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

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Pronouns: he/him/his

EDUCATION

2024 **University of Illinois Urbana - Champaign**, Urbana, IL
Ph.D. in Theoretical and Applied Mechanics
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
Start-up company designing and producing high-yield neutron sources for medicine, defense and energy sectors.

2010 - 2017 Senior Mechanical Design Engineer
Design and manufacturing company focused on projects in healthcare/life sciences, industrial/commercial, defense/security/aerospace, and networking/telecommunications.

PUBLICATIONS AND PATENTS

See *Google Scholar* for a research impact summary.

Journal Articles (Peer-Reviewed)

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)

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 Adapted to Course-Specific Content in Engineering Science," submitted manuscript, *Association for the Advancement of Artificial Intelligence (AAAI) Conference on Artificial Intelligence*, https://arxiv.org/abs/2504.08846, 2025.

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.

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," accepted presentation, 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) Graduate 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

2025	Instructor, USNCCM Short Course, "Fine-tuning large language models for Computational Mechanics," Summer 2025
2025	"Cross-scale covariance for material property prediction," MSE 598 guest lecturer, University of Illinois Urbana-Champaign, Spring 2025 (*link*)
2024 -	Mentor to two 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	DIGI-MAT NSF Graduate Traineeship
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

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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