JAEYUN MOON

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RESEARCH

Thermal and mechanical properties of materials; Structure of amorphous solids and liquids; Machine learning potential development; Computational material science; X-ray & neutron scattering, and laser spectroscopy

WORK EXPERIENCE

Assistant Professor — from July 2025
Department of Mechanical and Aerospace Engineering, University of Florida — *Gainesville, Fl*

Postdoctoral Scholar (Supervisor: Prof. Zhiting Tian) — September 2023 - May 2025
Sibley School of Mechanical and Aerospace Engineering, Cornell University — *Ithaca, NY*

Postdoctoral Scholar (Supervisor: Prof. Takeshi Egami) — February 2020 - August 2023
Materials Science and Technology Division, Oak Ridge National Laboratory — *Oak Ridge, TN*
Department of Materials Science and Engineering, University of Tennessee, Knoxville — *Knoxville, TN*

Visiting Scientist (Hosts: Profs. David Reis and Evan Reed) — September 2018 - September 2019
Stanford University/SLAC National Accelerator Laboratory — *Stanford, CA*

Summer Intern — June 2014 - August 2014
Samsung SDI — *Suwon, South Korea*

EDUCATION

PhD in Mechanical Engineering (Advisor: Prof. Austin Minnich), California Institute of Technology 2016 - 2020

MS in Mechanical Engineering (Advisor: Prof. Austin Minnich), California Institute of Technology 2014 - 2016

BS in Mechanical Engineering with the highest honor, Georgia Institute of Technology 2009 - 2014

AWARDS

International Union of Crystallography Young Scientist Award - US$1,050
Resnick Graduate Research Fellowship - US$115,000
Samsung Fellowship - US$250,000
Acosta Fellowship - US$25,000
SAMPE Tech Conference Outstanding Paper Award

PUBLICATIONS

#: equally contributing first authors; *: corresponding authors

Book

1. J. Moon*, *Heat Carriers in Liquids: An Introduction*, Springer, 2024
   With a foreword by Prof. Philip Allen at Stony Brook University

Journal publications

1. J. Moon*, T. Egami, (*in preparation*)

2. J. Moon*, (*invited article in preparation for Nanoscale*)
3. C. Cabero, J. Moon*, (*invited article in preparation for Journal of Materials Chemistry A*)
4. C. Cabero, J. Moon*, (*invited article in preparation for Chemical Physics Reviews*)
5. J. Moon*, M. Baggioli*, *Journal of Applied Physics*, 138, 15, 2025
6. J. Moon*, Z. Tian, Crystal-like thermal transport in amorphous carbon, *npj Computational Materials*, 11, 137, 2025
7. J. Moon*, L. Zella, L. Lindsay, Collective nature of phonon energies beyond harmonic oscillators, *Computational Materials Today*, 4, 100023, 2024
8. L. Zella, J. Moon, T. Egami*, Ripples in the potential energy landscape of metallic glass, *Nature Communications*, 15, 1, 2024
9. J. Moon*, S. Thébaud, L. Lindsay, T. Egami, Normal mode description of phases of matter: Application to heat capacity, *Physical Review Research*, 6, 1, 2024
10. J. Moon*, L. Lindsay, T. Egami, Atomic dynamics in fluids: Normal mode analysis revisited, *Physical Review E*, 108, 2023
11. L. Zella, J. Moon*, D. Keffer, T. Egami*, Transient nature of fast relaxation in metallic glasses, *Acta Materialia*, 239, 2022
12. J. Moon*, Examining normal modes as fundamental heat carriers in amorphous solids: The case of amorphous silicon, *Journal of Applied Physics*, 130, 5, 2021
13. J. Moon*, T. Egami, Enhancing elastic properties of single element amorphous solids through long-range interactions, *Applied Physics Letters*, 119, 5, 2021
14. T. Kim, J. Moon, A. J. Minnich*, Origin of micrometer-scale propagation lengths of heat-carrying acoustic excitations in amorphous silicon, *Physical Review Materials*, 5, 6, 2021
15. B. Sun#, S. Niu#, R. P. Hermann#, J. Moon, N. Shulumba, K. Page, B. Zhao, A. S. Thind, K. Mahalingam, J. Milam-Guerrero, R. Haiges, M. Mecklenburg, B. C. Melot, Y-D Jho, B. M. Howe, R. Mishra, A. Alatas, B. Winn, M. E. Manley*, J. Ravichandran*, A. J. Minnich*, High frequency atomic tunneling yields ultralow and glass-like thermal conductivity in chalcogenide single crystals, *Nature Communications*, 11, 1, 2020
16. J. Moon, R. P. Hermann, M. E. Manley, A. Alatas, A. H. Said, A. J. Minnich*, Thermal acoustic excitations with atomic-scale wavelengths in amorphous silicon, *Physical Review Materials*, 3, 6, 2019
17. F. DeAngelis, M. G. Muraleedharan, J. Moon, H. R. Seyf, A. J. Minnich, A. J. H. McGaughey, A. Henry*, Thermal Transport in disordered materials, *Nanoscale and Microscale Thermophysical Engineering*, 23, 2, 2019
18. J. Moon, B. Latour, A. J. Minnich*, Propagating elastic vibrations dominate thermal conduction in amorphous silicon, *Physical Review B*, 97, 2, 2018
19. J. Moon, A. J. Minnich*, Sub-amorphous thermal conductivity in amorphous heterogeneous nanocomposites, *RSC Advances*, 6, 107, 2016
20. B. A. Newcomb, L. A. Giannuzzi, K. M Lyons, P. V. Gulgunje, K. Gupta, Y. Liu, M. Kamath, K. McDonald, J. Moon, B. Feng, G. P. Peterson, H. G. Chae, S Kumar*, High resolution transmission electron microscopy study on polyacrylonitrile/carbon nanotube based carbon fibers and the effect of structure development on the thermal and electrical conductivities, *Carbon*, 93, 2015
21. A-T Chien, B. V. Gulgunje, H. G. Chae, A. S. Joshi, J. Moon, B. Feng, G. P. Peterson, S. Kumar*, *Polymer*, 54, 22, 2013
22. Z. Y. Ahmad, S. Didari, J. Moon, T. A. L. Harris* Computational Fluid Dynamics of Water Droplet Formation and Detachment from Gas Diffusion Layer, *ECS Transactions*, 45, 23, 2013

23. J. Moon, K. Weaver, B Feng*, H. G. Chae, S. Kumar*, J-B Baek, G. P. Peterson*, Note: Thermal conductivity measurement of individual poly(ether ketone)/carbon nanotube fibers using a steady-state dc thermal bridge method, *Review of Scientific Instruments*, 83, 1, 2012

RESEARCH PRESENTATIONS

Invited Talks and Seminars

1. University of Florida, Department of Materials Science and Engineering, 2025
   "Toward unified descriptors of atomic dynamics across phases"
2. Koç University, Mechanical Engineering Program, 2025
   "Towards unification of kinetic theories across phases"
3. University of Wyoming, Department of Mechanical Engineering, 2025
   "Towards unification of kinetic theories across phases"
4. University of Texas, Arlington, Department of Mechanical and Aerospace Engineering, 2025
   "Towards unification of kinetic theories across phases"
5. Mississippi State University, Michael W. Hall School of Mechanical Engineering, 2025
   "Towards unification of kinetic theories across phases"
6. Massachusetts Institute of Technology, Electrochemical Energy Laboratory, 2024
   "Rethinking phases of matter"
7. University of Maine, Department of Physics and Astronomy Seminar, 2024
   "Atomic view of thermal properties of liquids"
8. Louisiana State University, Department of Mechanical and Industrial Engineering Seminar, 2024
   "Atomic view of thermal properties of liquids"
9. Northeastern University, Department of Mechanical and Industrial Engineering Seminar, 2023
   "Atomic view of thermal and mechanical properties of liquids and glasses"
10. Hongik University, Department of Materials Science and Engineering Seminar, 2023
    "Characterization of complex atomic motion in liquids and glasses via atomic simulations"
11. Oak Ridge National Laboratory, Energy Materials Seminar Series, 2022
    "Microscopic view of heat capacity of matter"
12. Université Paris-Saclay, C2N Seminar, 2023
    "Characterization of complex atomic motion in liquids and glasses"
13. Yale University, Department of Mechanical Engineering and Materials Science Seminar, 2022
    "Atomic dynamics in liquids and glasses from thermal conduction to atomic diffusion"
14. Drexel University, Department of Mechanical Engineering and Mechanics Seminar, 2021
    "Atomic dynamics in liquids and glasses from thermal conduction to atomic diffusion"
15. NVIDIA, 2019
    "Transport phenomena in amorphous materials: towards the extreme lower limits of thermal conductivity"
16. Exponent, 2019
    "Transport phenomena in amorphous materials: towards the extreme lower limits of thermal conductivity"
17. Stanford University, 2018
    "Transport phenomena in amorphous materials: towards the extreme lower limits of thermal conductivity"

Conferences

- Various research talks at ASME, MRS, APS, and TMS meetings.

PROFESSIONAL ACTIVITIES

- Technical reviewer for over 45 manuscripts submitted to:
  Nature Physics, Physical Review X, Physical Review Letters, Physical Review Materials, Physical Review B, Materials Today Physics, npj Computational Materials, Cell Reports Physical Science, Physical Status Solidi (RRL) - Rapid Research Letters, New Journal of Physics, Applied Physics Letters, The Journal of Chemical Physics, Material Science and Engineering B, Semiconductor Science and Technology, International Journal of Thermal Sciences, International Journal of Heat and Mass Transfer, ASME Heat Transfer Conference Proceedings
- Member of ASME Heat Transfer Division K9 Committee on Nanoscale Thermal Transport
- Session chair: International Union of Pure and Applied Physics (IUPAP) Conference on Computational Physics (2025)
- Session chair: MRS Spring Meeting (2024) for Symposium EN07 - Thermal Transport and Energy Conversion.
- Professional memberships: American Society of Mechanical Engineering (ASME), Materials Research Society (MRS), and American Physical Society (APS), The Minerals, Metals, & Materials Society (TMS)
- Lead guest editor for *Journal of Applied Physics* for Special Topic, *Disordered Materials at the Atomic Scale* (30 papers published)

TEACHING/MENTORSHIP/SERVICE AT UNIVERSITY OF FLORIDA

- Courses taught: EML 4140 Heat Transfer, Fall 2025
- Graduate students advised: Carla Cabero del Hierro and Subham Pandey
- Undergraduate students advised: Grant Roberts, Conner Riley, Gregory Dina, Arya Banapur, and Jared Paulovich
- Committees served: Mechanical and Aerospace Engineering Seminar Committee and Mechanical and Aerospace Engineering Recruit & Admissions Committee