Ziqi Guo

+1 765 409 2603 | gziqi@purdue.edu | LinkedIn | Portfolio

Education

Purdue University — West Lafayette, IN, USA
Ph.D. in Mechanical Engineering; GPA: 4.00/4.00 — *Sep 2021 – Jun 2026 (Expected)*

Huazhong University of Science & Technology (HUST) — Wuhan, China
*B.E. in Energy & Power Engineering (**Honours Degrees**); GPA: 3.99/4.00, Rank: 1/221* — *Sep 2017 – Jun 2021*

Publications

Ziqi Guo, Zherui Han, Dudong Feng, Guang Lin*, and Xiulin Ruan*. Accelerated First-principles Prediction of Thermal Conductivity and Radiative Properties through Maximum Likelihood Estimation of Phonon Scattering Rates. *In Review.*

Ziqi Guo, Prabudhya Roy Chowdhury, Zherui Han, Yixuan Sun, Dudong Feng, Guang Lin*, and Xiulin Ruan*. Fast and Accurate Machine Learning Prediction of Phonon Scattering Rates and Lattice Thermal Conductivity. *npj Computational Materials.*

Andrea Felicelli, Ioanna Katsamba, Fernando Barrios, Yun Zhang, Ziqi Guo, Joseph Peoples, George Chiu*, and Xiulin Ruan*, Thin layer lightweight and ultrawhite hexagonal boron nitride nanoporous paints for daytime radiative cooling, *Cell Reports Physical Science*

Sijie Li[1], Ziqi Guo[1], Jacob B Ioffe, Yunfei Hu, Yi Zhen*, Xin Zhou*. Autism_genepheno: Text mining of gene-phenotype associations reveals new phenotypic profiles of autism-associated genes. *Scientific Reports.*

Song He, Zhengyuan Ma, Weizhong Deng, ZiKang Zhang, Ziqi Guo, Wei Liu, Zhichun Liu*. Novel flat plate loop heat pipe with dual evaporators for energy-efficient systems of cooling multiple heat sources. *Energy Reports.*

Grab-type flexible sorting method based on RFID spatial positioning technology.Patent. CN 201910875139.3. Filed Sep. 16,2019.

Sorting System Based on RFID Positioning Technology. Software Copyright. 2019SR1151524. Nov.14 2019.

Research Experience

Full Spectrum Optical Response of hBN nanocomposite — Purdue
Research Assistant — *Mar 2023 – Present*

- Predicted full spectrum temperature-dependent optical response of hBN nanocomposite entirely from first principles.
- Predicted refractive index with DFT for electron and four-phonon scattering for phonon. Predicted optical response of hBN nanocomposite with Monte-Carlo simulation.

Fast Optical Spectrum (FOS) calculations for nanoparticle media — Purdue
Research Assistant — *Jan 2023 – Present*

- Combined Mie theory with Monte Carlo simulations to predict the optical spectrum of nanoparticle media.
- Implemented the core-shell particle Mie theory. Released an open source code FOS.

Accelerated Prediction of Thermal and MIR-Optical Properties — Purdue
Research Assistant — *Aug 2022 – March 2023*

- Reduced the computational cost of predicting thermal and MIR-optical properties by up to 99% with relative errors less than 10% by using the maximum likelihood approximation to estimate phonon scattering rate.
- Integrated the accelerated phonon scattering calculation as an option of the open source code FourPhonon.

ML Prediction of Phonon Scattering and Thermal Conductivity — Purdue
Research Assistant — *Sep 2021 – Aug 2022*

- Built the first machine learning model that can predict phonon scattering rates and thermal conductivity at the experimental and first principles accuracy level, with up to two orders of magnitude acceleration.
- Trained deep neural network using TensorFlow. Mitigated challenges associated with the high skewness of phonon scattering rates and their complex contributions to the total thermal resistance. Performed transfer learning to further improve model performance.

Awards & Achievements

Ross Fellowship: For Ph.D. student with academic excellence. Purdue.

National Scholarship: Top 1% among all undergraduates nationwide. HUST. (Three consecutive years.)

Commencement Address Speaker: Delivered the commencement address on behalf of all undergraduates in HUST.)

Skills

Programming: Python, MATLAB, Fortran

Software: COMSOL, ANSYS, AutoCAD, SolidWorks

Technologies: Git, Arduino, Raspberry pi, PLC