

# JASON MAYEUR

## EDUCATION

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<b>Ph.D. in Mechanical Engineering</b>	2010
Georgia Institute of Technology	Atlanta, GA
<b>M.S. in Mechanical Engineering</b>	2004
Georgia Institute of Technology	Atlanta, GA
<b>B.S. in Mechanical Engineering</b>	2000
University of Kentucky	Lexington, KY

## EMPLOYMENT AND EXPERIENCE

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<b>University of Alabama in Huntsville</b>	Huntsville, AL
Assistant Professor	August 2018 – present
<b>CFD Research, Inc.</b>	Huntsville, AL
Sr. Research Engineer	January 2017 – August 2018
<b>Los Alamos National Laboratory</b>	Los Alamos, NM
Staff Scientist	November 2013 – December 2016
Postdoctoral Researcher	January 2011 – November 2013
<b>Sandia National Laboratories</b>	Livermore, CA
Research Intern	Summers 2004 – 2007
<b>Georgia Institute of Technology</b>	Atlanta, GA
Research Assistant	August 2001 – December 2010

## HONORS AND AWARDS

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LANL LDRD Early Career Award	December 2014
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## REFEREED JOURNAL ARTICLES

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1. M. I. Latypov, J.-C. Stinville, J. R. Mayeur, J. M. Hestroffer, T. M. Pollock, and I. J. Beyerlein. Insight into microstructure-sensitive elastic strain concentrations from integrated computational modeling and digital image correlation. *Scripta Materialia*, 192:78–82, 2021.
2. J. Indeck, G. Demeneghi, J. Mayeur, C. Williams, and K. Hazeli. Influence of reversible and non-reversible fatigue on the microstructure and mechanical property evolution of 7075-t6 aluminum alloy. *International Journal of Fatigue*, 145:106094, 2021.
3. C. A. Bronkhorst, J. R. Mayeur, V. Livescu, R. Pokharel, D. W. Brown, and G. T. Gray III. Structural representation of additively manufactured 316L austenitic stainless steel. *International Journal of Plasticity*, 118:70–86, 2019.
4. H. Cho, C. A. Bronkhorst, H. M. Mourad, J. R. Mayeur, and D. J. Luscher. Anomalous plasticity of body-centered-cubic crystals with non-Schmid effect. *International Journal of Solids and Structures*, 139:138–149, 2018.
5. C. K.-C. Lieou, J. R. Mayeur, and I. J. Beyerlein. Deformation in amorphous–crystalline nanolaminates: an effective-temperature theory and interaction between defects. *Modelling and Simulation in Materials Science and Engineering*, 25(3):034002, 2017.
6. J. R. Mayeur, H. M. Mourad, D. J. Luscher, A. Hunter, and M. A. Kenamond. Numerical implementation of a crystal plasticity model with dislocation transport for high strain rate applications. *Modelling and Simulation in Materials Science and Engineering*, 24(4):045013, 2016.

7. D. J. Luscher, J. R. Mayeur, H. M. Mourad, A. Hunter, and M. A. Kenamond. Coupling continuum dislocation transport with crystal plasticity for application to shock loading conditions. *International Journal of Plasticity*, 76:111–129, 2016.
8. I. J. Beyerlein and J. R. Mayeur. Mesoscale investigations for the evolution of interfaces in plasticity. *Current Opinion in Solid State and Materials Science*, 19:203–211, 2015
9. J. R. Mayeur and D. L. McDowell. Micropolar crystal plasticity simulation of particle strengthening. *Modelling and Simulation in Materials Science and Engineering*, 23:065007, 2015.
10. J. R. Mayeur, I. J. Beyerlein, C. A. Bronkhorst, and H. M. Mourad. Incorporating interface affected zones into crystal plasticity. *International Journal of Plasticity*, 65:206–225, 2015.
11. J. D. Clayton, M. A. Grinfeld, T. Hasebe, and J. R. Mayeur. Mechanics and geometry of solids and surfaces. *Advances in Mathematical Physics*, 2015, 2015.
12. J. S. Carpenter, R. J. McCabe, J. R. Mayeur, N. A. Mara, and I. J. Beyerlein. Interface-driven plasticity: The presence of an interface affected zone in metallic lamellar composites. *Advanced Engineering Materials*, 17(1):109–114, 2015.
13. J. R. Mayeur and D. L. McDowell. A comparison of Gurtin type and micropolar theories of generalized single crystal plasticity. *International Journal of Plasticity*, 57:29–51, 2014.
14. I. J. Beyerlein, J. R. Mayeur, R. J. McCabe, S. J. Zheng, J. S. Carpenter, and N. A. Mara. Influence of slip and twinning on the crystallographic stability of bimetal interfaces in nanocomposites under deformation. *Acta Materialia*, 72:137–147, 2014.
15. I. J. Beyerlein, J. R. Mayeur, S. Zheng, N. A. Mara, J. Wang, and A. Misra. Emergence of stable interfaces under extreme plastic deformation. *Proceedings of the National Academy of Sciences*, 111:4386–4390, 2014.
16. J.R. Mayeur, I.J. Beyerlein, C.A. Bronkhorst, and H.M. Mourad. The influence of grain interactions on the plastic stability of heterophase interfaces. *Materials*, 7:302–322, 2014.
17. M.A. Monclús, S.J. Zheng, J.R. Mayeur, I.J. Beyerlein, N.A. Mara, T. Polcar, J. Llorca, and J.M. Molina-Aldareguía. Optimum high temperature strength of two-dimensional nanocomposites. *APL Materials*, 1:052103, 2013.
18. J.R. Mayeur, I.J. Beyerlein, C.A. Bronkhorst, H.M. Mourad, and B.L. Hansen. A crystal plasticity study of heterophase interface character stability of Cu/Nb bicrystals. *International Journal of Plasticity*, 48:72–91, 2013.
19. C.A. Bronkhorst, J.R. Mayeur, I.J. Beyerlein, H.M. Mourad, B.L. Hansen, N.A. Mara, J.S. Carpenter, R.J. McCabe, and S.D. Sintay. Meso-scale modeling the orientation and interface stability of Cu/Nb-layered composites by rolling. *JOM*, 65:431–442, 2013.
20. I.J. Beyerlein, N.A. Mara, J.S. Carpenter, T. Nizolek, W.M. Mook, T.A. Wynn, R.J. McCabe, J.R. Mayeur, K. Kang, S. Zheng, J. Wang, and T. Pollock. Interface-driven microstructure development and ultra high strength of bulk nanostructured Cu-Nb multilayers fabricated by severe plastic deformation. *Journal of Materials Research*, 28:1799–1812, 2013.
21. B.L. Hansen, J.S. Carpenter, S.D. Sintay, C.A. Bronkhorst, R.J. McCabe, J.R. Mayeur, H.M. Mourad, I.J. Beyerlein, N.A. Mara, S.R. Chen, and G.T. Gray III. Modeling the texture evolution of Cu/Nb layered composites during rolling. *International Journal of Plasticity*, 49:71–84, 2013.
22. J.R. Mayeur and D.L. McDowell. An evaluation of higher-order single crystal strength models for constrained thin films subjected to simple shear. *Journal of the Mechanics and Physics of Solids*, 61:1935–1954, 2013.

23. J.R. Mayeur and D.L. McDowell. Bending of single crystal thin films modeled with micropolar crystal plasticity. *International Journal of Engineering Science*, 49:1357–1366, 2011.
24. J.R. Mayeur, D.L. McDowell, and D.J. Bammann. Dislocation-based micropolar single crystal plasticity: Comparison of multi- and single criterion theories. *Journal of the Mechanics and Physics of Solids*, 59:398–422, 2011
25. J. R. Mayeur, D. L. McDowell, and R. W. Neu. Crystal plasticity simulations of fretting of Ti-6Al-4V in partial slip regime considering effects of texture. *Computational Materials Science*, 41:356–365, 2008.
26. J. R. Mayeur and D. L. McDowell. A three-dimensional crystal plasticity model for duplex Ti-6Al-4V. *International Journal of Plasticity*, 23:1457–1485, 2007.

#### BOOK CHAPTERS

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1. S. Forest, J. R. Mayeur, and D. L. McDowell. Micromorphic crystal plasticity. In *Handbook of Nonlocal Continuum Mechanics for Materials and Structures*, pages 643–686. Springer International Publishing, 2019.
2. J. R. Mayeur, D. L. McDowell, and S. Forest. Micropolar crystal plasticity. In *Handbook of Nonlocal Continuum Mechanics for Materials and Structures*, pages 1–47. Springer International Publishing, 2018.

#### CONFERENCE PROCEEDINGS

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1. D. J. Luscher, M. A. Kenamond, A. Hunter, J. R. Mayeur, and H. M. Mourad. Implementation of a dislocation-density based single-crystal model into a continuum shock hydrodynamics code. In *AIP Conference Proceedings*, volume 1979, page 180006. AIP Publishing, 2018.
2. J. R. Mayeur and D. L. McDowell. A study of two approaches to higher-order single crystal plasticity. In *Contributions to the Foundations of Multidisciplinary Research in Mechanics*, Proceedings of the 24th International Congress of Theoretical and Applied Mechanics (ICTAM 2016), 2017.
3. V. Livescu, C. A. Bronkhorst, S. A. Vander Wiel, J. R. Mayeur, D. W. Brown, and O. Dippo. Capturing the complexity of additively manufactured microstructures. In *Proceedings of The Ninth Pacific Rim International Conference on Advanced Materials and Processing (PRICM9)*, 2016.
4. J. R. Mayeur and D. L. McDowell. Heterogeneous deformation of polycrystals simulated with micropolar single crystal plasticity. In *Advances in Heterogeneous Material Mechanics 2011: Proceedings of the Third International Conference on Heterogeneous Material Mechanics: May 22-26, 2011, Shanghai, China*, page 381. DEStech Publications, Inc, 2011.
5. J. R. Mayeur, R. W. Neu, and D. L. McDowell. Role of texture and microstructure in fretting fatigue of Ti-6Al-4V. In *Proceedings of Fatigue 2006*, volume 9, 2006.
6. J. R. Mayeur, R. W. Neu, and D. L. McDowell. Fretting fatigue of Ti-6Al-4V: a micromechanical approach. volume 4, pages 87–95, 2005.
7. J. R. Mayeur, D. L. McDowell, and R. W. Neu. Effect of crystallographic texture on deformation fields in fretting contacts. In *World Tribology Congress III*, pages 299–300. American Society of Mechanical Engineers, 2005.

#### THESES

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1. J. R. Mayeur. *Generalized continuum modeling of scale-dependent crystalline plasticity*. PhD thesis, Georgia Institute of Technology, 2010.
2. J. R. Mayeur. Three dimensional modeling of Titanium-Aluminum alloys with application to attachment fatigue. Master's thesis, Georgia Institute of Technology, 2004.

## CONFERENCE PRESENTATIONS

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1. J. R. Mayeur. A micropolar crystal plasticity model with interface effects. presented at TMS 2020. San Diego, CA. February 23–27, 2020.
2. J. R. Mayeur and C. Moynihan. Mesoscale modeling of damage evolution in thermal barrier coatings. presented at ICPDF 2020. Riviera Maya, Mexico. January 3–9, 2020.
3. J. R. Mayeur. A micropolar crystal plasticity model with interface effects. presented at ICPDF 2020. Riviera Maya, Mexico. January 3–9, 2020.
4. J. R. Mayeur. Microstructural scale modeling and homogenization of damage evolution in thermal barrier coatings. presented at EMI 2019. Pasadena, CA. June 18–21, 2019.
5. J. R. Mayeur and D. L. McDowell. Nonlocal crystal plasticity simulations of the size-dependent mechanical response of fcc/bcc multilayers. presented at ICTAM 2016. Montreal, Canada. August 21–26, 2016.
6. J. R. Mayeur and I. J. Beyerlein. Nonlocal crystal plasticity simulations of the size-dependent mechanical response of fcc/bcc multilayers. presented at TMS 2016. Nashville, TN. February 14–18, 2016.
7. J. R. Mayeur, H. M. Mourad, D. J. Luscher, A. Hunter, and M. A. Kenamond. Continuum dislocation dynamics simulations of shock loading. presented at the 2015 MACH Conference. Annapolis, MD. April 8–10, 2015.
8. J. R. Mayeur, I. J. Beyerlein, C. A. Bronkhorst, and H. M. Mourad. Incorporating interface affected zones into crystal plasticity. presented at TMS 2015. Orlando, FL. March 15–19, 2015.
9. J. R. Mayeur, I. J. Beyerlein, C. A. Bronkhorst, and H. M. Mourad. The influence of grain interactions on the plastic stability of heterophase interfaces. presented at TMS 2015. Orlando, FL. March 15–19, 2015.
10. J. R. Mayeur and I. J. Beyerlein. The development of preferred interfaces in roll bonded cu-nb multilayer composites: Experiments and simulations. presented at the the Workshop on Interface Mediated Plasticity in Nanostructured and Architected Materials. Poitiers, France. June 16, 2015.
11. J. R. Mayeur, I. J. Beyerlein, C. A. Bronkhorst, and H. M. Mourad. The influence of grain interactions on the plastic stability of heterophase interfaces. presented at the International Symposium on Plasticity. Freeport, Bahamas. January 3–8, 2014.
12. C. A. Bronkhorst, J. R. Mayeur, I. J. Beyerlein, H. M. Mourad, and B. L. Hansen. Modeling the crystallographic and morphological evolution of cu/nb layered composites by accumulated roll bonding. presented at the U.S. National Congress on Computational Mechanics. Raleigh, NC. July 22–25, 2013.
13. D. J. Luscher, J. R. Mayeur, C. A. Bronkhorst, and D. L. McDowell. Influence of length scale parameters for nonlocal crystal plasticity on localization in polycrystalline specimens. presented at the U.S. National Congress on Computational Mechanics. Raleigh, NC. July 22–25, 2013.
14. J. R. Mayeur, I. J. Beyerlein, C. A. Bronkhorst, H. M. Mourad, and B. H. Hansen. Predicting predominant interfaces in cu-nb multilayer nanolamellar composites synthesized via accumulative roll bonding. presented at the International Symposium on Plasticity. Nassau, Bahamas. January 3–8, 2013.
15. J. R. Mayeur, I. J. Beyerlein, C. A. Bronkhorst, H. M. Mourad, and B. H. Hansen. Crystal plasticity modeling of the interfacial stability of cu/nb bicrystals. presented at the International Symposium on Plasticity. Nassau, Bahamas. January 3–8, 2013.

16. J. R. Mayeur, I. J. Beyerlein, C. A. Bronkhorst, H. M. Mourad, and B. H. Hansen. Crystal plasticity modeling of the interfacial stability of cu/nb bicrystals. presented at the Annual Technical Meeting of The Society of Engineering Science. Atlanta, GA. October 10–12, 2012.
17. J. R. Mayeur and D. L. McDowell. Micropolar crystal plasticity at the micron scale. presented at the International Workshop on Computational Materials Modeling. Baltimore, MD. September 24–26, 2012.
18. J. R. Mayeur, H. M. Mourad, I. J. Beyerlein, D. L. McDowell, and D. J. Bammann. Dislocation-based micropolar crystal plasticity with evolving length scales. presented at ASME IMECE. Denver, CO. November 11–17, 2011.
19. J. R. Mayeur and D. L. McDowell. Micropolar crystal plasticity at the micron scale. presented at the International Workshop on Computational Materials Modeling. Baltimore, MD. September 24–26, 2011.
20. J. R. Mayeur, D. J. Bammann, and D. L. McDowell. Dislocation density based micropolar single crystal plasticity. presented at the 2<sup>nd</sup> International Conference on Material Modeling. Paris, France. August 31–September 2, 2011.
21. J. R. Mayeur and D. L. McDowell. Micropolar crystal plasticity simulations of size-dependent particle strengthening. presented at the International Symposium on Plasticity. Puerto Vallarta, Mexico. January 3–8, 2011.
22. J. R. Mayeur and D. L. McDowell. A comparison of micropolar and slip gradient-based approaches to single crystal plasticity. presented at the International Symposium on Plasticity. St. Kitts and Nevis. January 3–8, 2010.
23. J. R. Mayeur, D. L. McDowell, and D. J. Bammann. A micropolar model of crystal plasticity. presented at the International Symposium on Plasticity. St. Thomas, U.S. Virgin Islands. January 3–8, 2009.
24. J. R. Mayeur, D. L. McDowell, and R. W. Neu. Role of texture and microstructure in fretting fatigue of Ti-6Al-4V. presented at 9<sup>th</sup> International Fatigue Congress. Atlanta, GA. May 14–19, 2006.
25. J. R. Mayeur, D. L. McDowell, and R. W. Neu. Microstructural representation and its effect on prediction of plastic ratcheting during fretting fatigue. presented at ASME IMECE. Orlando, FL. November 5–11, 2005.
26. J. R. Mayeur, D. L. McDowell, and R. W. Neu. Effect of crystallographic texture on deformation fields in fretting contacts. presented at World Tribology Congress III. Washington, D.C. September 12–16, 2005.
27. J. R. Mayeur, D. L. McDowell, and R. W. Neu. Plastic ratcheting in fretting fatigue. presented at ASME IMECE. Anaheim, CA. November 14–19, 2004.
28. J. R. Mayeur, D. L. McDowell, and R. W. Neu. Fretting fatigue of Ti-6Al-4v: A micromechanical approach. presented at MS&T '04. New Orleans, LA. September 26–29, 2004.
29. J. R. Mayeur and D. L. McDowell. Crystal plasticity modeling of  $\alpha/\beta$  Ti-Al alloys. presented at ASME IMECE. Washington, DC. November 15–21, 2003.

## COURSES TAUGHT

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MAE 370	Mechanics of Materials	SP19,SP21
MAE 671	Continuum Mechanics	SP19,SP20,FA20
MAE 672	Theory of Elasticity	FA18,SP21
MAE 673	Plasticity	FA19

## PROFESSIONAL SERVICE

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- Society Memberships:** American Society of Mechanical Engineers (ASME).  
The Minerals, Metals, and Materials Society (TMS).  
International Union of Theoretical and Applied Mechanics (IUTAM).
- Committee Memberships:** Mechanical Behavior of Materials (TMS).  
Graduate Committee (UAH MAE)
- Symposia Organizer:** International Conference on Plasticity, Damage, and Fracture (2015,2020)  
MACH Conference (2015)
- Guest Editor:** Special issue of Advances in Mathematical Physics on Mechanics and Geometry of Solids and Surfaces (2015)
- Reviewer:** International Journal of Plasticity, Journal of the Mechanics and Physics of Solids, Acta Materialia, Scripta Materialia, Modelling and Simulation in Materials Science and Engineering, International Journal of Solids and Structures, International Journal of Damage Mechanics, Fatigue and Fracture of Engineering Materials & Structures, International Journal of Mechanical Sciences.

## SPONSORED RESEARCH

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- Title: Critical flow performance and mechanical property evaluation of additively manufactured thin-wall Copper-Chrome-Niobium alloys  
Sponsor: NASA Cooperative Agreement Notice  
Role: Co-PI  
Amount: \$141k (POP:5/1/20 - 4/30/21)
- Title: Fatigue and Impact on Properties of Additively Manufactured Al7075  
Sponsor: Army CCDC Aviation & Missile Center  
Role: Co-PI  
Amount: \$88k (POP:4/1/20 - 3/31/21)
- Title: Quantification of Property Degradation of Energy Storage Materials  
Sponsor: U.S. Department of Justice  
Role: Co-PI  
Amount: \$657k (POP:8/21/19 - 8/20/20)
- Title: Multiphysics Modeling of Alkaline Batteries Under Impact Loading  
Sponsor: U.S. Department of Justice  
Role: PI  
Amount: \$203k (POP:8/21/19 - 8/20/20)
- Title: Integrated Software to Predict Material Degradation in Special Technology Coatings  
Sponsor: Air Force SBIR program  
Role: PI  
Amount: \$90k (POP:2/27/19 - 9/28/20)

Title: A novel crystal plasticity model that explicitly accounts for energy storage and dissipation at material interfaces  
Sponsor: LANL LDRD Early Career Award  
Role: PI  
Amount: \$450k (POP:1/20/15 - 1/19/17)

Title: Enabling Mesoscale Science: Nonlocal Dislocation-Flux Crystal Plasticity under Shock Loading Conditions  
Sponsor: LANL LDRD ER Award  
Role: Co-PI  
Amount: \$1.2m (POP:11/1/13 - 10/31/16)