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Postdoctoral Scholar - Research Associate
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Pronouns: he/him/his

EDUCATION

- 2024 **University of Illinois Urbana - Champaign**, Urbana, IL
Ph.D. in Theoretical and Applied Mechanics
NSF NRT Trainee (*DIGI-MAT*) w/ Graduate Concentration in Data Science & Engineering
Dept. of Mechanical Science & Engineering
Advisor: Harley T. Johnson, Ph.D.
Towards Data-Driven Inverse Design for Materials and Structures
- 2010 **University of Wisconsin - Madison**, Madison, WI
M.S. in Mechanical Engineering
Dept. of Mechanical Engineering
Advisors: Frank Pfeifferkorn, Ph.D., and Kevin Turner, Ph.D.
Development and Calibration of Microscale Heat Flux Sensors Fabricated on Bulk Copper Substrates
- 2008 **University of Wisconsin - Madison**, Madison, WI
B.S. in Mechanical Engineering
w/ Certificate in Business
Dept. of Mechanical Engineering

PROFESSIONAL EXPERIENCE

- 2024 - Postdoctoral Scholar - Research Associate
Prof. Krishna Garikipati's group
University of Southern California, Los Angeles, CA
- 2017 - 2020 Mechanical Engineer
Design and production of high-yield neutron sources for medicine, defense and energy sectors.
- 2010 - 2017 Senior Mechanical Design Engineer
Concept, design, verification, and manufacturing transfer for devices in healthcare, industrial, defense/aerospace, and telecom.

PUBLICATIONS AND PATENTS

See *Google Scholar* for a research impact summary.

Journal Articles (Peer-Reviewed)

- 2025 M. F. Shojaei*, R. Gulati*, **B. A. Jasperson***, S. Wang, S. Cimolato, D. Cao, M. Vardhan, W. Neiswanger, and K. Garikipati, "AI University: An LLM-Based Learning Assistant Aligned with Course-Specific Content in the Finite Element Method," under review, *Transactions on Machine Learning Research*, <https://arxiv.org/abs/2504.08846>, 2025. (* Equal Contribution)
- 2025 **B. A. Jasperson**, I. Nikiforov, B. Runnels, H. T. Johnson, and E. B. Tadmor, "Fundamental microscopic properties as predictors of large-scale quantities of interest: Validation through grain boundary energy trends," *Acta Materialia*, p. 120722, Jan. 2025.
- 2025 **B. A. Jasperson**, I. Nikiforov, A. Samanta, F. Zhou, E. B. Tadmor, V. Lordi, and V. V. Bulatov, "Cross-scale covariance for material property prediction," *npj Computational Materials*, vol. 11, no. 1, p. 1, Jan. 2025.

- 2024 **B. A. Jasperson** and H. T. Johnson, “A data-driven method for optimization of classical interatomic potentials,” *MRS Advances*, vol. 9, no. 11, pp. 863–869, Mar. 2024
- 2024 **B. A. Jasperson**, M. G. Wood, and H. T. Johnson, “A dual neural network approach to topology optimization for thermal-electromagnetic device design,” *Computer-Aided Design*, vol. 168, p. 103665, Mar. 2024
- 2014 **B. A. Jasperson**, J. Schmale, W. Qu, F. E. Pfefferkorn, and K. T. Turner, “Thin film heat flux sensors fabricated on copper substrates for thermal measurements in microfluidic environments,” *J. Micromech. Microeng.*, vol. 24, no. 12, p. 125018, Dec. 2014.
- 2010 **B. A. Jasperson**, Yongho Jeon, K. T. Turner, F. E. Pfefferkorn, and Weilin Qu, “Comparison of micro-pin-fin and microchannel heat sinks considering thermal-hydraulic performance and manufacturability,” *IEEE Trans. Comp. Packag. Technol.*, vol. 33, no. 1, pp. 148–160, Mar. 2010.

Conference Proceedings (Peer-Reviewed)

- 2009 C. Konishi, W. Qu, **B. A. Jasperson**, F. Pfefferkorn, and K. T. Turner, “Experimental study of adiabatic water liquid-vapor two-phase pressure drop across an array of staggered micro-pin-fins,” *ASME International Mechanical Engineering Congress and Exposition Proceedings*, v10, p 1597-1605, 2009.

Conference Proceedings

- 2021 M. Wood, A. McKay, T. Morin, D. Serkland, T. Luk, S. Wolfley, L. Gastian, J., **B. A. Jasperson**, and H. T. Johnson, “Optically-triggered optical limiters for short-wavelength infrared sensor protection,” presented at CLEO, virtual, STh1E.3, 2021
- 2010 **B. A. Jasperson**, F. E. Pfefferkorn, W. Qu, and K. T. Turner, “A thin-film heat flux sensor fabricated on copper for heat transfer measurements in parallel channel heat sinks,” in *Proceedings of the 5th International Conference on Micromanufacturing*, p 437-444, 2010.

Patents

- 2019 P. Anderson, K. Novak, K. McLennan, M. Mackaplow, G. Song, G. S. Dhami, **B. Jasperson**, S. Smieja, M. Svacina, “Devices and methods for delivering a beneficial agent to a user,” 10213546, Feb. 26, 2019.

Journal Articles (in progress)

- 2025 **B. A. Jasperson**, Q. T. Tran, I. D. Boureima, H. Mourad, and K. Garikipati, “A global-local approach to phase-field fracture mechanics using an integrated machine learning-PDE solver”
- 2025 I. Nikiforov, D. Karls, C. Waters, E. Fuemmeler, **B. A. Jasperson**, K. Sheriff, J. E. Ogbebor, R. Freitas, G. Zhang, P. Hoellmer, T. Egg, S. Martiniani, R. Elliott, N. Bernstein, Cyberloop Personnel, AFLOW Personnel, and E. B. Tadmor, “Crystal Genome: OpenKIM interatomic potential testing framework for arbitrary AFLOW crystal prototypes”
- 2025 R. Gulati, **B. A. Jasperson**, J. Zhang, O. Liu, M. Vardhan, D. Cao, W. Neiswanger, and K. Garikipati, “Benchmarking spatiotemporal foundation models for accuracy and stability of physics forecasting”

INVITED TALKS

- 2024 “Towards data-driven inverse design for materials and structures”
National Institute of Standards and Technology (NIST), Thermodynamics and Kinetics Group

CAMPUS / DEPARTMENTAL TALKS

- 2023 "Towards data-driven inverse design for materials and structures," seminar speaker, Virtual, iShare seminar series (UIUC, UIC, Duke), July 2023
- 2022 "Optimization of an optical shutter using machine learning," Sandia Academic Alliance - University of Illinois LDRD Mini-Conference, Urbana, IL, Sept 2022.
- 2022 "Experiences / lessons learned from post-grad school industry life," UIUC, DIGI-MAT Professional Development Seminar, July 2022
- 2021 "Rclone," UIUC, DIGI-MAT Professional Development Seminar, July 2021

RESEARCH / CONFERENCE PRESENTATIONS

Presentations Given

- 2025 **B. Jasperson**, R. Gulati, Q. T. Tran, I. D. Boureima, H. Mourad, K. Garikipati, "Machine learning solvers for phase-field fracture mechanics," Society of Engineering Science (SES) Annual Technical Meeting, Atlanta, GA, Oct 12-15, 2025
- 2025 **B. Jasperson**, Q. T. Tran, I. D. Boureima, H. Mourad, K. Garikipati, "A global-local approach to phase-field fracture mechanics using an integrated machine learning-PDE solver," 18th U.S. National Congress on Computational Mechanics (USNCCM), Chicago, IL, July 20-24, 2025
- 2025 **B. Jasperson**, M. F. Shojaei, R. Gulati, S. Wang, S. Cimolato, D. Cao, W. Neiswanger, K. Garikipati, "Creating an AI Professor for a finite element methods course," Engineering Mechanics Institute Conference (EMI 2025), Anaheim, CA, May 27-30, 2025
- 2025 **B. Jasperson**, I. Nikiforov, A. Samanta, F. Zhou, B. Runnels, H. Johnson, V. Lordi, V. Bulatov, E. Tadmor, "Cross-scale covariance for material property prediction," Engineering Mechanics Institute Conference (EMI 2025), Anaheim, CA, May 27-30, 2025
- 2024 **B. Jasperson**, H. Johnson, "Towards data-driven inverse design for interatomic potentials," Engineering Mechanics Institute Conference and Probabilistic Mechanics & Reliability Conference (EMI/PMC 2024), Chicago, IL, May 27-30, 2024.
- 2023 **B. Jasperson**, H. Johnson, "Using data and machine learning to simplify and accelerate inverse design and model development in materials," poster, Society of Engineering Science (SES) Future Faculty Symposium, Minneapolis, MN, Oct 8-11, 2023.
- 2023 **B. Jasperson**, I. Nikiforov, H. Johnson, E. Tadmor, "Predicting grain boundary energy from few-atom simulations: A study across interatomic potentials," Society of Engineering Science (SES) Annual Technical Meeting, Minneapolis, MN, Oct 8-11, 2023.
- 2023 **B. Jasperson**, M. Wood, H. Johnson, "Inverse design and fabrication of a vanadium dioxide optical device using a dual neural network topology optimization approach," 17th U.S. National Congress on Computational Mechanics (USNCCM), Albuquerque, NM, July 23-27, 2023.
- 2022 **B. Jasperson**, M. Wood, H. Johnson, "Optimization of an optical shutter using machine learning," Society of Engineering Science (SES) Annual Technical Meeting, College Station, TX, Oct 16-19, 2022.
- 2022 **B. Jasperson**, "Optimization of an optical shutter using machine learning," Harnessing Data for Materials Symposium, Chicago, IL, Aug 19-30, 2022.
- 2010 **B. Jasperson**, F. Pfefferkorn, W. Qu, K. Turner, "A thin-film heat flux sensor fabricated on copper for heat transfer measurements in parallel channel heat sinks," 5th International Conference on Micromanufacturing (ICOMM), Madison, WI, April 5-8, 2010.

Coauthored Presentations (selected)

- 2025 E. Tadmor, **B. Jasperson**, I. Nikiforov, A. Samanta, F. Zhou, B. Runnels, H. Johnson, V. Lordi, V. Bulatov, “Cross-scale covariance for material property prediction,” presented at APS Global Physics Summit, Mar 16-21, 2025.
- 2025 R. Gulati, **B. Jasperson**, K. Garikipati, “Transformer models in continuum mechanics,” presented at SIAM Conference on Computational Science and Engineering, Fort Worth, TX, Mar 3-7, 2025
- 2009 B. Smith, **B. Jasperson**, and S. Manakasettharn, “Micro-machined molds for manufacturing micro-fluidic devices using soft lithography,” poster, presented at International Manufacturing Science and Engineering Conference-MSEC, West Lafayette, IN, Oct 4-7, 2009.

RESEARCH EXPERIENCE

- 2020 - 2024 Research Assistant, Prof. Harley Johnson’s group
University of Illinois Urbana-Champaign, Urbana, IL
- 2023 DIGI-MAT Graduate Internship, Prof. Ellad Tadmor’s group
University of Minnesota Twin Cities, Minneapolis, MN
- 2021 - 2023 National Science Foundation (NSF) NRT Trainee
University of Illinois Urbana-Champaign, Urbana, IL
- 2008 - 2010 Research Assistant, Prof. Frank Pfefferkorn’s and Prof. Kevin Turner’s groups
University of Wisconsin - Madison, Madison, WI

TEACHING AND MENTORING EXPERIENCE

- 2026 Instructor, USNC/TAM26 Short Course, “Foundation Models in Mechanics,” June 2026 (accepted course)
- 2026 Guest lecturer, Machine Learning and Computational Physics (AME 508),
University of Southern California
- 2025 Instructor, USNCCM Short Course, “Fine-tuning large language models for Computational Mechanics,” July 2025
- 2025 “Cross-scale covariance for material property prediction,” MSE 598 guest lecturer,
University of Illinois Urbana-Champaign, Spring 2025 ([link](#))
- 2024 - Mentor to multiple master’s students, Prof. Krishna Garikipati’s group,
University of Southern California
- 2023 Teaching Assistant, Introductory Solid Mechanics (TAM251),
University of Illinois Urbana-Champaign, Fall 2023
- 2022 - 2023 Mentor, Undergraduate Research Apprenticeship Program (URAP),
University of Illinois Urbana-Champaign
- 2017 - 2020 “Project Planning for Engineers,” ME 490 Senior Design guest lecturer,
Milwaukee School of Engineering
- 2016 - 2018 “Prototyping,” ME Senior Design guest lecturer,
University of Wisconsin-Madison
- 2012 Mentor, FIRST Robotics,
NEW Apple Corps - Team 93 (Appleton, WI)
- 2010 - 2020 Industry mentor for multiple interns and full-time hires

AWARDS, GRANTS AND ACHIEVEMENTS

- 2024 Top ten finalist, USNC/TAM 5MT Virtual Thesis Competition

- 2023 List of “Teachers Ranked as Excellent by Their Students”
University of Illinois Urbana-Champaign, Fall 2023
- 2023 Accepted to the Future Faculty Symposium
Society of Engineering Science, 2023
- 2023 Mavis Future Faculty Fellow (MF3)
University of Illinois Urbana - Champaign
- 2021 - 2023 NSF Graduate Traineeship
DIGI-MAT: Data and Informatics Graduate Intern-Traineeship: Materials at the Atomic Scale
University of Illinois Urbana - Champaign
- 2014 Article selected as “Highlights of 2014”, *J. Micromech. Microeng.*
- 2008 Graduated with Distinction
University of Wisconsin, Madison

LICENSES AND CERTIFICATIONS

- 2024 Certificate in Foundations of Teaching
Center for Innovation in Teaching & Learning (CITL)
University of Illinois Urbana-Champaign
- 2023 Graduate College Mentoring Certificate
University of Illinois Urbana-Champaign
- 2016 - Professional Engineer (P.E.), State of Wisconsin (Credential/License #45161)

ACADEMIC AND PROFESSIONAL SERVICE

- 2026 Session co-chair and organizer, “Foundation models for mechanics” Minisymposium, 20th U.S. National Congress of Theoretical and Applied Mechanics, Pasadena, CA, June 21-25, 2026 (accepted)
- 2025 - Journal Reviewer: Journal of Nonlinear Science
- 2024 Volunteer Judge, Undergraduate Research Symposium
University of Illinois Urbana - Champaign
- 2021 - 2022 Students Advising on Graduate Education (SAGE)
University of Illinois Urbana - Champaign
- 2021 - USACM - Member
- 2019 - ASME - Member
- 2005 - Tau Beta Pi – Wisconsin Alpha Chapter, Illinois Alpha Chapter

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