Yue Xiao

Assistant Professor
Department of Mechanical and Aerospace Engineering
The University of Alabama in Huntsville

EDUCATION

The University of Arizona, Tucson, AZ 08/2015 – 05/2020
Ph.D. in Mechanical Engineering. Advisor: Prof. Qing Hao
Ph.D. Thesis: Phonon and Electron Transport in Periodic Nanoporous Structures

Lehigh University, Bethlehem, PA 01/2013 – 01/2015
M.S. in Mechanical Engineering. Advisor: Prof. Yaling Liu
M.S. Thesis: A Cell Patterning System Based on Thermal Ink-jet Technology

Huazhong University of Science and Technology, Wuhan, China 08/2008 – 06/2012
B.S. in Mechanical Engineering
B.S. Thesis: CFD Modeling of a Single Wafer Atomic Layer Deposition Device

WORKING EXPERIENCE

The University of Alabama in Huntsville 08/2025 – Present
Assistant Professor 08/2025 – Present
Perform research on topics related to : 1) advanced materials and manufacturing technologies for space applications, 2) nonthermal plasma for chemical synthesis, and 3) semiconductor heat transfer.

Advanced Cooling Technologies, Inc. 07/2020 – 08/2025
Lead R&D Engineer 01/2024 – 08/2025
Lead a team of 6 engineers and 4 technicians to develop new technologies in thermal/fluid science in energy applications, nonthermal plasma, and additive manufacturing while maintaining active research work.

- Develop polymer composite space radiation shield using 3D printing technology to reduce the radiation shield weight and improve electronics heat dissipation.
- Develop a novel loop heat pipe manufacturing process that uses 3D printing for improved loop heat pipe performance.
- Develop plasma physics modeling for advanced nonthermal plasma reactor design
- Supervise technology transition by developing commercialization strategies, outreaching activities, etc.
- Manage other research projects related to direct-air CO2 capture (DAC), sensors, and additive manufacturing.
- Mentor ~8 engineers and technicians and manage a team revenue of ~$4.5M/year.

R&D Engineer III 02/2023-01/2024

Lead various R&D projects and proposals efforts.

- Develop high-fidelity semiconductor device modeling software with Monte-Carlo-based phonon transport simulation.
- Develop plasma sterilization and sanitation technologies for agricultural and medical purposes.
- Develop high-efficiency plasma-assisted chemical production device and process to produce hydrogen and syngas.
- Develop two-phase heat transfer-based data center/residence thermal management.
- Mentor 3 engineers and technicians and manage >$1.5M/year research funds.

R&D Engineer II 07/2020-02/2023

Lead and contribute to various R&D projects and proposals.

- Develop hybrid thermosiphon for thermal energy storage systems.
- Modeling of phase change material heat sink and loop heat pipe.
- Develop hydrogen plasma deoxidation device and process to recycle used metal parts and metal powders.
- Contribute to the Development of a rapid cooling system for high-temperature neutron scattering furnaces.
- Design and modeling of thermal energy storage systems using loop thermosyphon.

R&D GRANTS/CONTRACTS

As single PI:

- DOE SBIR Phase II Grant (DE-SC0023619) "Semiconductor Device Simulation Software with Monte Carlo Based Thermal Transport Modeling" University Subaward, 10/2025-04/2026, PI on the University side, Total %50K.
- DOE SBIR Phase II and Phase IIA Grant (DE-SC0019664) "Plasma-Catalysis of CO_2 and CH_4 to Produce High Value Chemicals". 04/2020-04/2024, Total funding $2.2 M.
- NASA SBIR Phase I Contract (80NSSC22PA922) and Phase II Contract (80NSSC23CA062) "Hybrid Manufacturing Process of Loop Heat Pipe Evaporator". 07/2022-01/2023, 07/2023-07/2025, Total $1.0 M.
- DOE SBIR Phase I Grant and Phase II Cooperative Agreement (DE-SC0022897) "Polymer-Based Conformal Space Radiation Shield with Thermal Management Manufactured by Five-Axis 3D Printing Platform". 06/2022-03/2023, 08/2023 -08/2025, Total funding $1.3 M.
- FDA SBIR Phase I and Phase II Grant (1R43FD007709-01) "Plasma Sterilization Device Compatible with Long Lumen Scopes". 09/2022-08/2025 Total Funding $2.2 M.
- DOE SBIR Phase I Grant and Phase II Grant (DE-SC0023619) "Semiconductor Device Simulation Software with Monte Carlo Based Thermal Transport Modeling". 02/2023-11/2023, 04/2024-08/2025, PI, Total $1.3M.
- USDA NIFA SBIR Phase I Grant (2024-33530-41928) "Post-Harvest Food Sanitation via Energy Efficient Plasma Activated Water Production". 07/2024-02/2025, PI, Total Funding

$175K.

- DOD DHA SBIR Phase I Grant (HT942524P0076) “Psoralen-UV-A Irradiation Based High-Throughput Pathogen Inactivation Device”. 06/2024-01/2025, PI, Total Funding $250K.

As Co-I:

- DOE SBIR Phase I, II, and Phase IIA Grant (DE-SC0019664) “Rapid and Tunable Cooling Technology for Vacuum Furnaces”. 04/2020-04/2025, Total funding $2.5 M.
- DOE Grant (DE-FE0031755) “Flexible Coal Power Plant Operation with Thermal Energy Storage Utilizing Thermosyphons and Cementitious materials”. 04/2019-04/2023, Total funding $3.0 M.

JOURNAL PUBLICATIONS

Google scholar:
https://scholar.google.com/citations?hl=en&user=i9Q4FgQAAAAJ&view_op=list_works&sortby=pubdate

1. **Xiao, Y.***, Zou, A., Carlson, D., Hanson, S. C., Hayes, R. B., Zhang, P. (2024). 3D-Printed Polymer-Based Conformal Space Radiation Shield with Heat Dissipation. *ACS Applied Materials and Interfaces* (In Preparation).
2. Hanson, S. C.*, **Xiao, Y.***, Charrette, R., & Hayes, R. B. (2024). A preliminary NASA compliant conformal coating for optimized space radiation shielding configurations and its mass attenuation coefficients. *Progress in Nuclear Energy*, *169*, 105089.
3. Cao, G., Gonzalez-Casamachin, D. A., **Xiao, Y.**, Chen, C., Uddi, M., & Baltrusaitis, J. (2024). Evaluating the carbon footprint of the integrated DBD-plasma bi-reforming unit via laboratory scale experiments and scaled-up process modeling. *Plasma Processes and Polymers*, *21*(1).
4. Cao, G., **Xiao, Y.**, Huang, W.-M., Chen, C.-H., & Baltrusaitis, J. (2023). DBD plasma-assisted ethanol steam reforming for green H2 production: Process optimization through response surface methodology (RSM). *International Journal of Hydrogen Energy*, *48*(2), 553–565.
5. Ma, J., Wang, S., Wan, X., Ma, D., Xiao, Y., Hao, Q., & Yang, N. (2022). The unrevealed 3D morphological evolution of annealed nanoporous thin films. *Nanoscale*, *14*(45), 17072–17079.
6. Cao, G., Handler, R. M., Luyben, W. L., **Xiao, Y.**, Chen, C.-H., & Baltrusaitis, J. (2022). CO2 conversion to syngas via electrification of endothermal reactors: Process design and environmental impact analysis. *Energy Conversion and Management*, *265*, 115763.
7. Wang, S., **Xiao, Y**., Chen, Q., & Hao, Q. (2022). Engineering thermal transport within Si thin films: The impact of nanoslot alignment and ion implantation. *Iscience*, *25*(11), 105386.
8. Chen, Q., Yan, X., Wu, L., **Xiao, Y**., Wang, S., Cheng, G., Zheng, R., & Hao, Q. (2021). Small-nanostructure-size-limited phonon transport within composite films made of single-wall carbon nanotubes and reduced graphene oxides. *ACS Applied Materials & Interfaces*, *13*(4), 5435–5444.
9. **Xiao, Y**., Chen, Q., & Hao, Q. (2021). Inverse thermal design of nanoporous thin films for thermal cloaking. *Materials Today Physics*, *21*, 100477.
10. **Xiao, Y**., & Hao, Q. (2021). Nanoslot patterns for enhanced thermal anisotropy of Si thin films. *International Journal of Heat and Mass Transfer*, *170*, 120944.
11. **Xiao, Y.**, Xu, D., Medina, F. J., Wang, S., & Hao, Q. (2020). Thermal studies of nanoporous

thin films with added periodic nanopores—A new approach to evaluate the importance of phononic effects. *Materials Today Physics*, *12*, 100179.

12. Li, Z., Hong, Z., **Xiao, Y**., Hao, Q., & Liang, R. (2020). Thermal effects in single-point curing process for pulsed infrared laser-assisted 3D printing of optics. *3D Printing and Additive Manufacturing*, *7*(4), 151–161.
13. Hao, Q., **Xiao, Y**., & Wang, S. (2020). Two-step modification of phonon mean free paths for thermal conductivity predictions of thin-film-based nanostructures. *International Journal of Heat and Mass Transfer*, *153*, 119636.
14. Hao, Q., & **Xiao, Y**. (2020). Periodic nanoslot patterns as an effective approach to improving the thermoelectric performance of thin films. *Physical Review Applied*, *13*(6), 64020.
15. Wu, L., **Xiao, Y**., Ghosh, M., Zhou, Q., & Hao, Q. (2020). Machine learning prediction for bandgaps of inorganic materials. *ES Materials & Manufacturing*, *9*(4), 34–39.
16. **Xiao, Y.**, Chen, Q., Ma, D., Yang, N., & Hao, Q. (2019). Phonon Transport within Periodic Porous Structures — From Classical Phonon Size Effects to Wave Effects. *ES Materials & Manufacturing*, *5*, 2–18. https://doi.org/10.30919/esmm5f237
17. Hao, Q., & **Xiao, Y**. (2019). Electron Monte Carlo simulations of nanoporous Si thin films—The influence of pore-edge charges. *Journal of Applied Physics*, *125*(6), 64301.
18. Hao, Q., **Xiao, Y**., & Medina, F. J. (2019). Annealing Studies of Nanoporous Si Thin Films Fabricated by Dry Etch. *ES Materials & Manufacturing*.
19. Hao, Q., **Xiao, Y**., & Chen, Q. (2019). Determining phonon mean free path spectrum by ballistic phonon resistance within a nanoslot-patterned thin film. *Materials Today Physics*, *10*, 100126.
20. Hao, Q., Zhao, H., **Xiao, Y**., & Kronenfeld, M. B. (2018). Electrothermal studies of GaN-based high electron mobility transistors with improved thermal designs. *International Journal of Heat and Mass Transfer*, *116*, 496–506.
21. Hao, Q., Zhao, H., **Xiao, Y**., Wang, Q., & Wang, X. (2018). Hybrid electrothermal simulation of a 3-D fin-shaped field-effect transistor based on GaN nanowires. *IEEE Transactions on Electron Devices*, *65*(3), 921–927.
22. Hao, Q., Xu, D., Zhao, H., **Xiao, Y.**, & Medina, F. J. (2018). Thermal studies of nanoporous Si films with pitches on the order of 100 nm—Comparison between different pore-drilling techniques. *Scientific Reports*, *8*(1), 9056.
23. **Xiao, Y.**, Hong, Z., Zhao, G. C. H., Liang, R., Lucas, P., & Hao, Q. (2018). Thermal studies of three-dimensional printing using pulsed laser heating. *ES Materials & Manufacturing*, *1*(3), 21–26.
24. Xu, D., Hanus, R., **Xiao, Y.**, Wang, S., Snyder, G. J., & Hao, Q. (2018). Thermal boundary resistance correlated with strain energy in individual Si film-wafer twist boundaries. *Materials Today Physics*, *6*, 53–59.
25. Hao, Q., **Xiao, Y**., & Zhao, H. (2017). Analytical model for phonon transport analysis of periodic bulk nanoporous structures. *Applied Thermal Engineering*, *111*, 1409–1416.
26. Hao, Q., Zhao, H., & **Xiao, Y.** (2017). A hybrid simulation technique for electrothermal studies of two-dimensional GaN-on-SiC high electron mobility transistors. *Journal of Applied Physics*, *121*(20), 204501.
27. Hao, Q., Xu, D., **Xiao, Y**., Xiao, B., & Zhao, H. (2017). Nanostructures for Reduced Lattice Thermal Conductivity—Case Studies for Nanopores and Grain Boundaries. *ECS Transactions*,

80(5), 67.

28. Hao, Q., **Xiao, Y**., & Zhao, H. (2016). Characteristic length of phonon transport within periodic nanoporous thin films and two-dimensional materials. *Journal of Applied Physics*, *120*(6), 65101.

CONFERENCE PUBLICATIONS

1. **Y Xiao**, A Zou, D Carlson, et al. 3D-Printed Polymer-Based Conformal Space Radiation Shield with Heat Dissipation. *53rd International Conference on Environmental Systems*, Louisville, KY (2024)
2. **Y Xiao**, C Chen, Q Hao, Thermal Transport Study on Nanoslot-Patterned Thin Films. *2021 The Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Online (2021)
3. Q Hao, H Zhao, **Y Xiao**. Multi-Length Scale Electro-Thermal Simulations of GaN High Electron Mobility Transistors. *18th Conference on Compound and Semiconducting Materials, Microwave Devices, and Optoelectronic Devices in China*, Xiamen, China (2017)
4. Q Hao, D Xu, **Y Xiao** et al. Nanostructures for Reduced Lattice Thermal Conductivity — Case Studies for Nanopores and Grain Boundaries. *ECS Transactions* **80** (5), 67-75, *ECS Meeting*, National Harbor, MD (2017)
5. Q Hao, **Y Xiao**, H Zhao. Analytical Model for Lattice Thermal Conductivity Predictions of Periodic Nanoporous Structures. *ASME 2016 International Mechanical Engineering Congress and Exposition (IMECE)*, Phoenix, AZ (2016)

SELECTED CONFERENCE PRESENTATIONS

Presenter name underlined

1. **Y Xiao**, C Chen, M Uddi, et al. High-Efficiency Plasma-Assisted Methane Reforming. *American Vacuum Society 69*, Portland, OR (2023)
2. C Chen, **Y Xiao**, P Radyjowski, et al. Rapid and Controllable Cooling of High-Temperature Neutron Furnace. *2022 American Conference of Neutron Scattering*, Boulder, CO (2022)
3. **Y Xiao**, C Chen, M Uddi, et al. High-Efficiency Plasma-Assisted Methane Reforming and catalyst Decoking. *2022 IEEE Conference on Plasma Science*, Seattle, WA (2022)
4. **Y Xiao**, C Chen, M Uddi, et al. High-Efficiency Plasma-Assisted Methane Reforming. *2023 MRS Fall Meeting*, Boston, MA (2023)
5. **Y Xiao**, Q Chen, Q Hao, Thermal Transport Study on Nanoslot-Patterned Thin Films. *2021 The Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems*, Online (2021)
6. D Xu, **Y Xiao**, FJ Medina et al. Thermal Studies of Nanoporous Thin Films with Increased Periodic Nanopores. *2019 MRS Spring Meeting & Exhibit*, Phoenix, AZ (2019)
7. **Y Xiao,** Z Hong, G Coleman et al. Thermal Studies of 3D Printing Using Laser Curing of Polymers. *2018 MRS Spring Meeting & Exhibit*, Phoenix, AZ (2018)

PATENTS

1. **Xiao, Y**. et al., Dry Methane Reforming by Stacked Wire Dielectric barrier Discharge Plasma and Efficient Decoking Process in Plasma-Assisted Bi-reforming, U.S. Patent Application number 19/008,240 (Patent Pending, 2024)
2. **Xiao, Y**. et al., Braided Wire reactor for Plasma Decontamination, U.S. Patent Application number 19/008,982 (Patent Pending, 2024)
3. **Xiao, Y.** et al., Polymer-based Multi-Layer Multi-Functional Radiation Shielding, U.S. Patent Application number 18/882,313 (Patent Pending, 2024)
4. Chen, C-H., **Xiao, Y.** et al., Cooling Systems and Methods for a Vacuum Furnace, U.S. Non-Provisional Patent Application number 18/318,289 (Patent Pending, 2023)
5. **Xiao, Y.** et al., Methods for Recycling Oxidized metallic Substrates and Recycling Apparatuses for Oxidized Metallic Particles, U.S. Non-Provisional Patent Application number 18/185,138 (Patent Pending, 2022)

TEACHING EXPERIENCE

Instructor, The University of Alabama in Huntsville

- Statics, undergraduate course
- Introduction to Heat and Mass Transfer, undergraduate course

Teaching Assistant, Lehigh University

- Finite Element Analysis, undergraduate course
- Biomechanics, undergraduate course

Teaching Assistant, The University of Arizona

- Matlab I, II, undergraduate course
- Principles of Engineering Instrumentation and Measurements, undergraduate course
- Introduction to Heat Transfer, Undergraduate course

SYNERGISTIC ACTIVITIES

Proposal review:

- NIH SBIR Program Scientific Review Panel, 01/2026, 07/2025, 04/2025, 09/2024, 04/2024, 01/2024, 07/2023, 04/2023, 01/2023

Journal/Conference Peer review:

- *Advanced Composites and Hybrid Materials*
- *ES Materials and Manufacturing*
- *Carbon Letters*
- IEEE ITherm Conference 2022, 2023, 2024