

CALEB FOSTER

calebfoster95@gmail.com • College Station, TX • 662-341-2211

EDUCATION

Texas A&M University

Ph.D. in Mechanical Engineering

GPA: 3.90/4.00

Graduation: May 2024

Mississippi State University

B.S. in Mechanical Engineering

Summa Cum Laude

GPA: 3.95/4.00

Graduation: May 2019

RESEARCH INTERESTS

- Computational solid mechanics, particularly in high-strain rate environments
- Enhanced material properties of metal alloys, especially for automotive, defense, and aerospace applications
- Increasing the knowledge of the fundamental mechanisms of materials through multiscale modeling, constitutive modeling, and finite element modeling.

RESEARCH EXPERIENCE

Nonequilibrium Phenomena Laboratory, Texas A&M University

Dr. Justin Wilkerson

Graduate Assistant Researcher, September 2019 – Present

- Studying how realistic microstructure affects strain localization in Finite Element (FE) simulations of ballistic penetration.
- Investigating factors that affect the ductility and spall strength of magnesium alloys in ballistic impact environments.
- Creating a bridge between phenomenological and physics-based material models.

Nonlinear Mechanics and Dynamics Research Institute, Sandia National Laboratories

Dr. Rob Kuether

Summer Intern, June 2019 – August 2019

- Conducted Finite Element Analysis (FEA) research on nanoindentation of heterogeneous materials in conjunction with the University of New Mexico (UNM)
- Created a set of models that could be used to extract material properties of the different heterogeneous configurations in order to study the effectiveness of approximating these composites as homogenized models.

Computational Mechanics and Materials Laboratory, Mississippi State University

Dr. Matthew Priddy

Undergraduate Researcher, August 2018 – May 2019

- Studied the effects of porous structures to help reduce the stiffness of Ti-6Al-4V spinal implants.
- Presented on the research at the Mississippi State University Undergraduate Research Symposium.

Center for Advanced Vehicular Systems, Mississippi State University

Dr. Mark Horstemeyer & Dr. Youssef Hammi

Undergraduate Researcher, May 2017 – August 2017

- Prepared CAD models of innovative designs for worm gears for FEA simulations.
- Imported, assembled, and meshed parts in Abaqus and resolved imprecise geometry problems.

Center for Advanced Vehicular Systems, Mississippi State University

Dr. Mark Horstemeyer

Undergraduate Researcher, May 2016 – August 2016

- Conducted FEA on models of an improved foam football helmet liner.
- Ran an optimization study of different foam types and thicknesses using explicit FE simulations.

Center for Advanced Vehicular Systems, Mississippi State University

Dr. Raj Prabhu & Dr. Mark Horstemeyer

Undergraduate Researcher, May 2015 – August 2015

- Performed uncertainty analysis of large amounts of geologic data.
- Perused hundreds of journal articles containing K-Ar and Ar-Ar dating of geologic specimens.
- Sorted data by geographical location for further analysis.

INDUSTRY EXPERIENCE

Stamping Department, Honda Manufacturing of Alabama

Engineering Co-op, May 2018 – August 2018

- Headed up projects to improve ergonomics and workflow in vehicle panel stamping.
- Projects included improving ergonomics by reducing the weight lifted by associates for different panels and improving a conveyor system to carry parts to the stamping press line.

Frame Assembly Quality Department, Honda Manufacturing of Alabama

Engineering Co-op, August 2017 – December 2017

- Worked to improve consistency and quality of vehicle assembly.
- Projects included improving quality in the rear and front suspension stabilizer links by analyzing tool data and ensuring that the equipment was in spec.

Web Design Department, FGen Solutions

Web Designer, August 2013 – August 2019

- Oversaw the entire web design process including meetings with clients, visual design, content creation, and responsive design integration.
- Continually updated and made changes to the websites as needed per the customers' requests.

PUBLICATIONS

- **C. Foster**, A. Olinger, D. Mallick, and J.W. Wilkerson, “A Representative Unit Cell for Impact Models from a Characterized Microstructure.” In preparation for *Mechanics of Materials*.
- B. Ravaji, S. Datta, **C. Foster**, J.T. Lloyd, J.W. Wilkerson, and S.P. Joshi, “[Texture effects and rate-dependent behaviors of notched magnesium bars](#),” *Mechanics of Materials*, September 2, 2021.
- A. Olinger, **C. Foster**, J. Lloyd, and J.W. Wilkerson, “[Homogenized modeling of anisotropic impact damage in rolled AZ31b magnesium](#),” *Journal of Dynamic Behavior of Materials*, September 25, 2020.

PRESENTATIONS

- **C. Foster**, A. Olinger, and J.W. Wilkerson, “Homogenized Modeling of Anisotropic Impact Damage in Rolled AZ31B with Aligned Second-Phase Particles,” at 19th U.S. National Congress on Theoretical and Applied Mechanics, June 19-24, 2022.
- **C. Foster** and J.W. Wilkerson, “Modeling the Ballistic Performance of Magnesium Alloys,” at 2022 Mach Conference, April 6-8 2022.
- **C. Foster**, A. Olinger, and J.W. Wilkerson, “Homogenized Modeling of Anisotropic Impact Damage in Rolled AZ31B with Aligned Second-Phase Particles,” at 2021 Mach Conference, April 7-9, 2021.
- **C. Foster**, B. Gurrutxaga-Lerma, and J.W. Wilkerson, “Effect of Spatial Variations on Instabilities and Fracture,” at Materials in Extreme Dynamic Environments (MEDE) 2020 Fall Meeting, October 15, 2020.
- **C. Foster**, I. Mihalic, A. Olinger, T. Nguyen, and J.W. Wilkerson, “Implications of Void Nucleation at Realistic Second-Phase Particles on Spall Failure,” at MEDE 2020 Fall Meeting, October 15, 2020.
- A. Olinger, **C. Foster**, T. Nguyen, and J.W. Wilkerson, “Void Dominated Failure: Implications of Void Nucleation at Realistic Second-Phase Particles and Grain/Twin Boundaries on Spall Failure,” at MEDE 2019 Fall Meeting, October 17, 2019.
- **C. Foster**, B. Piñeyro, B. Tucker-Roper, Y.L. Shen, and T. Khraishi, “Indentation in Porous Materials: Factors Affecting the Indentation Results and a Comparison to Bulk Material Testing,” at Nonlinear Mechanics and Dynamics (NOMAD) Research Institute, August 1, 2019.
- **C. Foster**, D.P. Failla, and M.W. Priddy, “Porous Spinal Implants Using Additive Manufacturing,” at Mississippi State University Spring 2019 Undergraduate Research Symposium, April 16, 2019.

SKILLS

- FE Programs: Abaqus, Sierra, CUBIT
- SolidWorks: Certified SolidWorks Associate
- CATIA
- MATLAB
- Mathcad
- Programming Languages: Python, C, FORTRAN
- LaTeX
- Web Design: WordPress, Wix, CSS, HTML
- Automotive Repair: Powertrain, Body & Chassis, Electrical
- Plant Safety Protocol Training
- Machining and Power Tool Operation
- AutoCAD: Working Knowledge

PROFESSIONAL ACTIVITIES

- Texas A&M Mechanical Engineering Graduate Student Organization (MEGSO): *(2019 – Present)*
 - Treasurer *(2021 – Present)*
 - Social Events Officer *(2020 – 2021)*
- Tau Beta Pi Engineering Honor Society: *Member (2018 – Present)*
- Plasticity Journal Club at Texas A&M: *Co-Founder (2020 – Present)*
- Phi Kappa Phi Honor Society: *Member (2017 – 2021)*
- Aggies Invent: *Graduate Mentor (October, 2020)*
- Christian Engineering Leaders: *Member (2019 – 2020)*
- Mississippi State University SAE Chapter: *Treasurer (2016 – 2017)*
- Mississippi State University Shackouls Honors College: *Member (2014 – 2019)*

SERVICE AND COMMUNITY ACTIVITIES

- Aggie West Coast Swing Dance Club: *(2019 – Present)*
 - President *(2022 – Present)*
 - Treasurer *(2021 – 2022)*
 - Events Coordinator *(2020 – 2021)*
- OnRamp: *Vehicle Team Volunteer (2021 – Present)*
- Junction Young Adults Ministry: *(2021 – Present)*
 - Connect Team Volunteer *(2021 – Present)*
- Solo Pianist for Weddings and Events *(2013 – 2019)*
- Mississippi State University Baptist Student Union: *(2015 – 2018)*
 - Small Group Leader *(2017 – 2018)*
- Church of Tibbee Volunteer Group: *Volunteer (2010 – 2018)*
- Boys and Girls Club of Starkville: *Volunteer (2016)*

HONORS AND AWARDS

- NDSEG Fellowship Recipient (2021)
- NSF GRFP Fellowship Recipient (2021)
- James J. Cain Outstanding Graduate Student Award (2021)
- Materials in Extreme Dynamic Environments (MEDE) – Materials for Strategic Advantage (MSA) Research Fellowship Recipient (Summer, 2020)
- Sally & Ray Bowen '58 Fellowship Recipient (2019 – 2021)
- 2nd Place in the Mississippi State University Public Health Research Competition (2019)
- 3rd Place at the Mississippi State University Undergraduate Spring Research Symposium (2019)
- John H. Caldwell, Sr. Scholarship Recipient (2014 – 2018)
- Shackouls Honors College Summer Research Fellowship Recipient (Summer, 2015)
- National Merit Scholar (2014)