

DARSHAN BAMNEY

EDUCATION

- 2021 **Doctor of Philosophy, Materials Science and Engineering**, University of Florida
Cumulative GPA - 3.90 / 4.00
- 2017 **Masters of Science, Materials Science and Engineering**, University of Florida
Cumulative GPA - 3.84 / 4.00
- 2015 **Bachelors of Engineering, Mechanical Engineering**, M. S. Ramaiah Institute of
Technology (India)
Cumulative GPA - 9.33 / 10.00

RESEARCH EXPERIENCE

- 2021 **Graduate Research Assistant**, University of Florida
Advisor: Dr. Douglas E. Spearot, Ph.D.
Dissertation Title: Mesoscale Modeling of Defect-Mediated Plasticity in Metals
- Developed and implemented frameworks and tools for the discrete dislocation dynamics (DDD) simulation method to investigate dislocation-mediated plasticity in metals
- Developed and implemented virtual x-ray diffraction (XRD) algorithms for generating line profiles from dislocation microstructures obtained using DDD
 - Generated virtual XRD line profile databases for aluminum, tantalum, and iron, which have been used to train machine learning models to quantify dislocation densities from experimentally measured XRD profiles
 - Implemented atomistically-derived dislocation mobility laws to accurately characterize the role of dislocation core structure on the kinetics of dislocation slip and the evolution of dislocation networks
 - Developed and implemented a framework for modeling equilibrium and non-equilibrium grain boundary structures in DDD, which has been used to gain new insights into the influence of intergranular stresses on dislocation slip transmission in aluminum
- 2019 **Visiting Scientist**, Los Alamos National Laboratory
Mentor: Dr. Laurent Capolungo, Ph.D.
- Collaborated with postdoctoral researchers and staff scientists in the Materials Science in Radiation and Dynamics Extremes group at Los Alamos National Laboratory on the development of algorithms and methods for discrete dislocation dynamics

2017 **Student Researcher**, University of Florida
Mentor: Dr. Bhavani Sankar, Ph.D.

Analyzed the biaxial flexural deformation behavior of hydroxyapatite-polysulfone laminated composites using the finite element method

- Simulated and analyzed stress distributions in laminates with different layer thickness ratios to identify the influence of layer thicknesses on the principal tensile and the interlaminar shear stresses, which determine the load bearing capacity of the composite

INDUSTRY EXPERIENCE

2016 **Foundry Engineering Intern, Foundry**, Federal Mogul-Powertrain

Assisted managers and engineers at the foundry in Federal Mogul-Powertrain's South Bend plant on several key projects

- Performed start-up curve analyses to investigate and validate the reliability of the aluminum piston casting process in the foundry
- Assessed, organized, and inventoried casting die components, and developed a die database
- Designed and performed experiments to improve the ladle coating process and developed standard operating instructions to reduce scrap due to oxide and improve overall quality of cast aluminum pistons

TEACHING EXPERIENCE

2018 **Graduate Teaching Assistant, Department of Materials Science and Engineering**, University of Florida

Assisted instructors in designing and grading coursework, assignments, quizzes, projects, and exams for two graduate courses (diffusion, kinetics, and phase transformations and introduction to materials) with up to 80 students

- Administered course content using e-learning technologies (Canvas and WileyPLUS)
- Provided additional support through office hours and review sessions

2017 **Teaching Assistant (Grading), Department of Mechanical and Aerospace Engineering**, University of Florida

Assisted instructor in designing and grading assignments, quizzes, and exams for an undergraduate course in finite element analysis and design

JOURNAL PUBLICATIONS

- 2021 Bamney, D., Capolungo, L., Spearot, D.E. (2021) “**Role of equilibrium and non-equilibrium grain boundary stress fields on dislocation transmission**”, *Journal of Materials Research*, submitted
- 2021 Tallman, A.E., Pokharel, R., Bamney, D., Spearot, D.E., Lebensohn, R.A., Brown, D., Capolungo, L. (2021) “**Data-driven analysis of neutron diffraction line profiles: Application to plastically deformed Ta**”, *npj Computational Materials*, submitted
- 2020 Bamney, D., Tallman, A., Capolungo, L., Spearot, D.E. (2020) “**Virtual diffraction analysis of dislocations and dislocation networks in discrete dislocation dynamics simulations**”, *Computational Materials Science*, 174, 109473
- 2020 Dang, K.Q., Bamney, D., Capolungo, L., Spearot, D.E. (2020) “**Mobility of dislocations in aluminum: Role of non-Schmid stress state**”, *Acta Materialia*, 185, 420-432
- 2019 Dang, K.Q., Bamney, D., Bootsita, K., Capolungo, L., Spearot, D.E. (2019) “**Mobility of dislocations in aluminum: Faceting and asymmetry during nanoscale dislocation shear loop expansion**”, *Acta Materialia*, 168, 426-435

PRESENTATIONS

- 2021 Bamney, D., “**Advancements in Discrete Dislocation Modeling of Slip Transmission through Equilibrium and Non-equilibrium Grain Boundaries**”, *The Minerals, Metals & Materials Society*, Annual Meeting (Virtual), March 2021
- 2020 Bamney, D., “**Hierarchical Multiscale Study of the Role of Dislocation Mobility on Plasticity in Aluminum**”, *Society of Engineering Science*, Virtual Technical Meeting, September 2020
- 2020 Bamney, D., “**Modeling of Dislocation-Mediated Plasticity at the Mesoscale**”, *Department of Materials Science and Engineering at the University of Florida*, Student Structural Materials Seminar, Gainesville, Florida, July 2020
- 2020 Bamney, D., “**Hierarchical Integration of Atomistically-derived Dislocation Mobility Laws into Discrete Dislocation Dynamics Simulations**”, *The Minerals, Metals & Materials Society*, Annual Meeting, San Diego, California, March 2020
- 2019 Bamney, D., “**Virtual Diffraction Analysis of Microstructural Features in Discrete Dislocation Dynamics Simulations**”, *The Minerals, Metals & Materials Society*, Annual Meeting, San Antonio, Texas, March 2019

SERVICE AND VOLUNTEERING

- 2020 **Organizing Committee Member, Department of Materials Science and Engineering**, University of Florida
- Organized and moderated talks for the Student Structural Materials Seminar series, which is a 1-hour, monthly meeting for graduate students in the department with a research focus in structural materials
- 2021 **Assistant Instructor, Cuong Nhu Martial Arts (Cypress Dojo)**, University of Florida
- Led martial arts training sessions and assisted senior black belts in training Cuong Nhu Martial Arts practitioners at the University of Florida
- 2016 **Mentor, MentorUF**, University of Florida
- Mentored middle school students at Kanapaha Middle School and Lincoln Middle School in Gainesville, Florida, for three semesters and tutored and helped mentees with school homework, sports practice, and final projects

HONORS AND AWARDS

- 2020 **Outstanding Achievement Award**, Herbert Wertheim College of Engineering, University of Florida
- Recipient of award given to only 15 students for outstanding academic achievement, strong leadership skills, and community engagement
- 2016 **Achievement Award Scholarship for Engineering Graduate Students**, Herbert Wertheim College of Engineering, University of Florida
- Recipient of the scholarship of amount \$4500
- 2016 **Member**, Alpha Epsilon Lambda, University of Florida
- Inducted into Alpha Epsilon Lambda, which is a national graduate honors society that admits the top 1% (on the basis of academic merit) of the graduate student population at UF

TECHNICAL SKILLS

Programming Languages and Softwares – Matlab, Fortran, Bash, Python, ParaView, Abaqus
Languages – English, Hindi, Kannada, German

WEBSITES

Website – <https://dbamney.github.io>

LinkedIn - <https://www.linkedin.com/in/dbamney/>