Benjamin A. Jasperson, Ph.D., P.E.

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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 Pfefferkorn, 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)

2026 **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"

2026 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"

2026 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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