

*Curriculum Vitae*

TONYA W. STONE

ASSOCIATE PROFESSOR, DEPT. OF MECHANICAL ENGINEERING, MISS. STATE UNIVERSITY

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<b>Education</b>	2006- 2009	<u>Mississippi State University</u>	Mississippi State, MS
	<i>Ph.D., Mechanical Engineering</i>		
	<ul style="list-style-type: none"><li>▪ GPA: 4.0/4.0</li><li>▪ Dissertation Title: Multiscale Friction using a Nested Internal State Variable Model for Particulate Materials</li><li>▪ Advisor: Professor Mark Horstemeyer (Ph.D., Georgia Institute Technology)</li></ul>		
	2004- 2006	<u>Mississippi State University</u>	Mississippi State, MS
	<i>M.Sc., Mechanical Engineering</i>		
	<ul style="list-style-type: none"><li>▪ GPA: 4.0/4.0</li><li>▪ Thesis Title: Molecular Dynamics Simulations of Nanoparticle Interactions</li><li>▪ Advisor: Professor Mark Horstemeyer (Ph.D., Georgia Institute Technology)</li></ul>		
	1990- 1995	<u>Mississippi State University</u>	Mississippi State, MS
	<i>B.Sc., Mechanical Engineering</i>		
	<ul style="list-style-type: none"><li>▪ GPA: 3.84/4.00</li></ul>		

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<b>Professional Experience</b>		<u>Mississippi State University</u>	Mississippi State, MS
	<i>2020- Present, Associate Director for Computational Engineering Mechanics, CAVS</i> <i>2021- Present, Graduate Coordinator for Mechanical Engineering</i> <i>2018- Present, Dr. Oswald Rendon-Herrero Diversity Professorship</i> <i>2017- Present, Associate Professor of Mechanical Engineering</i> <i>2009- 2017 Assistant Professor of Mechanical Engineering</i> <i>2009-Present, Graduate Faculty Appointment in Computational Engineering</i>		
	<ul style="list-style-type: none"><li>▪ Research interests: mechanical behavior of materials, including metals, polymers, cementitious materials and biomaterials using small-scale simulations and experimentation; micro-structure-property relations, fatigue, failure analysis, molecular dynamics, discrete element methods, as well as industrial issues in the areas of powder metallurgy and additive manufacturing</li><li>▪ Teaching: Mechanics of Machinery, Applied Elasticity, Failure of Engineering Materials</li></ul>		
	2004- 2009	<u>Center for Advanced Vehicular Systems</u>	Mississippi State, MS
	<i>Research Associate I, Computational Manufacturing &amp; Design</i> <i>Graduate Research Assistant, Computational Manufacturing &amp; Design</i>		
	<ul style="list-style-type: none"><li>▪ Modeled metallic particle interactions using molecular dynamics simulations</li><li>▪ Conducted uniaxial compaction, sintering, dilatometry, and immersion density experiments on powder metal compacts</li><li>▪ Taught several lectures of Inelasticity course to graduate students</li></ul>		
	1995- 2003	<u>The Dow Chemical Company</u>	Houston, TX
	<i>Mechanical Engineer, Dow Design &amp; Construction</i>		

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- Responsible for overall process equipment design on capital projects (ranging from \$5MM to over \$200MM) for Dow production plants worldwide in the following technology areas: Polyurethane, Super Absorbent Polymers, AgroSciences, Polystyrene, Wastewater Treatment, and Polyethylene
- Wrote technical reports, gave training sessions on 3D modeling, tracked project schedule and cost
- Led mechanical project team on developing technical equipment specifications, performing technical bid evaluations, reviewing equipment drawings, and providing construction support
- Developed and implemented new work process for meeting schedule commitments on projects

1991- 1995                      NSF ERC for Computational Field Simulations                      Mississippi State, MS  
*Undergraduate Research Assistant (Advisors: Professor Bharat Soni, Professor Robert Moorhead)*

- Wrote training manual for grid generation code
- Gave research presentations on Genie+ grid generation code

## Publications

### Peer-Reviewed Journal Publications/Books Chapters (21)

*Italicized names are/were students*

- [1] *A.T.N. Vo*, M. A. Murphy, P. K. Phan, R. K. Prabhu, **T. W. Stone**, Effect of Force Field Resolution on Membrane Mechanical Response and Mechanoporation Damage under Tensile Deformation, *Molecular Biotechnology*, (2023) <http://dx.doi.org/10.1007/s12033-023-00726-x>
- [2] *A. Vo*, M. Murphy, P. Phan, **T. W. Stone**, R. Prabhu, Molecular Dynamics Simulation of Membrane Systems in the context of Traumatic Brain Injury, *Current Opinion in Biomedical Engineering*, 27 (2023) <https://doi.org/10.1016/j.cobme.2023.100453>
- [3] *R. A. Perkins*, C.J. Duncan, D. Johnson, **T.W. Stone**, J.A. Sherburn, M. Chandler, R.D. Moser, B. Paliwal, R.K. Prabhu, Y. Hammi, Assessment of a high strength concrete using experimental and numerical methodologies for high strain rate ballistic impacts, *International Journal of Impact Engineering*, 178 (2023) <https://doi.org/10.1016/j.ijimpeng.2023.104598>
- [4] *R. A. Perkins*, C.J. Duncan, D. Johnson, **T.W. Stone**, J.A. Sherburn, M. Chandler, R.D. Moser, B. Paliwal, R.K. Prabhu, Y. Hammi, Assessment of the ballistic impact response of Cor-Tuf UHPC concrete using the HJC constitutive model, *International Journal of Protective Structures*, (2023) <https://doi.org/10.1177/20414196231160235>
- [5] *J. Reeves*, Y. Liu, Y. Hammi, D. Dickel, **T.W. Stone**, C. Bounds, Automation and High-Speed Forming of Thin Layer Composite, *International Journal of Engineering Science Invention*, 11 (3) (2022) 34-54.
- [6] *C.O. Yenusab*, J. Yanzhou, L. Yucheng, **T. W. Stone**, M. F. Horstemeyer, L-Q Chen, L. Chen, Three-dimensional Phase-field simulation of  $\gamma''$  precipitation kinetics in Inconel 625 during heat treatment, *Computational Materials Science*, Volume 187 (2021) <https://doi.org/10.1016/j.commatsci.2020.110123>
- [7] *Vo, A.*, Murphy, M., **Stone, T. W.**, Phan, P., Baskes, M., Prabhu, R. Molecular dynamics simulations of phospholipid bilayer mechanoporation under different strain states – a comparison between GROMACS and LAMMPS. *Modelling and Simulation in Materials Science and Engineering*, 29 (5) (2021) DOI 10.1088/1361-651X/abfeaf
- [8] *M.J. Mahtabi*, **T.W. Stone**, N. Shamsaei, Load Sequence Effects and Variable Amplitude Fatigue of Superelastic NiTi, *International Journal of Mechanical Sciences*, 148 (2018) 307-315. <https://doi.org/10.1016/j.ijmecsci.2018.08.037>

- [9] O.R. Junaid, **T. W. Stone**, J.H. Alexander, Experimental Characterization of Milling, Compaction and Sintering of Nanocrystalline FC-0205 Copper Steel Powder, *The Global Journal of Researches in Engineering*, 18 (1) (2018)
- [10] M.J. Mahtabi, A. Yadollahi, M. Rahmati, **T. W. Stone**, Correlation Between Hardness and Loading Transformation Stress of Superelastic NiTi, *Arabian Journal for Science and Engineering*, 43 (9) (2018) 5029-5033.
- [11] **T.W. Stone**, Y. Hammi, Chapter 13: Nickel Powder Metal Modeling Illustrating Atomistic-Continuum Friction Laws. *Integrated Computational Materials Engineering (ICME) for Metals: Concepts and Case Studies*, Ed. M.F. Horstemeyer, Wiley (2018) 447- 464.
- [12] Y. Hammi, **T.W. Stone**, H. Doude, L.A. Tucker, P.G. Allison, M.F. Horstemeyer, Chapter 6: Steel Powder Metal Modeling. *Integrated Computational Materials Engineering (ICME) for Metals: Concepts and Case Studies*, Ed. M.F. Horstemeyer, Wiley, (2018) 137-198.
- [13] H. Cho, Y. Hammi, D.K. Francis, **T.W. Stone**, Y. Mao, C. K. Sullivan, J. Wilbanks, R. Zelinka, M.F. Horstemeyer, Chapter 7: “Microstructure Sensitive, History Dependent Internal State Variable Plasticity-Damage Model for a Sequential Tubing Process. *Integrated Computational Materials Engineering (ICME) for Metals: Concepts and Case Studies*, Ed. M.F. Horstemeyer, Wiley (2018) 199-234. <https://doi.org/10.1002/9781119018377.ch7>
- [14] M. N. Burcham, R. Escobar Jr., C.O. Yenusab, **T. W. Stone**, G.N. Berry, A.L. Schemmel, B.M. Watson, C.U. Verzyynyvelt, Characterization and Failure Analysis of an Automotive Ball Joint, *Journal of Failure Analysis and Prevention* 17 (2) (2017) pp. 262-274. <http://dx.doi.org/10.1007/s11668-017-0240-4>
- [15] Y. Hammi, **T.W. Stone**, B. Paliwal, P.G. Allison, M.F. Horstemeyer, Smooth Yield Surface Constitutive Modeling for Granular Materials, *ASME Journal of Engineering Materials and Technology* 139 (1) (2016)
- [16] M. Murphy, M. F. Horstemeyer, S. R. Gwaltney, **T.W. Stone**, M. LaPlaca, J. Liao, L. Williams, R. Prabhu, Nanomechanics of phospholipid bilayer failure under strip biaxial stretching using molecular dynamics. *Modeling and Simulation in Materials Science and Engineering* 24 (5) (2016) 055008. DOI 10.1088/0965-0393/24/5/055008
- [17] W. Song, J. L. Woods, R. T. Davis, J. K. Offutt, E. P. Bellis, E. S. Handler, C. K. Sullivan, **T. W. Stone**, Failure Analysis and Simulation Evaluation of an Al 6061 Alloy Wheel Hub. *Journal of Failure Analysis and Prevention* 15 (4) (2015) 521-533.
- [18] C. A. Walton, B. E. Nesbit, H. M. Candia, Z. A. Myers, W. R. Whittington, **T. W. Stone**, Failure analysis and mechanical performance evaluation of a cast aluminum hybrid-iron golf club hosel. *Journal of Failure Analysis and Prevention* 13 (5) (2013) 561-569.
- [19] **T.W. Stone**, M. F. Horstemeyer, Length Scale Effects of Friction in Particle Compaction Using Atomistic Simulations and a Friction Scaling Model. *Journal of Nanoparticle Research* 14 (2012) 1121.
- [20] E. Acar, Y. Hammi, P. G. Allison, **T. W. Stone**, M. F. Horstemeyer, Sensitivity and Uncertainty Analysis of Microstructure-Property Relations for Compacted Powder Metals. *Powder Metallurgy* 53 (2) (2010) 141-145.

- [21] **T. W. Stone**, M. F. Horstemeyer, Y. Hammi, P. M. Gullett, Contact and Friction of Single Crystal Nickel Nanoparticles using Molecular Dynamics. *Acta Materialia* 56 (14) (2008) 3577-3584. <https://doi.org/10.1016/j.actamat.2008.03.044>

Peer-Reviewed Conference Proceedings (20)

*Italicized names are students*

- [1] *Vo, A. T.*, To, F., Murphy, M. M., **Stone, T.**, Adibi Sadeh, S., Miralami, R., Phan, P. K., BMES Annual Meeting, "Nanoscale Simulations of Stretching induced Deformation of Complex Neuronal Membranes With versus Without Cholesterol," BMES, Atlanta, GA. (October 2022).
- [2] *Mabowitz, E. F.*, Murphy, M., Sharma, G., Lee, N., Mun, S., **Stone, T. W.**, Priddy, L., Dickel, D. T., Bone, W. G., Miralami, R., ASME 2022 International Mechanical Engineering Congress and Exposition, "Finite Element Modeling of Vehicle Vibration and Its Effects on the Lumbar Spine," American Society of Mechanical Engineers, Columbus, OH. (October 2022).
- [3] Makki, Nidaa, Cutright, Teresa J., Coats, Linda T., Willits, Rebecca K., **Stone, Tonya W.**, Williams, Lakiesha N., Rodrigues, Debora F. Preparation of Female and Minority PhD and Post-Docs for Careers in Engineering Academia (Experience). *ASEE Annual Conference Proceedings* (2022).
- [4] *Vo, A.*, Murphy, M., **Stone, T. W.**, Phan, P., Prabhu, R., International Mechanical Engineering Congress & Exposition (IMECE), "Molecular dynamics simulations of phospholipid bilayers under deformation – a comparison between GROMACS and LAMMPS," *2020 ASME International Mechanical Engineering Congress & Exposition Proceedings*, Virtual. November (2020)
- [5] *C.O. Yenusab*, Y. Ji, Y. Liu, **T. W. Stone**, M.F. Hortemeyer, L. Chen, Investigating the Precipitation Kinetics and Hardening Effects of  $\gamma$  in Inconel 625 Using a Combination of Meso-scale Phase-Field Simulation and Macro-Scale Precipitate Strengthening Calculations, *2020 ASME International Mechanical Engineering Congress & Exposition Proceedings*, Virtual. November (2020)
- [6] *M. Davis*, J. Ball, Y. Liu, **T. Stone**, Design and Fabrication of Mount Plate for Integration of Multiple Cameras in UAV Using 3D Printing and Traditional Manufacturing Method *2020 ASME International Mechanical Engineering Congress & Exposition Proceedings*, Virtual. November (2020)
- [7] Teresa J Cutright, Rebecca K Willits, Linda T Coats, **Tonya Stone**, Lakiesha N Williams, Debora F Rodrigues, Update on Academics with Diversity Education and Mentorship in Engineering (ACADEME) Activities and Fellows, *2020 ASEE Annual Conference & Exposition Proceedings* (2020)
- [8] P.J. Hill, B. Kirkland, Y. Koshka, R. Sullivan, **T.W. Stone**, A Multidisciplinary Undergraduate Nanotechnology Education Program with Integrated Laboratory Experience and Outreach Activities, *2016 ASEE Annual Conference & Exposition Proceedings*, New Orleans, June (2016)
- [9] P.J. Hill, Y. Koshka, **T.W. Stone**, B. Kirkland, R. Sullivan, A Multidisciplinary Undergraduate Nanotechnology Education Program with Integrated Laboratory Experience, *2015 ASEE Annual Conference & Exposition Proceedings*, Seattle, June (2015)
- [10] **T. W. Stone**, *K. SalemeRuiz*, *O. Asafa*, Y. Hammi, Die Filling and Compaction Using a Multiscale Methodology. *Proceedings of the MPIF/APMI 2012 International Conference on Powder Metallurgy and Particulate Materials*. Nashville, USA (2012).
- [11] *C. Hardin*, **T. W. Stone**, P. M. Gullett, *D. Ward*, Atomistic Modeling of Aluminum Nanoparticle Interactions. *Proceedings of the 2010 Materials Science and Technology Conference*, Houston, USA (2010) 1195-1206.
- [12] Y. Hammi, **T.W. Stone**, P.G. Allison, M.F. Horstemeyer, "Fatigue Modeling of a Powder Metallurgy Main Bearing Cap." *Proceedings of the 2010 SIMULLA Customer Conference*, Providence, RI USA, May 25-27, 2010.

- [13] **T. W. Stone**, Y. Hammi, R. Carino, M. F. Horstemeyer, Modeling for Powder Metallurgy Component Design and Performance Prediction. *Proceedings of the MPIF/APMI 2009 International Conference on Powder Metallurgy and Particulate Materials*. Las Vegas, USA (2009)
- [14] **T. W. Stone**, H. I. Sanderow, E. Acar, Y. Hammi, K. N. Solanki, Process Modeling: Use of Uncertainty, Sensitivity and Optimization Techniques for Improved Understanding of Compaction Model Outputs. *Proceedings of the MPIF/APMI 2009 International Conference on Powder Metallurgy and Particulate Materials*. Las Vegas, USA (2009).
- [15] **T. W. Stone**, L. Tucker, T. N. Williams, Y. Hammi, H. El Kadiri, M. F. Horstemeyer, Comparison of Density Measurement Techniques for Large P/M Components. *Proceedings of the World Congress on Powder Metallurgy and Particulate Materials*. Washington, DC USA (2008) 11-84 – 11-96.
- [16] Y. Hammi, L. Tucker, P. G. Allison, **T. W. Stone**, M. F. Horstemeyer, E. B. Marin, Modeling for Powder Metallurgy Component Design and Performance Prediction. *Proceedings of the World Congress on Powder Metallurgy and Particulate Materials*. Washington, DC USA (2008) 1-96 –1-110.
- [17] **T. Stone**, B. Jelinek, P. Gullett, S. Kim, M. Horstemeyer, Molecular Dynamics Simulations of the Compressive Behavior of  $\alpha$ -Fe and Fe-Cu Nanocrystalline Materials. *Proceedings of the MPIF/APMI 2007 International Conference on Powder Metallurgy and Particulate Materials*. Denver, CO USA (2007)1-15 –1- 24.
- [18] **T. Stone**, L. Arias-Meza, Y. Hammi, M. F. Horstemeyer, Multiscale Modeling of Powder Metallurgy Processes. *Proceedings of the MPIF/APMI 2006 International Conference on Powder Metallurgy and Particulate Materials*. San Diego, USA (2006) 1-41 –1-54.
- [19] Y. Hammi, **T. Stone**, M. F. Horstemeyer, Constitutive Modeling for Powder Compaction and Densification. *Proceedings of the MPIF/APMI 2005 International Conference on Powder Metallurgy and Particulate Materials*. Montreal, Canada (2005) 1-38 –1-51.
- [20] Y. Hammi, **T. W. Stone**, M. F. Horstemeyer, Constitutive Modeling of Metal Powder Behavior. SAE 2005 World Congress & Exhibition, Transactions, *Journal of Materials & Manufacturing* 114 (5) (2005) 293–299.

### Technical Reports

*Italicized names are students*

- [1] *K. Saleme Ruiz*, **T. W. Stone**, Implementation of a New Force Scheme into DEM for Brittle Polycrystalline Materials, Army Engineer Research & Development Center (2014) 1-17.
- [2] *K. Saleme Ruiz*, **T. W. Stone**, Computational Modeling of Brittle Polycrystalline Materials Based on Discrete Element Method, Army Engineer Research & Development Center (2013) 1-52.
- [3] *K. Saleme Ruiz*, **T. W. Stone**, Method for Digitally Generating the Microstructure for Brittle and Layered Biomaterials, Army Engineer Research & Development Center (2013) 1-30.
- [4] **T.W. Stone**, M.F. Horstemeyer, Y. Hammi, P. Allison, H. Grewal, E. Acar, L. Tucker, H. Brown, S.J. Park, and P.T. Wang, Process and Performance History Modeling of a Powder Metal Engine Bearing Cap Under Monotonic and Cyclic Loads, MSU.CAVS.CMD.2009-R0001, Center for Advanced Vehicular Systems prepared for USCAR (2009)

### Peer-Reviewed Abstracts

*Italicized names are students*

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- [1] **T.W. Stone**, *K. Sullivan*, R. Zelinka, "The Structure-Property Relationship of Cold-Drawn 1010 Steel Tubing", The Minerals, Metals, & Materials Society (TMS) Conference, Orlando, FL, March 15-19, 2015.
- [2] *M.A. Murphy*, M. F. Horstemeyer, S.R. Gwaltney, **T.W. Stone**, M.C. LaPlaca, J. Liao, L. Williams, R. Prabhu, "Phospholipid Deformation Size Effects during Tensile Molecular Dynamics Simulations," Poster at Biomedical Engineering Society (BMES) 2015 Annual Meeting, scheduled for October 7-10, 2015 in Tampa, Florida
- [3] *M. A. Murphy*, M. F. Horstemeyer, S. R. Gwaltney, **T. W. Stone**, M. C. LaPlaca, J. Liao, et al., "The Effects of Stress State on the Mechanical Response and Failure of the Neuronal Phospholipid Bilayer: a Molecular Dynamics Study," Poster at 2015 Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Snowbird, UT, 2015, pp. 1288-1289.
- [4] *M. A. Murphy*, M. F. Horstemeyer, S. R. Gwaltney, **T. W. Stone**, M. C. LaPlaca, J. Liao, et al., "Validation of High Rate Strip Biaxial Tension Deformations of the Neuronal Phospholipid Bilayer Using Empirical Data," Poster at Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Snowbird, UT, 2015, pp. 1268-1269.
- [5] *M. A. Murphy*, S. Mun, M. F. Horstemeyer, S. R. Gwaltney, **T. W. Stone**, M. C. LaPlaca, et al., "Constructing Rudimentary Limit Curves For Neuronal Phospholipid Bilayer Failure and Theoretical Calcium Penetration," 2015 Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3C), Snowbird, UT, 2015, pp. 1093-1094.
- [6] *K. Sullivan*, **T.W. Stone**, M.F. Horstemeyer, R. Zelinka, "The Structure-Property Relationship of Cold-Drawn 1010 Steel Tubing", The Minerals, Metals, & Materials Society (TMS) Conference, San Diego, CA, February 16-20, 2014.
- [7] *K. SalemeRuiz*, **T.W. Stone**, B. Devine, L. Walizer, W. Hodo, "Fracture Criterion for Brittle Polycrystalline Materials Based on a Discrete Element Method", Poster at The Minerals, Metals, & Materials Society (TMS) Conference, San Diego, CA, February 16-20, 2014.
- [8] *K. SalemeRuiz*, **T.W. Stone**, B. Devine, L. Walizer, W. Hodo, Structure-Property Correlations of a Digitally Represented Polycrystalline Microstructure based on Discrete Element Method, Material, Science, and Technology (MS&T) Conference, Montreal, Canada, October 27- 31, 2013.
- [9] **T.W. Stone**, Y. Hammi, Compaction Modeling using a Multiscale Methodology, Material, Science, and Technology (MS&T) Conference, Montreal, Canada, October 27- 31, 2013.
- [10] *C.K. Sullivan*, **T.W. Stone**, M.F. Horstemeyer, R. Zelinka, "Effect of Microstructure on the Mechanical Properties of Cold-Drawn 1010 Steel Tubing", Material, Science, and Technology (MS&T) Conference, Montreal, Canada, October 27- 31, 2013.
- [11] *T. McIntyre*, **T.W. Stone**, Y. Hammi, "Effect of Size and Processing Conditions on the Consolidation of Nanocrystalline Metal Powders", Material, Science, and Technology (MS&T) Conference, Montreal, Canada, October 27- 31, 2013.
- [12] *O. Asafa*, **T.W. Stone**, M.A. Tschopp, P.M. Gullett, M.F. Horstemeyer, "Molecular Dynamics Study of Frictional Effects on the Compaction of Metal Nanoparticles", Material, Science, and Technology (MS&T) Conference, Columbus, OH, October 16-20, 2011.

- [13] **T.W. Stone**, *O.Asafa, J.D. Stone*, Y. Hammi, “Deformation Mechanisms in Nanocrystalline Metals”, Material, Science, and Technology (MS&T) Conference, Columbus, OH, October 16- 20, 2011.
- [14] **T.W. Stone**, *O.Asafa*, M.F. Horstemeyer, “Atomic-Scale Friction in Metal Nanoparticles using Molecular Dynamics Simulations”, Material, Science, and Technology (MS&T) Conference, Houston, TX, October 17- 21, 2010.

**Grants  
Received**

**Total Funded Projects: 20, \$14.15 million**

**DoD ERDC Military Engineering, Task 16**

- Amount: \$237,785
- Title: Machine Learning-Based Surrogate Modeling of Dynamic Ballistic Penetration Behavior for Steel Alloys
- Dates: May 2021– Dec. 2023
- Role: Principal Investigator

**ARL RAD Year 2:**

- Amount: \$250,000
- Title: Advanced Additive Manufacturing and High Throughput Materials Discovery
- Dates: May 2021– Dec. 2022
- Role: Senior Personnel

**ARL LIFT Phase 2:**

- Amount: \$500,000
- Title: Advanced Additive Manufacturing and High Throughput Materials Discovery
- Dates: May 2021– Dec. 2022
- Role: Senior Personnel

**DoD ERDC Military Engineering, Task 16**

- Amount: \$237,785
- Title: Machine Learning-Based Surrogate Modeling of Dynamic Ballistic Penetration Behavior for Steel Alloys
- Dates: May 2021– Dec. 2023
- Role: Principal Investigator

**DoD ERDC HPC Enabled Surrogate Models and Data Analytics, Topic 7**

- Amount: \$740,634
- Title: Machine Learning-Based Surrogate Modeling of Dynamic Ballistic Penetration Behavior for Steel Alloys
- Dates: Mar 2021– Feb. 2023
- Role: Co- Principal Investigator

**ARL RAD:**

- Amount: \$250,000



- Title: Advanced Additive Manufacturing and High Throughput Materials Discovery
- Dates: May 2021– Dec. 2022
- Role: Senior Personnel

#### **National Science Foundation**

- Amount: \$445,296
- Title: Theoretical Understanding and Predicting Porosity Mechanisms During Directional Solidification and Promoting Process-Structure-Property-Performance Study of Cast Alloys
- Dates: Aug 2017– Jul 2022
- Role: PI (Jul 2021- Jun 2022)

#### **ARL Cold Spray Topic 1:**

- Amount: \$378,853
- Title: A coupled thermo-mechanical approach to quantify the Chemistry-Process-Structure-Property-Performance (CPSPP) relationships of additive manufacturing processes
- Dates: 2020– Dec. 2022
- Role: Senior Personnel

#### **AM General**

- Amount: \$4,200,000
- Title: High Mobility Multipurpose Wheeled Vehicle (HMMWV) Light-weighting Phases I & II
- Dates: Apr. 2019– Mar. 2022
- Role: Co- Principal Investigator

#### **National Science Foundation**

- Amount: \$24,560
- Title: Supplemental Award- Collaborative Research: Professional Preparation of Underrepresented Minority PhD's and Post-Docs for a Career in Engineering Academia
- Dates: Jul. 2020 – Jun. 2022
- Role: Principal Investigator

#### **National Science Foundation**

- Amount: \$217,429
- Title: Collaborative Research: Professional Preparation of Underrepresented Minority PhD's and Post-Docs for a Career in Engineering Academia
- Dates: Jul. 2017 – Jun. 2022
- Role: Principal Investigator

#### **National Science Foundation**

- Amount: \$174,980
- Title: BRIGE: Multiscale Modeling and Simulation of the Consolidation of Metallic Nanoparticles
- Dates: Sep. 2010 – Aug. 2015
- Role: Principal Investigator

#### **MSU Office of Research and Economic Development**

- Amount: \$2,000



- Title: The Intersection of Mentoring and Socialization: Increasing Faculty of Color Presence in Academia
- Dates: Nov. 2015 – Oct. 2016
- Role: Co- Principal Investigator

#### **Predictive Design Technologies/ Plymouth Tube**

- Amount: \$104,815
- Title: Innovative Process-Structure-Property Relations and Design
- Dates: Aug. 2012 – Jul. 2014
- Role: Principal Investigator

#### **National Science Foundation**

- Amount: \$200,000
- Title: NUE: Multifunctional Nanostructures for Integrated Electrical, Chemical, Mechanical, and Geological Applications: A Multidisciplinary Laboratory Education Program
- Dates: Jan. 2014 – Dec. 2016
- Role: Co-Principal Investigator

#### **National Science Foundation**

- Amount: \$287,944
- Title: REU: Physical Properties of Materials
- Dates: Mar. 2014 – Feb. 2017
- Role: Senior Personnel

#### **Army Engineering Research and Development Center (ERDC)**

- Amount: \$70,343
- Title: Discrete Element Modeling of Layered Bio-Materials
- Dates: Jul. 2012 – Jun. 2013
- Role: Principal Investigator

#### **Department of Defense: Consortium for Energy, Environment, and Demilitarization (CEED)**

- Amount: \$91,856
- Title: Nonlinear Mathematical Formulation for Discrete Particle Fracture
- Dates: Sep. 2013 – Sep. 2014
- Role: Child Principal Investigator

#### **DoD-IVPPED Integrated Virtual Prototyping for Product Engineering & Design**

- Amount: \$96,897
- Title: Nonlinear Mathematical Formulation for Discrete Particle Fracture
- Dates: Sep. 2014 – Sep. 2015
- Role: Child Principal Investigator

#### **Department of Defense: Consortium for Energy, Environment, and Demilitarization (CEED)**

- Amount: \$2.1 MM (\$420,000 per year)
- Title: Multiscale Cementitious Materials
- Dates: Feb. 2014 – Jan. 2019
- Role: Senior Investigator

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**Department of Defense: Computational Research for Engineering and Science – Ground Vehicle (CRES-GV)**

- Amount: \$750,000 (\$250,000 per year for 3 years)
- Title: Discrete Element Method Software Development
- Dates: Nov 15 – Oct. 2018
- Role: Child Co-Principal Investigator

**Department of Defense: SimBRS**

- Amount: \$2 MM (\$400,000 per year for 5 years)
- Title: WD 64- Virtual Prototyping of Vehicle Systems, MMSF model for metals and polymers
- Dates: Feb. 2014 – Jan. 2019
- Role: Senior Investigator

**Department of Defense: Army Research Laboratory**

- Amount: \$2 MM (\$400,000 per year for 5 years)
- Title: Collaborative Research: Transitioning Material Systems From Laboratory to Fabrication  
Dates: Aug. 2015 – Jul. 2020
- Role: Senior Investigator

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**Research Presentations**

- "An Atomistic Study of the Deformation Behavior of Bulk Titanium Alloys" 2019 TMS Annual Meeting & Exhibition, " TMS, San Antonio, TX, 2019.
- "Material Characterization and Structure Property Relations in Process Modeling" Additive Manufacturing Working Group Meeting, Mississippi State University, April 6, 2015.
- "Compaction Modeling using a Multiscale Methodology," Material, Science, and Technology (MS&T) Conference Proceedings, Montreal, CA, October 27- 31, 2013.
- "Die Filling and Compaction Using a Multiscale Methodology," International Conference on Powder Metallurgy and Particulate Materials, Nashville, TN, June 2012.
- "Molecular Dynamics Study of Frictional Effects on the Compaction of Metal Nanoparticles," Material, Science, and Technology (MS&T) Conference, Columbus, OH, October 2011.
- "Multiscale Modeling of Nanoparticle Deformation," Material, Science, and Technology (MS&T) Conference, Columbus, OH, October 2011.
- "Molecular Dynamics Simulations of Nanoparticle Interactions," Minority Faculty Development Workshop Poster Session, MIT, March 2010.
- "Modeling for Powder Metallurgy Component Design and Life Cycle Prediction: Sintering," International Conference on Powder Metallurgy and Particulate Materials, Las Vegas, NV, June 2009.
- "Process Modeling: Use of Uncertainty, Sensitivity and Optimization Techniques for Improved Understanding of Compaction Model Outputs," International Conference on Powder Metallurgy and Particulate Materials, Las Vegas, NV, June 2009.
- "Molecular Dynamics Simulations of the Compressive Behavior of  $\alpha$ -Fe and Fe-Cu Nanocrystalline Materials," International Conference on Powder Metallurgy and Particulate Materials, Denver, Colorado, May 2007.

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- “Multiscale Modeling of P/M Processes,” International Conference on Powder Metallurgy and Particulate Materials, San Diego, California, June 2006.
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### Professional Affiliations

- Member of American Society of Mechanical Engineers (**ASME**) since 2006
  - Member of The Minerals, Metals & Materials Society (**TMS**) since 2010
  - Member of American Society of Engineering Education (**ASEE**)
  - Member of Society of Women Engineers (**SWE**)
  - National Society of Black Engineers (**NSBE**)
  - Phi Kappa Phi Honor Society
  - Tau Beta Bi Engineering Honor Society
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### Service

- **Chair**- Faculty Research Advisory Council (2023-2024)
  - **Faculty Advisor**- MSU Student Chapter National Society of Black Engineers (2021-)
  - **Faculty Advisor**- Mechanical Engineering Minority Organization (2015- )
  - **Chair**- Mechanical Engineering Mechanical Systems Course Standardization Committee (2016-)
  - **Appointed Chair** of TMS Education Committee (2016-2019)
  - **Co-Chair**- MSU Council on Minority Affairs (2015- 2018)
  - **Committee Member**- Faculty Research Advisory Council (2018-2022)
  - **Committee Member**- BCoE Committee for Courses & Curricula (2016-2020)
  - **Committee Member**- University Promotion & Tenure Committee (2018-2021)
  - **Co-Organizer**-2018, 2019 MS&T Conferences, “Curricular Innovations and continuous Improvement of Academic Programs (and Satisfying ABET Along the Way): The Elizabeth Judson Memorial Symposium”
  - **Co-Organizer**-2014 TMS Conference “Mechanical Behavior Related to Interface Physics II Symposium”
  - **Reviewer**- Metallurgical and Materials Transactions A (2013- )
  - **Reviewer**- Journal of Nanoparticle Research (2012- )
  - **Committee Member** of TMS Powder Materials Committee (2012- )
  - **Committee Member** of TMS Nanomechanical Materials Behavior Committee (2012- )
  - **Education Representative**- TMS Materials Processing & Manufacturing Division (2012-2015)
  - **Session Co-Chair**, 2011 MS&T Conference: Multi Scale Modeling of Microstructure Deformation in Material Processing Symposium
  - **Session Chair**, TMS 2014: Characterization of Minerals, Metals and Materials Symposium, Characterization of Material Processing Session
  - **Session Chair**, TMS 2015: Characterization of Minerals, Metals and Materials Symposium, Characterization of Ferrous Metals Session
  - **Faculty Representative**-MSU President’s Commission on the Status of Women (2009-2012)
  - **Reviewer**- NSF BRIGE program (2011, 2013)
  - **Reviewer**- NSF CMMI (2010, 2011, 2013)
  - **Reviewer**- NSF MPS- DMR (2014)
  - **Reviewer**- NSF Graduate Research Fellowship Program (2013, 2015, 2016, 2018)
  - **Reviewer**- Oxford University Press (2013, 2014)
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### Professional & Civic Presentations

- 03/2014 Women of Color Summit Panel Session “A New Female Epidemic: The Burden of Greatness”, Mississippi State University

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- 08/2013 NSF Annual BRIGE Grantee Meeting “Multiscale Modeling and Simulation of the Consolidation of Metallic Nanoparticles- Broadening Participation Highlights”, Washington, D.C.,
  - 04/2012 Faculty Panel for Graduate/Professional Students, Mississippi State University
  - 02/2012 Gender Series Lecture: “Women in Science, Technology, Engineering, and Math”, Mississippi State University
  - 09/2010 MSU NSF GRFP Workshop, Mississippi State University
  - 07/2010 IMAGE Summer Bridge Program “How to Be a Successful Student”, Mississippi State University
  - 03/2010 New Faculty Panel “Balancing Multiple Roles as New Faculty”, Mississippi State University
  - 03/2010 IMAGE Student Meeting “Graduate School vs. Industry”, “Mississippi State University
  - 03/2010 Fellowship Workshop “Reflections from a Former NSF Graduate Fellow”, Mississippi State University
  - 01/2010 Annual Winter Scholar Symposium, Alliance for Graduate Education in Mississippi “Prepared for the Professoriate: Was I Really?,” University of Southern Mississippi
  - 07/2009 WISE Summer Camp “Who Wants to Be an Engineer?” Mississippi State University
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### Honors and Recognition

- 2012 Faculty Appreciation Award for Enhancing Diversity, James Worth Bagley College of Engineering, Mississippi State University
- 2010 The Alliance for Graduate Education in Mississippi (AGEM) Graduate Award
- 2010 Faculty Appreciation Award for Enhancing Diversity, James Worth Bagley College of Engineering, Mississippi State University
- 2009 Women of Color Magazine and IBM Corporation Technology Rising Star Award
- 2009 Stem Women’s Walk of Fame Honoree, MSU Studio School Summer Camp
- 2009 Engineering Research Support Staff Award, Mississippi State University
- 2006 Engineering Graduate Student Research Award, Mississippi State University
- 2005 National Science Foundation Graduate Research Fellowship Award
- 2004 Graduate Research Assistant Fellowship, Center for Advanced Vehicular Systems, Mississippi State University
- 2004 Hearin Hess Graduate Scholarship, Mississippi State University
- 2001 Dow Special Recognition Award(for project cost savings)
- 1998 Dow Project Excellence Award (EPT Project)

### Mentoring

#### Current students

- Ph.D. co-advisor of Ms. Anh Vo (Biomedical Engineering)
- Ph.D. advisor of Mr. Micael Edwards (Mechanical Engineering)
- M.S. non-thesis advisor of Mr. Dakota Jordan (Mechanical Engineering)
- Ph.D. committee of Mr. Clay Goodman (Civil Engineering)
- Ph.D. committee of Mr. Javier Osorio-Carrasquillo (Civil Engineering)

Former students

- Ph.D. co-advisor of Mr. Mohammad Javad Mahtabi Oghani (Mechanical Engineering, Aug. 2017)
- Ph.D. advisor of Ms. Katerine SalemeRuiz (Computational Engineering, Aug. 2016)
- M.S. thesis advisor of Mr. Caleb Yenusah (Mechanical Engineering, Dec 2017)
- M.S. thesis advisor of Mr. David McInnis (Mechanical Engineering, Dec 2017)
- M.S. thesis co-advisor of Mr. Benjamin Rutherford (Mechanical Engineering, May 2017)
- M.S. thesis co-advisor of Mr. Alexander Johnson (Mechanical Engineering, May 2017)
- M.S. thesis advisor of Mr. Olelakan Junaid (Mechanical Engineering, Aug. 2016)
- M.S. thesis advisor of Mr. Charles Sullivan (Mechanical Engineering, Aug. 2014)
- M.S. thesis advisor of Mr. Olufemi Asafa (Mechanical Engineering, Aug. 2012)
- M.S. non-thesis advisor of Mr. Azizi Turner (Mechanical Engineering, Aug 2018)
- M.S. non-thesis advisor of Mr. Trevor Smith (Mechanical Engineering, Dec. 2017)
- M.S. non-thesis advisor of Mr. Thomas McIntyre (Mechanical Engineering, May 2017)
- M.S. non-thesis advisor of Ms. Lana Turner (Mechanical Engineering, Aug. 2013)
- Undergraduate research advisor of Mr. Parshu Bhusal (Mechanical Engineering)
- Undergraduate research advisor of Mr. Tyrone McDonald (Mechanical Engineering)
- Undergraduate research advisor of Mr. Zachary Collins (Mechanical Engineering)
- Undergraduate research advisor of Ms. Breanna Pittman (Mechanical Engineering)
- Undergraduate research advisor of Mr. Patrick King (Mechanical Engineering)
- Undergraduate research advisor of Mr. Cameron L. Hardin (Mechanical Engineering, Dec. 2011)
- Undergraduate research advisor of Ms. Palara Grant (Mechanical Engineering)
- Undergraduate research advisor of Ms. Ayesha Hicks (Chemical Engineering)
- M.S. thesis committee of Mr. Clay Goodman (Civil Engineering, Dec. 2017)
- M.S. thesis committee of Mr. Brad Hansen (Civil Engineering, Dec. 2017)
- M.S. thesis committee of Ms. Megan Burcham (Mechanical Engineering, May 2016)
- M.S. thesis committee of Mr. Michael Murphy (Biomedical Engineering, May 2014)
- Ph.D. committee of Mr. Brad Hansen (Civil Engineering, Aug 2019)
- Ph.D. committee of Mr. Daniel Johnson (Mechanical Engineering, Dec 2019)
- Ph.D. committee of Mr. Michael Murphy (Biomedical Engineering, Aug. 2017)
- Ph.D. committee of Mr. Aref Yadollahi (Mechanical Engineering, Aug. 2017)
- Ph.D. committee of Mr. Josef Cobb (Mechanical Engineering, May 2016)
- Ph.D. committee of Mr. William Lawrimore (Mechanical Engineering, May 2016)
- Ph.D. committee of Mr. Chris Walton (Mechanical Engineering, Dec. 2013)
- Ph.D. committee of Ms. Marta Guerra (Physics, May 2010)

**Teaching  
Experience**

- ME-3613- System Dynamics (Junior/Senior Undergraduate students)
- ME 4111- Professional Development Seminar (Senior Undergraduate students)
- ME 3423- Mechanics of Machinery (Junior/Senior Undergraduate students)
- EM 8203- Applied Elasticity (Graduate/Distance students)
- ME 4123/6123- Failure of Engineering Materials (Graduate/Senior Undergraduate/Distance students)
- CHE 1001- Nano Exposed Seminar (Freshman Undergraduate students)

**Professional  
Workshops  
Attended**

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- September 2019, NSF Minority Faculty Development Workshop —Engineering a World of Difference: Policy and Practice (NSF travel grant), Harvard University
  - September 2018, NSF Minority Faculty Development Workshop —21st Century Mindsets & Strategies for Career Advancement (NSF travel grant), University of Michigan at Ann Arbor
  - August 5-7, 2015, Large-scale Atomic/Molecular Massively Parallel Simulator (LAMMPS) Users' Workshop and Symposium, Albuquerque, NM
  - September 2015, NSF Minority Faculty Development Workshop —21st Century Mindsets & Strategies for Career Advancement (NSF travel grant), Washington, DC
  - May 30- June 1, 2012 NSF Summer Institute Short Course on Materiomics—Merging Biology and Engineering in Multiscale Structures and Materials (NSF travel grant), Massachusetts Institute of Technology
  - July 19-21, 2011, “How to Engineer Engineering Education” Teaching Workshop, Bucknell University
  - March 2010, NSF Career Proposal Writing Workshop (NSF travel grant), Georgia Institute of Technology
  - March 2010, NSF Minority Faculty Development Workshop (NSF travel grant), Massachusetts Institute of Technology
  - May 27 – 30, 2009, NSF Summer Institute Short Course on Multiscale Science Based-Modeling and Simulation and Experimental Validation on Enabling Materials (NSF travel grant), Northwestern University