

TIMOTHY J. TRUSTER, Ph.D., P.E. (TN)

Associate Professor University of Tennessee – Dept. of Civil & Environmental Engineering
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EDUCATION

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN URBANA, IL
Doctor of Philosophy in Civil Engineering, May 2010 – May 2013
Dissertation Title: “A Variational Multiscale Computational Framework for Nonlinear Interfacial Solid Mechanics” <http://hdl.handle.net/2142/44348>
Master of Science in Civil Engineering Aug. 2008 – May 2010
Thesis Title: “A Variational Multiscale A-Posteriori Error Estimation Method for Nearly Incompressible Elasticity” <http://hdl.handle.net/2142/15985>

UNIVERSITY OF DAYTON DAYTON, OH
Bachelor of Civil Engineering Aug. 2004 – May 2008

APPOINTMENTS

University of Tennessee – Knoxville	Associate Professor	2019 – Present
University of Tennessee – Knoxville	Assistant Professor	2013 – 2019
University of Illinois at Urbana-Champaign	Postdoctoral Researcher	2013
University of Illinois at Urbana-Champaign	Graduate Research Assistant	2008 – 2013

RESEARCH INTERESTS

Computational mechanics	Composite material modeling
Crystal plasticity	Texture modeling
High performance computing	Stabilized methods
Interface mechanics	Nonlinear solid mechanics
Discontinuous Galerkin method	A-posteriori error estimation

PUBLICATIONS

REFEREED JOURNALS AND REVIEWED CONFERENCES

1. Aduloju S.C., Truster T.J., A primal formulation for imposing periodic boundary conditions on conforming and nonconforming meshes, *Computer Methods in Applied Mechanics and Engineering*, (2020) doi: 10.1016/j.cma.2019.112663.
2. Messner M.C., Nassif O., Ma R., Truster T.J., Cochran K., Parks D.M., ShamT.-L., Combined crystal plasticity and grain boundary modeling of creep in Ferritic-Martensitic Steels, part 2: The effect of stress and temperature on Engineering and microstructural properties, *Modelling and Simulation in Materials Science and Engineering*, 27 (2019) 075010.
3. Nassif O., Truster T.J., Ma R., Cochran K., Parks D.M., Messner M.C., ShamT.-L., Combined crystal plasticity and grain boundary modeling of creep in Ferritic-Martensitic Steels, part 1: Theory and implementation, *Modelling and Simulation in Materials Science and Engineering*, 27 (2019) 075009.
4. Ma R., Truster T.J., A hierarchical multiscale modeling investigation on the behavior of microtextured regions in Ti-6242 α/β processing, *Metals*, 9 (2019) 233.

5. Ma R., Truster T.J., FFT-based homogenization of hypoelastic plasticity at finite strains, *Computer Methods in Applied Mechanics and Engineering*, 349 (2019) 499–521.
6. Aduloju S.C., Truster T.J., On topology-based cohesive interface element insertion along periodic boundary surfaces, *Engineering Fracture Mechanics*, 205 (2019) 10–13.
7. Aduloju S.C., Truster T.J., A variational multiscale discontinuous Galerkin formulation for both implicit and explicit dynamic modeling of interfacial fracture, *Computer Methods in Applied Mechanics and Engineering*, 343 (2019) 602–630.
8. Truster T.J., DEIP, discontinuous element insertion Program — Mesh generation for interfacial finite element modeling, *SoftwareX*, 7 (2018) 162–170.
9. Ma R., Pilchak A.L., Semiatin S.L., Truster T.J., Modeling the evolution of microtextured regions during α/β processing using the crystal plasticity finite element method, *International Journal of Plasticity*, 107 (2018) 189–206.
10. Ma R., Truster T.J., Puplampu S., Penumadu D., Investigating mechanical degradation due to fire exposure of aluminum alloy 5083 using crystal plasticity finite element method, *International Journal of Solids and Structures*, 134 (2018) 151–160.
11. Chen P., Truster T.J., Masud A., Interfacial stabilization at finite strains for weak and strong discontinuities in multi-constituent materials, *Computer Methods in Applied Mechanics and Engineering*, 328 (2018) 717–758.
12. Puplampu S., Penumadu D., Ma R., Truster T.J., Woracek R., Payzant E.A., Bunn J.R., Degradation and onset of plastic anisotropy in marine aluminum alloy due to fire exposure by bulk neutron diffraction and in situ loading, *Materials Science and Engineering: A*, 700 (2017) 583–591.
13. Truster T.J., Masud A., A unified mixture formulation for density and volumetric growth of multi-constituent solids in tissue engineering, *Computer Methods in Applied Mechanics and Engineering*, 314 (2017) 222–268.
14. Khorsandi F., Ayers P.D., Truster T.J., Developing and evaluating a finite element model for predicting the two-posts rollover protective structure nonlinear behaviour using SAE J2194 static test, *Biosystems Engineering*, 156 (2017) 96–107.
15. Truster T.J., Nassif O., Variational projection methods for gradient crystal plasticity using Lie algebras, *International Journal for Numerical Methods in Engineering*, 110 (2017) 303–332.
16. Truster T.J., Masud A., Discontinuous Galerkin method for frictional interface dynamics, *Journal of Engineering Mechanics*, 142:11 (2016) 04016084.
17. Truster T.J., On interface element insertion into three-dimensional meshes, *Engineering Fracture Mechanics*, 153 (2016) 171–174.
18. Truster T.J., A stabilized, symmetric Nitsche method for spatially localized plasticity, *Computational Mechanics*, 57 (2016) 75–103.
19. Truster T.J., Chen P., Masud A., On the algorithmic and implementational aspects of a discontinuous Galerkin method at finite strains, *Computers and Mathematics with Applications*, 70 (2015) 1266–1289.

20. Truster T.J., Chen P., Masud A., Finite strain primal interface formulation with consistently evolving stabilization, *International Journal for Numerical Methods in Engineering*, 102 (2015) 278-315.
21. Hlepas G., Truster T.J., Masud A., A heterogeneous modeling method for porous media flows, *International Journal for Numerical Methods in Fluids*, 75 (2014) 487-518.
22. Truster T.J., Masud A., Primal interface formulation for coupling multiple PDE: A consistent derivation through the variational multiscale method, *Computer Methods in Applied Mechanics and Engineering* 268 (2014) 194-224.
23. Masud A., Truster T.J., A framework for residual-based stabilization of incompressible finite elasticity: Stabilized formulations and F-bar methods for linear triangles and tetrahedra, *Computer Methods in Applied Mechanics and Engineering* 267 (2013) 359-399.
24. Truster T.J., Eriten M., Polycarpou A.A., Bergman L.A., Masud A., Stabilized interface methods for mechanical joints: Physics-based models and variationally consistent embedding, *International Journal of Solids and Structures* 50 (2013) 2132-2150.
25. Truster T.J., Masud A., A discontinuous/continuous Galerkin method for modeling of interphase damage in fibrous composite systems, *Computational Mechanics* 52 (2013) 499-514.
26. Masud A., Truster T.J., Bergman L.A., Unified formulation for interface coupling and frictional contact modeling with embedded error estimation, *International Journal for Numerical Methods in Engineering* 92 (2012) 141-177.
27. Masud A., Truster T.J., Bergman L.A., A variational multiscale a-posteriori error estimation method for mixed-form of nearly incompressible elasticity, *Computer Methods in Applied Mechanics and Engineering* 200 (2011) 3453-3481.

CONFERENCE PROCEEDINGS

1. Aduloju S., Gu W., Truster T.J., Emery J., Reedy D., Grutzik S.J., Designing brittle fracture specimens to investigate environmentally assisted crack growth, *Fracture, Fatigue, Failure and Damage Evolution* 7 (2018) 25-33.
2. Flicek, R. C., Moore, K. J., Castelluccio, G. M., Brake, M. R. W., Truster, T.J., Hammetter, C. I., Stress waves propagating through bolted joints, Proceedings of IMAC Conference & Exposition on Structural Dynamics, Orlando, Florida, January 25 – 28, 2016.
3. Truster T.J., Stabilized Nitsche method for combining dissimilar PDEs: Application to spatially localized plasticity, Proceedings of 17th U.S. National Congress on Theoretical and Applied Mechanics, East Lansing, Michigan, June 15 – 20, 2014.
4. Truster T.J., Masud A., Bergman L.A., Variational formulation for frictional interface dynamics, Proceedings of ASME 2012 International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Chicago, Illinois, August 12 – 15, 2012.
5. Masud A., Bergman L.A., Polycarpou A.A., Truster T.J., Eriten M., Modeling of contact interfaces: A novel computational framework, Proceedings of 2011 NSF Engineering Research and Innovation Conference, Atlanta, Georgia, January 4 – 7, 2011.

6. Masud A., Bergman L.A., Polycarpou A.A., Patrick J., Truster T.J., A Variational Multiscale a posteriori error estimation method, Proceedings of 2009 NSF Engineering Research and Innovation Conference, Honolulu, Hawaii, June 22 – 25, 2009.

TECHNICAL REPORTS

1. Messner M.C., Truster T.J., Cochran K.B., Parks D.M., Sham T.L., FY17 Status Report on the Micromechanical Finite Element Modeling of Creep Fracture of Grade 91 Steel, *Argonne National Laboratory*, Report ANL-ART-95, 2017.
2. Dodds R.H. Jr., Truster T.J., Cochran K.B., Parks D.M., Sham T.L., Modeling of Creep Deformation and Fracture of Grade 91 Steel through Crystal Plasticity and Grain Boundary Cavitation, *Argonne National Laboratory*, Report ANL-ART-52, 2016.
3. Truster T.J., Discontinuous Element Insertion Algorithm, *University of Tennessee*, November 2015.
4. Truster T.J., Parks D.M., Dodds R.H. Jr., Sham T.L., Progress report on the modeling of deformation behavior in the prior austenite grains, *Oak Ridge National Laboratory*, Report ORNL/LTR-2015/354, 2015.
5. Truster T.J., Sham T.L., Preliminary report on creep deformation simulation using dislocation-based crystal plasticity model, *Oak Ridge National Laboratory*, Report ORNL/LTR-2014/369, 2014.

CONFERENCE PRESENTATIONS

ORAL PRESENTATIONS

- Truster T.J., Ma R., “Hierarchical multiscale modeling of microtextured regions in Ti-6242 during alpha/beta processing.” 15th U.S. National Congress on Computational Mechanics, Austin, TX, July 28 – August 1, 2019.
- Aduloju S., Truster T.J., “A Variational Multiscale Discontinuous Galerkin Method for Periodic Boundary Condition Modeling of RVE.” 2019 Engineering Mechanics Institute Conference, CalTech, Pasadena, CA, June 18 – 21, 2019.
- Truster T.J., Cochran K.B., Messner M.C., Nassif O., Parks D.M., Sham T.L., “Creep Life Prediction of Ferritic-Martensitic Steels at High and Low Stresses Through Crystal Plasticity and Grain Boundary Modeling.” 13th World Congress on Computational Mechanics, New York, New York, July 22 – 27, 2018.
- Ma R., Truster T.J., “Modeling the Evolution of Microtextured Regions in Ti-6242 using Crystal Plasticity Finite Element Method.” 2018 Engineering Mechanics Institute Conference, MIT, Cambridge, MA, May 29 – June 1, 2018.
- Aduloju S., Gu W., Truster T.J., Emery J., Reedy D., Grutzik S., “Novel Bi-beam Specimen Design for Studying Stress Corrosion Cracking.” 2018 Engineering Mechanics Institute Conference, MIT, Cambridge, MA, May 29 – June 1, 2018.
- Truster T.J., Aduloju S., “Insertion of Cohesive Interface Elements Along Periodic Boundary Surfaces.” 2018 Engineering Mechanics Institute Conference, MIT, Cambridge, MA, May 29 – June 1, 2018.
- Truster T.J., Nassif O., “Combined Crystal Plasticity and Grain Boundary Modeling of Creep in Ferritic-Martensitic Steels at Moderate and Low Stresses.” Mach Conference 2018, Annapolis, Maryland, April 4 – 6, 2018.

- Truster T.J., “A stabilized, symmetric Nitsche method for spatially localized plasticity.” 14th U.S. National Congress on Computational Mechanics, Montreal, Ontario, July 17 – 20, 2017.
- Aduloju S.C., Gu W., Reedy E.D., Emery J., Truster T.J., Grutzik S.J., “Designing brittle fracture specimens to investigate environmentally assisted crack growth.” Conference and Exposition on Experimental and Applied Mechanics, Indianapolis, IN, June 12 – 15, 2017.
- Ma R., Truster T.J., “Crystal plasticity based investigation on the mechanical degradation caused by fire exposure.” 2017 Engineering Mechanics Institute Conference, San Diego, CA, June 4 – 7, 2017.
- Nassif O., Truster T.J., “Microstructure-based modeling of ferritic-martensitic steels including crystal plasticity and grain boundary effects.” 2017 Engineering Mechanics Institute Conference, San Diego, CA, June 4 – 7, 2017.
- Truster T.J., “Discontinuous element insertion algorithm.” 2017 Engineering Mechanics Institute Conference, San Diego, CA, June 4 – 7, 2017.
- Truster T.J., Masud A., “Stabilized interface formulation for frictional dynamics.” 2016 Engineering Mechanics Institute/ Probabilistic Mechanics & Reliability Joint Conference, Vanderbilt University, Nashville, TN, May 22 – 25, 2016.
- Nassif O., Truster T.J., “Primal method for GND-based kinematic hardening model.” 2016 Engineering Mechanics Institute/ Probabilistic Mechanics & Reliability Joint Conference, Vanderbilt University, Nashville, TN, May 22 – 25, 2016.
- Flicek, R. C., Moore, K. J., Castelluccio, G. M., Brake, M. R. W., Truster, T.J., Hammett, C. I., “Stress waves propagating through bolted joints.” IMAC Conference & Exposition on Structural Dynamics, Orlando, Florida, January 25 – 28, 2016.
- Truster T.J., Hicks W., “Modeling Delamination in Composites under Dynamic Loading using a Stabilized Discontinuous Galerkin Approach.” 13th U.S. National Congress on Computational Mechanics, San Diego, CA, July 27 – 30, 2015.
- Masud A., Hlepas G., Truster T.J., “A heterogeneous modeling method with embedded interfaces for porous media flows.” 13th U.S. National Congress on Computational Mechanics, San Diego, CA, July 27 – 30, 2015.
- Truster T.J., Nassif O., “Variational Projection and Implicit Integration for Gradient Crystal Plasticity.” 2015 Conference of the ASCE Engineering Mechanics Institute, Stanford University, Stanford, CA, June 16 – 19, 2015.
- Truster T.J., Masud A., “A computational approach for modeling growth of cross-linking in tissue mechanics using mixture theory.” 2014 Conference of the ASCE Engineering Mechanics Institute, McMaster University, Hamilton, Ontario, August 5 – 8, 2014.
- Masud A., Truster T.J., Chen P., “Interface Damage in Composites under Finite Strains.” 17th U.S. National Congress on Theoretical and Applied Mechanics, Michigan State University, East Lansing, Michigan, June 15 – 20, 2014.
- Truster T.J., “Stabilized Nitsche method for combining dissimilar PDEs: Application to spatially localized plasticity.” 17th U.S. National Congress on Theoretical and Applied Mechanics, Michigan State University, East Lansing, Michigan, June 15 – 20, 2014.

- Truster T.J., Chen P., Masud A., "Discontinuous Galerkin method and Variational Multiscale formulation for interphase damage evolution at finite strains." 2013 Conference of the ASCE Engineering Mechanics Institute, Northwestern University, Evanston, IL, August 4 – 7, 2013.
- Truster T.J., Masud A., "Modeling of nearly incompressible composite materials using a new stabilized mixed method for tetrahedral elements." 12th U.S. National Congress on Computational Mechanics, Raleigh, NC, July 22 – 25, 2013.
- Masud A., Truster T.J., "Unified interface formulation combining Discontinuous Galerkin and Variational Multiscale methods." Advances in Computational Mechanics with Emphasis on Fracture and Multiscale Phenomena, workshop honoring Prof. Ted Belytschko's 70th birthday, Northwestern University, Evanston, IL, April 18 – 20, 2013.
- Truster T.J., Masud A., Bergman L., "Variational formulation for frictional interface dynamics." ASME 2012 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Chicago, IL, August 12 – 15, 2012.
- Truster T.J., Masud A., "A unified framework for modeling of interphase damage in fibrous composite systems." EMI 2012: Engineering Mechanics Inst. Conference/ PMC 2012: 11th ASCE Joint Specialty Conference on Probabilistic Mechanics & Structural Reliability, South Bend, IN, June 17 – 20, 2012.
- Truster T.J., Masud A., Bergman L.A., "Unified interface formulation combining discontinuous Galerkin and variational multiscale methods." 11th U.S. National Congress on Computational Mechanics, Minneapolis, MN, July 25 – 28, 2011.
- Truster T.J., Masud A., Bergman L.A., "Unified formulation for interface coupling and frictional contact." American Society of Mechanical Engineers: 2011 Applied Mechanics and Materials Conference, Chicago, IL, May 30 – June 1, 2011.
- Truster T.J., Eriten M., Polycarpou A.A., Bergman L.A., Masud A., "Modeling of contact interfaces: A novel computational framework." 2010 International Joint Tribology Conference, San Francisco, CA, October 18 – 20, 2010.

POSTER PRESENTATIONS

- Truster T.J., Aduloju S., Geut E., "Multi-Resolution Discontinuous Galerkin Method for Microstructure Modeling." 2019 Society of Engineering Science Conference, Washington University, Clayton, MO, October 13-15, 2019.
- Truster T.J., Moslehy A., Aduloju S., Alshibli K., "Modeling the Anisotropic Behavior of Natural Rocksalt during Creep Tests using Dislocation Density-based Crystal Plasticity." 2019 Engineering Mechanics Institute Conference, CalTech, Pasadena, CA, June 18 – 21, 2019.
- Ma R., Truster T.J., "Modeling the Evolution of Microtextured Regions in Ti-6242 using Crystal Plasticity Finite Element Method." 2018 Engineering Mechanics Institute Conference, May 29 – June 1, 2018.
- Aduloju S., Gu W., Truster T.J., Emery J., Reedy D., Grutzik S., "Novel Bi-beam Specimen Design for Studying Stress Corrosion Cracking." 2018 Engineering Mechanics Institute Conference, May 29 – June 1, 2018.

- Groß J., Armand J., Lacayo R.M., Schwingshackl, C.W., Reuß P., Truster T.J., Salles L., Kuether R., Brake M.R., "Numerical Round Robin for Predicting the Dynamics of Jointed Structures." ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Boston, MA, August 2 – 5, 2015.
- Flicek R., Moore K., Truster T.J., Hammetter C., Castelluccio G., Brake M.R., "Stress Wave Propagation through Jointed Interfaces." ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, Boston, MA, August 2 – 5, 2015.
- Truster T.J., Masud A., "Modeling of nearly incompressible composite materials using a new stabilized mixed method for tetrahedral elements." 12th U.S. National Congress on Computational Mechanics, Raleigh, NC, July 22 – 25, 2013.
- Truster T.J., Masud A., Bergman L.A., "Unified interface formulation combining discontinuous Galerkin and variational multiscale methods." 11th U.S. National Congress on Computational Mechanics, Minneapolis, MN, July 25 – 28, 2011.

OTHER PRESENTATIONS AND RESEARCH ACTIVITIES

INVITED PRESENTATIONS

- Truster T.J., Aduloju S., "A Variational Multiscale Discontinuous Galerkin Method for Imposing Periodic Boundary Conditions on Nonconforming Meshes." G.I. Taylor Medal Symposium in Honor of Prof. Arif Masud, 2019 Society of Engineering Science Conference, Washington University, Clayton, MO, October 13-15, 2019.
- Truster T.J., "Framework for Process and Performance Modeling at High Temperatures using Crystal Plasticity and Interface Finite Element Methods," Computational Mechanics Seminar, Oak Ridge National Laboratory, August 22, 2019.
- Truster T.J., "Framework for Process and Performance Modeling at High Temperatures using Crystal Plasticity and Interface Finite Element Methods," Advanced Computing, Mathematics and Data Division, Pacific Northwest National Laboratory, May 15, 2019.
- Truster T.J., "Framework for Process and Performance Modeling at High Temperatures using Crystal Plasticity and Interface Finite Element Methods," Mechanical and Aerospace Engineering Department, The Ohio State University, March 20, 2019.
- Truster T.J., "Creep Life Prediction of Ferritic-Martensitic Steels at High and Low Stresses Through Crystal Plasticity and Grain Boundary Modeling," Materials and Manufacturing Directorate, Air Force Research Laboratory, August 14, 2018.
- Truster T.J., "A Stabilized Finite Element Framework for Modeling Slip and Fracture at Interfaces," Civil Engineering Departmental Seminar, Purdue University, February 6, 2018.
- Truster T.J., "Crystal Plasticity Finite Element Modeling of Microtextured Regions in Ti-6242 at High Temperatures," Materials and Manufacturing Directorate, Air Force Research Laboratory, August 9, 2017.
- Truster T.J., "A Stabilized Finite Element Framework for Modeling Slip and Fracture at Interfaces," Civil Engineering Departmental Seminar, Notre Dame University, July 28, 2017.

Truster T.J., “A Stabilized Finite Element Framework for Modeling Slip and Fracture at Interfaces,” Civil Engineering Departmental Seminar, Vanderbilt University, November 15, 2016.

Truster T.J., “A Stabilized Finite Element Framework for Modeling Interfacial Failure in Fiber-Reinforced Composites,” Materials and Manufacturing Directorate, Air Force Research Laboratory, November 10, 2016.

Truster T.J., “Crystal Plasticity Finite Element Modeling of Microtextured Regions in Ti-6242 at High Temperatures,” Materials and Manufacturing Directorate, Air Force Research Laboratory, August 2, 2016.

Truster T.J., “Crystal Plasticity Finite Element Method Coupled with Imaging Techniques for Texture Modeling,” Joint Institute for Neutron Sciences Seminar, Oak Ridge National Laboratory, December 15, 2015.

Truster T.J., “A Stabilized Finite Element Framework for Modeling Slip and Fracture at Interfaces,” Civil Engineering Departmental Seminar, Duke University, September 28, 2015.

Truster T.J., Continuing Education Seminar, “Computational Modeling of Failure at Interfaces in Structures and Materials,” ASCE Knoxville Branch, March 28, 2014.

WORKSHOPS

AFRL/Industry Titanium Processing Workshop, Wright Bros. Institute Tec[^]Edge, Dayton, OH, March 26-27, 2018

- Participated in academic/laboratory/industry discussion groups, recorded minutes for the meeting

Nonlinear Mechanics and Dynamics Summer Research Institute, Sandia National Laboratory and University of New Mexico, Albuquerque, NM, June 20 – July 29, 2016.

- Mentored one group of two students (including own student) on project related to subcritical crack growth in glass

Truster T.J., “Stabilized Interface Method for High Velocity Fracture in Three Dimensions,” Workshop on Brittle Hard Rocks Exposed to High Energetic Cyclic Loads: Experimental and Numerical Discussions, Caterpillar Corporation, November 9, 2015.

Nonlinear Mechanics and Dynamics Summer Research Institute, Sandia National Laboratory and University of New Mexico, Albuquerque, NM, June 23 – July 31, 2015.

- Mentored two groups of three students on projects related to computational modeling of bolted mechanical joints

RESEARCH PROPOSALS

ACCEPTED PROPOSALS

Transient Coupling of Peridynamics and Classical Continuum Mechanics for Dynamic Fracture Modeling

University of Tennessee Research Seed Program, 2019-2020

Research Experiences of Undergraduates supplement

National Science Foundation, Mechanics of Materials and Structures Program, 2018-2019

CAREER: Predictive Fatigue Behavior of Structural Materials Through Computationally-Informed Textural and Microstructural Influences

National Science Foundation, Mechanics of Materials and Structures Program, 2018-2023

Modeling of Microtextured Region Breakdown in Ti-6242 Alloy

Air Force Research Laboratory, Summer Faculty Fellowship Program, 2017

Extension: Creep-Rupture Modeling Using Crystal Plasticity in WARP3D

UCHICAGO ARGONNE contract extension through Argonne National Laboratory, project DE-AC05-000R22725, 2017

3D Experimental and Computational Studies of Crystallographic Effects on Creep and Fracture in Salt Rock

National Science Foundation, Geotechnical Engineering and Materials Program, 2016-2019 co-PI with Khalid Alshibli (UTK)

Crystal Plasticity Modeling of Microtextured Regions in Ti-6242 Alloy

Air Force Research Laboratory, Summer Faculty Fellowship Program, 2016

Creep-Rupture Modeling Using Crystal Plasticity in WARP3D

UCHICAGO ARGONNE contract through Argonne National Laboratory, project DE-AC05-000R22725, 2015-2016

Portable Mechanical Testing System for Fiber Reinforced Polymer Composites

University of Tennessee Scholarly and Research Incentive Funds, 2015-2016 co-PI with Dayakar Penumadu, Uday Vaidya, and Chad Duty (UTK)

Implementation of Crystal Plasticity in WARP3D – Phase II

UT-Battelle contract through Oak Ridge National Laboratory, project DE-AC05-000R22725, 2014-2015

Implementation of Crystal Plasticity in WARP3D

UT-Battelle contract through Oak Ridge National Laboratory, project DE-AC05-000R22725, 2014

Numerical Analysis of Fatigue Characteristics of Materials under Engineered and Natural Loadings

Sub-award through University of Illinois at Urbana-Champaign from BP America, 2013-2014

MENTORING EXPERIENCE

UNIVERSITY OF TENNESSEE

PhD. Graduate Students:

2014 – present

Omar Nassif (2014-May 2019) Dissertation Title: Modeling Creep in Ferritic-Martensitic Steels Accounting for Dislocation Creep and Void Growth along Grain Boundaries

Sunday Aduloju (2018- Dec. 2019 anticipated) Dissertation title: Stabilized Variational Interface Formulation for Dynamic Damage and Microscale Modeling: Methods Development and Applications

Ran Ma (2016-Dec. 2018): Dissertation title: Modeling the Processing and Micromechanical Degradation of Polycrystalline Materials using a Multiscale Crystal Plasticity Framework

M.S. Graduate Students: 2014 – present

Wesley Hicks (2014-2015); M.S. with thesis: Modeling of Debonding and Crack Propagation in Fibrous Composites Using a Discontinuous Galerkin Approach

Russell Hollman (2015-2017); M.S. with thesis: Mixed-Mode Dynamic Crack Propagation using the Discontinuous Galerkin Method

Sunday Aduloju (2015-2018); M.S. with thesis: BiBeam Specimen Design for investigating Stress Corrosion Cracking in Brittle Materials

Elina Geut (2018-2020 anticipated); M.S. with thesis

Undergraduate Students: Research Experience for Undergraduates 2014 – present

Cameron Snook (2014-2015): Translation of crystal plasticity subroutines from FORTRAN to MATLAB; numerical studies on Variational Multiscale stabilized elastodynamics formulation

Russell Hollman (2015): Dynamic debonding modeling with Discontinuous Galerkin method

Francis Nunez (2019): Finite element mesh format transitions to optimize representation of fatigue cracks.

Daniel Pledger (2019): Implementation of HDF5 data output scheme into WARP3D

Jack Rymer (2018): Polycrystalline microstructure generation; representative volume element statistical sensitivity

TEACHING EXPERIENCE

UNIVERSITY OF TENNESSEE, KNOXVILLE

Course No.	Course Name	Semester	No. of Students	Instructor Effectiveness of Teaching (out of 5)
CE472	Steel Design	S14	25	4.08
CE538 CE561	Finite Element Applications for Structural and Geotechnical Engineering	F14	18	3.56
CE371	Structural Engineering I	S15	28	4.54
CE472	Steel Design	S15	19	4.21
CE538 CE561	Finite Element Applications for Structural and Geotechnical Engineering	F15	18	3.46
CE472	Steel Design	S16	28	4.68
CE595	Advanced Structural Mechanics	F16	15	4.1
CE472	Steel Design	S17	15	4.93
CE538 CE561	Finite Element Applications for Structural and Geotechnical Engineering	S17	14	3.6
CE691	Nonlinear Finite Element Methods	F17	7	5.0
CE262	Structural Mechanics	S18	56	4.80
CE472	Steel Design	S18	22	4.95

CE538 CE561	Finite Element Applications for Structural and Geotechnical Engineering (Distance Education)	F18	20	4.1
CE262	Structural Mechanics	S19	42	4.67
CE560	Advanced Structural Mechanics	S19	6	4.33
CE262	Structural Mechanics	F19		
CE538 CE561	Finite Element Applications for Structural and Geotechnical Engineering	F19		

OUTREACH ACTIVITIES

COMMUNITY ENGAGEMENT

High School Introduction to Engineering Systems for Twelfth Graders 2018, 2019

Hosted between two to three rising high school seniors from under-represented backgrounds for one week during the summer as a part of the Tickle College of Engineering office of diversity programs. Students conducted research on materials modeling and computer programming

Physics Workshop: Vector Concepts, Technologies, and Geometrical Nature 2019

Two six-hour workshops hosted at Oak Ridge Associated Universities' classroom facilities during the summer for middle and high school teachers on recent pedagogies and technologies for topics involving vectors and mechanics

GENERAL PRESENTATIONS

Truster T.J., "Graduate School and Beyond in Civil & Environmental Engineering – Perspectives from a UD Alumnus," Department of Civil and Environmental Engineering, University of Dayton, November 11, 2016.

LICENSURES

Professional Engineering Licensure: Tennessee, 2017-present

HONORS

Faculty Service Recognition Award, Department of Civil & Environmental Engineering, *University of Tennessee – Knoxville*, 2019

Professional Promise in Research Award, Tickle College of Engineering, *University of Tennessee – Knoxville*, 2019

Research Recognition Award, Department of Civil & Environmental Engineering, *University of Tennessee – Knoxville*, 2018

Outstanding Teaching Award, Department of Civil & Environmental Engineering, *University of Tennessee – Knoxville*, 2017

Finalist, Twenty-Fifth Annual Robert J. Melosh Medal Competition for the Best Student Paper on Finite Element Analysis, *Duke University*, 2014

Scholar Recognition Award, Department of Civil & Environmental Engineering, *University of Tennessee – Knoxville*, 2014

Award for the Best Mathematically Oriented Poster, Computers & Mathematics with Applications, *12th U.S. National Congress on Computational Mechanics*, 2013

ACADEMIC SERVICE

COMMITTEE MEMBERSHIP

Computational Mechanics Committee, ASCE/Engineering Mechanics Institute (2014-present); Student Poster Competition Judge, 2015 Conference of the ASCE Engineering Mechanics Institute

ORGANIZATION SERVICE

Postdoctoral Researcher Teaching Statement Workshop, Professional Development Committee, Oak Ridge National Laboratory, Oak Ridge, TN, November 4, 2016.

- Served on panel with two other assistant professors to discuss applying to academic positions with 18 postdoctoral fellows at ORNL; reviewed 6 teaching statements

AGENCY SERVICE

NSF Proposal Review Panelist, 2015

NSF Proposal Review Panelist, 2017

NSF Proposal Ad-Hoc Review, 2019

CONFERENCE SYMPOSIA

Session Organizer: “Computational Mechanics for Performance and Damage of Materials,” 15th U.S. National Congress on Computational Mechanics, July 28 – August 1, 2019, Austin, TX.

Session Organizer: “Mechanics of Rocks and Anisotropic Polycrystals,” 2019 Engineering Mechanics Institute Conference, CalTech, Pasadena, CA, June 18 – 21, 2019.

Session Organizer: “Computational Methods and Applications for Solid and Structural Mechanics,” 2019 Engineering Mechanics Institute Conference, June 18 – 21, 2019, Pasadena, CA

Session Organizer: “Integrated Computational Materials Engineering (ICME),” 13th World Congress on Computational Mechanics, July 22 – 27, 2018, New York, New York

Session Organizer: “Computational Methods and Applications for Solid and Structural Mechanics,” 2018 Engineering Mechanics Institute Conference, May 29 – June 1, 2018, Cambridge, MA

Session Organizer: “Stabilized and Multiscale Methods for Interface Mechanics,” 14th U.S. National Congress on Computational Mechanics, July 17 – 20, 2017, Montreal, Ontario

Session Organizer: “Computational Methods and Applications for Solid and Structural Mechanics,” 2017 Engineering Mechanics Institute Conference, June 4 – 7, 2017, San Diego, CA

Session Organizer: “Computational Methods and Applications for Solid and Structural Mechanics,” 2016 Engineering Mechanics Institute/ Probabilistic Mechanics & Reliability Joint Conference, May 22 – 25, 2016, Nashville, TN

Session Co-Organizer: “Modeling the Mechanics of Material Surfaces and Interfaces,” 2016 Engineering Mechanics Institute/ Probabilistic Mechanics & Reliability Joint Conference, May 22 – 25, 2016, Nashville, TN

Session Co-Organizer: “Stabilized and Multiscale Methods for Interface Mechanics,” 13th U.S. National Congress on Computational Mechanics, July 27 – 30, 2015, San Diego, CA

Session Co-Organizer: “Computational Methods and Applications for Solid and Structural Mechanics,” 2015 Conference of the ASCE Engineering Mechanics Institute, June 16 – 19, 2015, Stanford, CA

Session Co-Organizer: “Stabilized and Multiscale Methods for Interface Mechanics,” 17th U.S. National Congress on Theoretical & Applied Mechanics, June 15 – 20, 2014, East Lansing, MI

REVIEW ACTIVITIES

Journal of Engineering Mechanics (2013-present), Finite Elements in Analysis and Design (2014-present), Journal of Applied Mechanics (2014-present), Engineering Fracture Mechanics (2014-present), Advances in Applied Mathematics and Mechanics (2015-present), Computer Methods in Applied Mechanics and Engineering (2015-present), Mechanics Research Communications (2015-present), International Journal of Heat and Mass Transfer (2016-present), Materials (2016-present), International Journal of Mechanical Sciences (2016-present), International Journal for Numerical Methods in Engineering (2017-present), International Journal for Solids and Structures (2017-present), Journal of Pressure Vessel Technology (2018-present), International Journal for Fatigue (2018-present), Metals (2018-present), Journal of Computational and Applied Mathematics (2019-present); AIAA Journal (2019-present)

UNIVERSITY OF TENNESSEE

Departmental Library Representative, CEE, 2014 – Present
Search Committee, Assistant Professor of Structures, CEE, 2014-2015
Search Committee, Assistant Professor of Structures, CEE, 2015-2016
Awards Committee, CEE, 2016-present
Search Committee, Assistant Professor of Construction, CEE, 2018-2019
2019 ASCE Southeast Student Conference, CEE, surveying competition co-chair, 2019
2019 Southeast Regional Student Steel Bridge Competition, CEE, co-chair, 2019

PROFESSIONAL AFFILIATIONS

American Society of Civil Engineers, 2004 – Present
American Society of Mechanical Engineers, 2010 – Present
Structural Engineers Association, 2008 – Present
Chi Epsilon, 2006 – Present
United States Association for Computational Mechanics, 2012 – Present
American Society of Engineering Education, 2013 – Present

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