Helmholtz decomposition for modal analysis of electromagnetic problems in inhomogeneous media,” in *2023 International Applied Computational Electromagnetics Society Symposium (ACES)*, 2023, pp. 1–2. DOI: [10.23919/ACES57841.2023.10114767](https://doi.org/10.23919/ACES57841.2023.10114767).
- [13] **J. Zhu**, D.-Y. Na, T. Roth, and W. C. Chew, “The validity of radiation gauge,” in *2021 IEEE International Symposium on Antennas and Propagation and USNC-URSI Radio Science Meeting (APS/URSI)*, 2021, pp. 1799–1800. DOI: [10.1109/APS/URSI47566.2021.9704266](https://doi.org/10.1109/APS/URSI47566.2021.9704266).
- [14] H. Dey, **J. Zhu**, and P. Bermel, “Plasmonic physically unclonable function devices for hardware security,” in *Plasmonics: Design, Materials, Fabrication, Characterization, and Applications XVIII*, SPIE, vol. 11462, 2020, 114620H. DOI: [10.1117/12.2568289](https://doi.org/10.1117/12.2568289).
- [15] D.-Y. Na, **J. Zhu**, and W. C. Chew, “Quantum computational electromagnetics,” in *2020 XXXIIIrd General Assembly and Scientific Symposium of the International Union of Radio Science*, IEEE, 2020, pp. 1–4. DOI: [URSIGASS49373.2020.9232025](https://doi.org/10.232025).
- [16] **J. Zhu**, D.-Y. Na, P. Bermel, and W. C. Chew, “Quantum information propagation using Huygens’ principle,” in *2020 IEEE International Symposium on Antennas and Propagation and North American Radio Science Meeting*, IEEE, 2020, pp. 1729–1730. DOI: [10.1109/IEEECONF35879.2020.9329839](https://doi.org/10.1109/IEEECONF35879.2020.9329839).