THE UNIVERSITY OF TEXAS AT AUSTIN
Cockrell School of Engineering
Standard Resume

FULL NAME: John T. Foster **TITLE:** Professor

DEPARTMENT: Hildebrand Petroleum and Geosystems Engineering

Aerospace Engineering and Engineering Mechanics (by courtesy)

Oden Institute for Computer Science and Engineering

EDUCATION

Purdue University	Aeronautics & Astronautics	PhD	December 2009
Texas Tech University	Mechanical Engineering	MS	December 2004
Texas Tech University	Mechanical Engineering	BS	December 2002

PROFESSIONAL REGISTRATION

Professional Engineer, Texas, #118233

CURRENT AND PREVIOUS ACADEMIC POSITIONS

The University of Texas at Austin	Professor	August 2024 – Present
The University of Texas at Austin	Associate Professor	September 2017 – August 2024
The University of Texas at Austin	Assistant Professor	August 2014 – August 2017
The University of Texas at San Antonio	Assistant Professor	August 2011 – August 2014
The University of New Mexico	Adjunct Professor	September 2010 – May 2011

OTHER PROFESSIONAL EXPERIENCE

Sandia National Laboratories	Senior Member of the Technical Staff	January 2006 – August 2011
Sandia National Laboratories	Member of the Technical Staff	August 2004 – January 2006

CONSULTING

Hilcorp	Injection scheduling and optimization	October 2023 – Present
Bazean Corp.	Executive in residence	January 2019 – August 2019
Curl, Stahl, Geis	Engineering analysis / expert witness	November 2014 – February 2015

AWARDS & HONORS

2023 SPE SPE Regional Data Science and Engineering Analytics Award

2018 ICES W.A. “Tex” Moncrief Grand Challenge Award

2015 SPE Petroleum Engineering Innovative Teaching Award

2013 Air Force Office of Scientific Research Young Investigator Award

2013 ‘40 Under 40’ - San Antonio Business Journal

REFEREED JOURNAL ARTICLES

†*Underlined name indicates student or postdoctoral co-authors under primary supervision*

Published

J.T. Foster, A.A. Barhorst, C.N. Wong, and M.T. Bement. Modeling Loose Joints in Elastic Structures–Experimental Results and Validation. *Journal of Vibration and Control*, 15(4):549–565, 2009. doi:10.1177/1077546307082908.

J.T. Foster, S.A. Silling, and W.W. Chen. Viscoplasticity using peridynamics. *International Journal for Numerical Methods in Engineering*, 81(10):1242–1258, 2010. doi:10.1002/nme.2725.

J.T. Foster, W. Chen, and V.K. Luk. Dynamic crack initiation toughness of 4340 steel at constant loading rates. *Engineering Fracture Mechanics*, 78(6):1264 – 1276, 2011. doi:10.1016/j.engfracmech.2011.02.019.

In rank of Assistant Professor

J.T. Foster, S.A. Silling, and W. Chen. An energy based failure criterion for use with peridynamic states. *International Journal of Multiscale Computational Engineering*, 9(6):675–688, 2011. doi:10.1615/IntJMultCompEng.2011002407.

J.T. Foster, D.J. Frew, M.J. Forrestal, E.E. Nishida, and W. Chen. Shock testing accelerometers with a Hopkinson pressure bar. *International Journal of Impact Engineering*, 46:56–61, August 2012. doi:10.1016/j.ijimpeng.2012.02.006.

J.T. Foster. Comments on the validity of test conditions in Kolsky bar experiments of elastic-brittle materials. *Experimental Mechanics*, 52(9):1559–1563, Brief Technical Note 2012. doi:10.1007/s11340-012-9592-6.

R. Rahman, **J.T. Foster**, and A. Haque. Molecular dynamics simulation and characterization of graphene-cellulose nanocomposites. *The Journal of Physical Chemistry A*, 117(25):5344–5353, 2013. doi:10.1021/jp402814t.

E.E. Nishida, **J.T. Foster**, and P.E. Briseno. Constant-strain-rate testing of a G10 laminate composite through optimized Kolsky bar pulse shaping techniques. *Journal of Composite Materials*, 47(23):2895–2903, 2013. doi:10.1177/0021998312460263.

A. Katiyar, **J.T. Foster**, H. Ouchi, and M.M. Sharma. A peridynamic formulation of pressure driven convective fluid transport in porous media. *Journal of Computational Physics*, 261:209–229, March 2014. doi:10.1016/j.jcp.2013.12.039.

R. Rahman and **J.T. Foster**. Deformation mechanism of graphene in amorphous polyethylene: A molecular dynamics based study. *Computational Material Science*, 87:232–240, May 2014. doi:10.1016/j.commatsci.2014.02.023.

R. Rahman, **J.T. Foster**, and A. Haque. A multiscale modeling scheme based on peridynamic theory. *International Journal of Multiscale Computational Engineering*, 12(3):223–248, 2014. doi:10.1615/IntJMultCompEng.2014007954.

R. Rahman and **J.T. Foster**. Bridging the length scales through nonlocal hierarchical multiscale modeling scheme. *Computational Material Science*, 92:401–415, September 2014. doi:10.1016/j.commatsci.2014.05.052.

M.D. Brothers, **J.T. Foster**, and H.R. Millwater. A comparison of different methods for calculating tangent-stiffness matrices in a massively parallel computational peridynamics code. *Computer Methods in Applied Mechanics and Engineering*, 279:247—267, September 2014. doi:10.1016/j.cma.2014.06.034.

M. Bessa, **J.T. Foster**, T. Belytschko, and W.K. Liu. A meshfree unification: Reproducing kernel peridynamics. *Computational Mechanics*, 53(6):1251–1264, 2014. doi:10.1007/s00466-013-0969-x.

J.T. O'Grady and **J.T. Foster**. Peridynamic beams: A non-ordinary state-based model. *International Journal of Solids and Structures*, 51(18):3177–3183, 2014. doi:10.1016/j.ijsolstr.2014.05.014.

J.T. O'Grady and **J.T. Foster**. Peridynamic plates and flat shells: A non-ordinary state-based model. *International Journal of Solids and Structures*, 51(25–26):4572–4579, 2014. doi:10.1016/j.ijsolstr.2014.09.003.

H. Ouchi, A. Katiyar, J.R. York, **J.T. Foster**, and M.M. Sharma. A fully coupled porous flow and geomechanics model for fluid driven cracks: a peridynamics approach. *Computational Mechanics*, 55(3):561–576, March 2015. doi:10.1007/s00466-015-1123-8.

R. Rahman and **J.T. Foster**. A molecular dynamics based investigation of thermally vibrating graphene under different boundary conditions. *Physica E: Low-dimensional Systems and Nanostructures*, 72:25–47, August 2015. doi:10.1016/j.physe.2015.04.007.

R. Rahman and **J.T. Foster**. Peridynamic theory of solids from the perspective of classical statistical mechanics. *Physica-A*, 437:162–183, November 2015. doi:10.1016/j.physa.2015.05.099.

R. Rahman and **J.T. Foster**. Onto resolving spurious wave reflection problem with changing nonlocality among various length scales. *Communications in Nonlinear Science and Numerical Simulation*, 34:86–122, 2016. doi:10.1016/j.cnsns.2015.10.003.

J.T. Foster. A variationally consistent approach to constrained motion. *ASME. J. Appl. Mech.*, 83(5), May 2016. doi:10.1115/1.4032856.

J.T. O'Grady and **J.T. Foster**. A meshfree method for bending and failure in non-ordinary peridynamic shells. *Computational Mechanics*, 57(6):921–929, June 2016. doi:10.1007/s00466-016-1269-z.

In rank of Associate Professor

1. H. Ouchi, **J.T. Foster**, and M.M. Sharma. Effect of reservoir heterogeneity on the vertical migration of hydraulic fractures. *Journal of Petroleum Science and Engineering*, 151:384–408, 2017. doi:10.1016/j.petrol.2016.12.034.

2. H. Ouchi, A. Katiyar, **J.T. Foster**, and M. M. Sharma. A peridynamics model for the propagation of

hydraulic fractures in naturally fractured reservoirs. *SPE Journal*, Preprint(SPE-173361-PA), May 2017. doi:10.2118/173361-PA.

3. **J.T. Foster** and X. Xu. A generalized, ordinary, finite deformation constitutive correspondence model for peridynamics. *International Journal of Solids and Structures*, 141–142:245–253, June 2018. doi:10.1016/j.ijsolstr.2018.02.026.

4. M. Pasetto, Y. Leng, J.S. Chen, **J.T. Foster**, and P. Seleson. A reproducing kernel enhanced approach for peridynamic solutions. *Computer Methods in Applied Mechanics and Engineering*, 340:1044–1078, October 2018. doi:10.1016/j.cma.2018.05.010.

5. M. Behzadinasab, T.J. Vogler, A.M. Peterson, R. Rahman, and **J.T. Foster**. Peridynamics modeling of a shock wave perturbation decay experiment in granular materials with intra-granular fracture. *Journal of Dynamic Behavior of Materials*, 4(4):529–542, December 2018. doi:10.1007/s40870-018-0174-2.

6. D. Kamensky, M. Behzadinasab, **J.T. Foster**, and Y. Bazilevs. Peridynamic modeling of frictional contact. *Journal of Peridynamics and Nonlocal Modeling*, Apr 2019. doi:10.1007/s42102-019-00012-y.

7. Y. Leng, X. Tian, and **J.T. Foster**. Super-convergence of reproducing kernel approximation. *Computer Methods in Applied Mechanics and Engineering*, 352:488–507, August 2019. doi:10.1016/j.cma.2019.04.038.

8. M. Behzadinasab and **J.T. Foster**. The third Sandia Fracture Challenge: peridynamic blind prediction of ductile fracture characterization in additively manufactured metal. *International Journal of Fracture*, June 2019. doi:10.1007/s10704-019-00363-z.

9. S.L.B. Kramer, A. Jones, A. Mostafa, B. Ravaji, T. Tancogne-Dejean, C.C. Roth, M. Gorji Bandpay, K. Pack, **J.T. Foster**, M. Behzadinasab, and others. The third Sandia Fracture Challenge: predictions of ductile fracture in additively manufactured metal. *International Journal of Fracture*, June 2019. doi:10.1007/s10704-019-00361-1.

10. M. Behzadinasab and **J.T. Foster**. On the stability of the generalized, finite deformation correspondence model of peridynamics. *International Journal of Solids and Structures*, 2019. doi:10.1016/j.ijsolstr.2019.07.030.

11. A. Katiyar, S. Agrawal, H. Ouchi, P. Seleson, **J.T. Foster**, and M.M. Sharma. A general peridynamics model for multiphase transport of non-Newtonian compressible fluids in porous media. *Journal of Computational Physics*, 2019. doi:10.1016/j.jcp.2019.109075.

12. M. Behzadinasab and **J.T. Foster**. A semi-lagrangian constitutive correspondence framework for peridynamics. *Journal of the Mechanics and Physics of Solids*, 137:103862, April 2020. doi:10.1016/j.jmps.2019.103862.

13. S. Agrawal, S. Zheng, **J.T. Foster**, and M.M. Sharma. Coupling of meshfree peridynamics with the finite volume method for poroelastic problems. *Journal of Petroleum Science and Engineering*, page 107252, 2020. doi:10.1016/j.petrol.2020.107252.

14. M. Behzadinasab and **J.T. Foster**. Revisiting the third sandia fracture challenge: a bond-associated, semi-lagrangian peridynamic approach to modeling large deformation and ductile fracture. *International Journal of Fracture*, 2020. doi:10.1007/s10704-020-00455-1.

15. X. Xu and **J.T. Foster**. Deriving peridynamic influence functions for one-dimensional elastic materials with periodic microstructure. *Journal of Peridynamics and Nonlocal Modeling*, 2020. doi:10.1007/s42102-020-00037-8.

16. Y. Leng, X. Tian, N.A. Trask, and **J.T. Foster**. Asymptotically compatible reproducing kernel collocation and meshfree integration for the peridynamic navier equation. *Computer Methods in Applied Mechanics and Engineering*, 370:113264, 2020. doi:10.1016/j.cma.2020.113264.

17. M. Behzadinasab, **J.T. Foster**, and Y. Bazilevs. A Unified, Stable, and Accurate Meshfree Framework for Peridynamic Correspondence Modeling—Part II: Wave Propagation and Enforcement of Stress Boundary Conditions. *Journal of Peridynamics and Nonlocal Modeling*, 2020. doi:10.1007/s42102-020-00039-6.

18. Y. Leng, X. Tian, N.A. Trask, and **J.T. Foster**. Asymptotically Compatible Reproducing Kernel Collocation and Meshfree Integration for Nonlocal Diffusion. *SIAM Journal on Numerical Analysis*, 59(1):88–118, 2021. doi:10.1137/19M1277801.

19. S. Agrawal, J.R. York, **J.T. Foster**, and M.M. Sharma. Coupling Peridynamics with the Classical Methods for Modeling Hydraulic Fracture Growth in Heterogeneous Reservoirs. *SPE Journal*, pages 1–19, 04 2021. doi:10.2118/205393-PA.

20. M. Yang and **J.T. Foster**. hp-variational physics-informed neural networks for nonlinear two-phase transport in porous media. *Journal of Machine Learning for Modeling and Computing*, 2:15–32, 2021. doi:10.1615/JMachLearnModelComput.2021038005.

21. X. Xu, M. D'Elia, and **J.T. Foster**. A machine-learning framework for peridynamic material models with physical constraints. *Computer Methods in Applied Mechanics and Engineering*, 386, December 2021. doi:10.1016/j.cma.2021.114062.

22. X. Xu, C. Glusa, M. D'Elia, and **J.T. Foster**. A FETI approach to domain decomposition for meshfree discretizations of nonlocal problems. *Computer Methods in Applied Mechanics and Engineering*, 387:114148, 2021. doi:10.1016/j.cma.2021.114148.

23. M. Behzadinasab, G. Moutsanidis, N. Trask, **J.T. Foster**, and Y. Bazilevs. Coupling of iga and peridynamics for air-blast fluid-structure interaction using an immersed approach. *Forces in Mechanics*, 4:100045, 2021. doi:10.1016/j.finmec.2021.100045.

24. Y. Leng, X. Tian, L. Demkowicz, H. Gomez, and **J.T. Foster**. A Petrov-Galerkin method for nonlocal convection-dominated diffusion problems. *Journal of Computational Physics*, 452:110919, 2022. doi:10.1016/j.jcp.2021.110919.

25. M. Yang and **J.T. Foster**. Multi-output physics-informed neural networks for forward and inverse pde problems with uncertainties. *Computer Methods in Applied Mechanics and Engineering*, page 115041, 2022. doi:10.1016/j.cma.2022.115041.

26. Y. Bazilevs, M. Behzadinasab, and **J.T. Foster**. Simulating concrete failure using the Microplane (M7) constitutive model in correspondence-based peridynamics: Validation for classical fracture tests and extension to discrete fracture. *Journal of the Mechanics and Physics of Solids*, page 104947, 2022. doi:10.1016/j.jmps.2022.104947.

27. X. Xu, M. D'Elia, C. Glusa, and **J.T. Foster**. Machine-learning of nonlocal kernels for anomalous subsurface transport from breakthrough curves. *Numerical Algebra, Control and Optimization*, 0, 2022. doi:10.3934/naco.2022025.

28. X. Xu and **J.T. Foster**. The peridynamic Jacobian. *Journal of Peridynamics and Nonlocal Modeling*, 2022. doi:10.1007/s42102-022-00091-4.

29. M.B. Abdullah, M. Delshad, K. Sepehrnoori, M.T. Balhoff, **J.T. Foster**, and M.T. Al-Murayri. Physics-Based and Data-Driven Polymer Rheology Model. *SPE Journal*, pages 1–23, 02 2023. doi:10.2118/214307-PA.

30. M. Yang and **J.T. Foster**. Using physics-informed neural networks to solve for permeability field under two-phase flow in heterogeneous porous media. *Journal of Machine Learning for Modeling and Computing*, 2023. doi:10.1615/JMachLearnModelComput.2023046921.

31. E. Maldonado-Cruz, **J.T. Foster**, and M.J. Pyrcz. Sonic Well-Log Imputation Through Machine-Learning-Based Uncertainty Models. *Petrophysics*, 64(02):253–270, 04 2023. doi:10.30632/PJV64N2-2023a7.

32. D.J. Littlewood, M.L. Parks, **J.T. Foster**, J.A. Mitchell, and P. Diehl. The Peridigm Meshfree Peridynamcis Code. *Journal of Peridynamics and Nonlocal Modeling*, 2023. doi:10.1007/s42102-023-00100-0.

33. E. Rustamzade, W. Pan, **J.T. Foster**, and M.J. Pyrcz. Comparison of commingled and sequential production schemes by sensitivity analysis for gulf of mexico paleogene deepwater. *Energy Exploration & Exploitation*, 2023. doi:10.1177/01445987231195679.

34. H. You, X. Xu, Yue Yu, S.A. Silling, M D'Elia, and **J.T. Foster**. Towards a unified nonlocal, peridynamics framework for the course-graining of molecular dynamics data with fractures. *Applied Mathematics and Mechanics*, (44):1125–1150, 2023. doi:/10.1007/s10483-023-2996-8.

35. F. ́Ozbayrak, **J.T. Foster**, and M.J. Pyrcz. Spatial bagging to integrate spatial correlation into ensemble machine learning. *Computers & Geosciences*, page 105558, 2024. doi:10.1016/j.cageo.2024.105558.

BOOKS AUTHORED

1. **J.T. Foster**. *Introduction to High-Performance Computing*. e-book, 2022. URL: https://johnfoster.pge.utexas.edu/hpc-book

2. **J.T. Foster**. *Numerical Methods and Computer Programming*. e-book, 2019. URL: https://johnfoster.pge.utexas.edu/numerical-methods-book

BOOKS EDITED

1. F. Bobaru, **J.T. Foster**, P.H. Geubelle, and S.A. Silling, editors. *Handbook of Peridynamic Modeling*. Number ISBN 9781482230437 in Advances in Applied Mathematics. Chapman and Hall/CRC Press, 2016

BOOK CHAPTERS

1. **J.T. Foster**. *Handbook of Peridynamic Modeling*, chapter Constitutive Modeling in Peridynamics. Number ISBN 9781482230437 in Advances in Applied Mathematics. Chapman and Hall/CRC Press, 2016

CONFERENCE PROCEEDINGS

1. **J.T. Foster**, A.A. Barhorst, C.N. Wong, and M.T. Bement. Modeling and Experimental Verification of Frictional Contact-Impact in Loose Bolted Joint Elastic Structures. In *Proceedings of IDETC'05*, number DETC2005-85465. IDETC, 2005.

2. J.G. Averett, J.D. Cargile, **J.T. Foster**, and V.K. Luk. Projectile Deceleration Due to Perforation Through Layers of Unreinforced Concrete Targets. In *Limited Proceedings of 76th Shock and Vibration Conference*, number U-045. SAVIAC, 2006.

3. J.G. Averett, J.D. Cargile, **J.T. Foster**, and V.K. Luk. Oblique Perforation of Unreinforced Concrete Targets: Experiments and Numerical Simulations. In *Limited Proceedings of 77th Shock and Vibration Conference*, 2007.

4. D.A. Dederman, D. Burnett, **J.T. Foster**, and J.A. Dykes. In Situ Penetration Testing of Darts with 16-Inch Mobile Gas Gun. In *Proceedings of 24th International Symposium on Ballistics*, number TB149, 2008.

5. **J.T. Foster**, V.K. Luk, and W. Chen. Dynamic initiation fracture toughness of high strength steel alloys. In *Proceedings of the XIth International Congress and Exposition. Orlando, Florida Society for Experimental Mechanics Inc*, volume 77, 2008.

6. **J.T. Foster**, S.A. Silling, and W.W. Chen. State based peridynamic modeling of dynamic fracture. In *SEM 2009 Conference on Experimental and Applied Mechanics*, number 33. SEM, 2009.

7. **J.T. Foster**, S.A. Silling, and W.W. Chen. State based peridynamic modeling of dynamic fracture. In *DYMAT 2009-9th International Conference on the Mechanical and Physical Behaviour of Materials under Dynamic Loading*, volume 2, pages 1529–1535, 2009. doi:10.1051/dymat/2009216.

8. **J.T. Foster**, W. Chen, and V.K. Luk. Dynamic fracture initiation toughness of high strength steel alloys. In *DYMAT 2009-9th International Conference on the Mechanical and Physical Behaviour of Materials under Dynamic Loading*, volume 1, pages 407–412, 2009. doi:10.1051/dymat/2009058.

9. **J.T. Foster**, D.J. Frew, M.J. Forrestal, E.E. Nishida, and W. Chen. Shock testing accelerometers with a Hopkinson pressure bar. *Experimental and Applied Mechanics, Volume 6*, pages 229–237, 2011. doi:10.1007/978-1-4614-0222-0_29.

In rank of Assistant Professor

10. **J.T. Foster** and E.E. Nishida. *A priori* pulse shaper design for constant-strain-rate tests of elastic-brittle materials. In V. Chalivendra, B. Song, and D. Casem, editors, *Dynamic Behavior of Materials, Volume 1*, Conference Proceedings of the Society for Experimental Mechanics Series, pages 379–386. Springer New York, 2013. doi:10.1007/978-1-4614-4238-7_49.

11. J.R. York, **J.T. Foster**, E.E. Nishida, and B. Song. A novel torsional Kolksy bar for constant-strain-rate materials testing. In B. Song, D. Casem, and J. Kimberly, editors, *Dynamic Behavior of Materials, Volume 1*, Conference Proceedings of the Society for Experimental Mechanics Series. Springer New York, 2013. doi:10.1007/978-3-319-00771-7_36.

12. J.T. O'Grady and **J.T. Foster**. Peridynamic beams and plates: A non-ordinary state-based model. In *ASME 2014 International Mechanical Engineering Congress and Exposition*, number IMECE2014-39887, 2014. doi:10.1115/IMECE2014-39887.

13. H. Ouchi, A. Katiyar, **J.T. Foster**, and M.M. Sharma. A Peridynamics Model for the Propagation of Hydraulic Fractures in Heterogeneous, Naturally Fractured Reservoirs. In *SPE Hydraulic Fracturing Technology Conference*, number SPE-173361-MS. Society of Petroleum Engineers, February 2015. doi:10.2118/173361-MS.

14. E.A. Lynd, **J.T. Foster**, and Q.P. Nguyen. An application of the Isogeometric Analysis Method to reservoir simulation. In *78th EAGE Conference and Exhibition*, number SPE-180110-MS. Society of Petroleum Engineers, 2016. doi:10.2118/180110-MS.

In rank of Associate Professor

15. H. Ouchi, S. Agrawal, **J.T. Foster**, and M.M. Sharma. Effect of small scale heterogeneity on the growth of hydraulic fractures. In *SPE Hydraulic Fracturing Technology Conference and Exhibition*. Society of Petroleum Engineers, 2017. doi:10.2118/184873-MS.

16. M. Behzadinasab, T.J. Vogler, and **J.T. Foster**. Modeling perturbed shock wave decay in granular materials with intra-granular fracture. In *20th Biennial APS Conference on Shock Compression of Condensed Matter*, 2017.

17. S. Agrawal, J. York, **J.T. Foster**, and M. Sharma. Coupling meshfree peridynamics with the classical methods for modeling hydraulic fracture growth in heterogeneous reservoirs. In *Unconventional Resources Technology Conference, 20–22 July 2020*, pages 180–203. Unconventional Resources Technology Conference (URTEC), 2020.

TECHNICAL REPORTS

1. **J.T. Foster**. Scale Modeling of Earth Penetrators for In Situ Targets. Technical Report SAND2006-4273, Sandia National Laboratories, 2006.

2. J.A. Dykes and **J.T. Foster**. Discrete-ULL 1-C Final Test Report. Technical Report SAND2007-4273, Sandia National Laboratories, 2007.

3. **J.T. Foster** and A.J. Webb. Penetration Simulations for Angle-of-Attack (AoA) Experiments into Low Strength Concrete Targets. SAND2007-5256, Sandia National Laboratories, 2007.

4. R.J. Fogler, J.W. Giron, J.A. Jacob, W.P. Wolfe, R.W. Greene, R.D. Tucker, A.E. Fortier, **J.T. Foster**, D.M. Van Zuiden, W.T. O'Rourke, H.D. Nguyen, E. Ollila, and J.R. Phelan. Guided miniature air-deliverable sensor dart. Technical Report SAND2007-6528, Sandia National Laboratories, 2007.

5. P.D. Coleman, R.A. Bates, M.T. Buttram, S.B. Dron, **J.T. Foster**, R.J. Franco, C.O. Landron, G.M. Loubriel, J.E. Lucero, A. Mar, T.L. Martinez, F.E. Reyes, and B.J. Welch. Void Sensor for Penetrators. Technical Report SAND2007-6528, Sandia National Laboratories, 2007.

6. **J.T. Foster**, A.J. Webb, A.E. Fortier, V.K. Luk, and D.A. Dederman. Penetration Code Study for Angle-of-Obliquity (AoO) Experiments into High-Strength Concrete Targets. Technical Report SAND2008-1162, Sandia National Laboratories, 2008.

7. **J.T. Foster**, A.E. Fortier, J.G. Averett, J.D. Cargile, V.K. Luk, and D.A. Dederman. Predictive Simulation for Perforation Through Layers of Unreinforced Concrete Targets. Technical Report SAND2008-113, Sandia National Laboratories, 2008.

8. E.E. Nishida, **J.T. Foster**, E.W. Klamerus, and D. Burnett. Dynamic behavior of shock isolation/ mitigation materials by kolsky bar experiments. Technical Report SAND2011-8266, Sandia National Laboratories, 2011.

9. J.V. Cox, G.W. Wellman, J.M. Emery, J.T. Ostien, **J.T. Foster**, T.E. Cordova, T.B. Crenshaw, A. Mota, J.E. Bishop, S.A. Silling, D.J. Littlewood, J.W. Foulk III, K.J. Dowding, K. Dion, B.L. Boyce, J.H. Robbins, and B.W. Spencer. Ductile Failure X-prize. Technical Report SAND2011-6801, Sandia National Laboratories, 2012. doi:10.2172/1029764.

In rank of Assistant Professor

10. Peridynamics Capabilities Review Panel. Peridynamics capabilities review panel report. SAND Report 2015-1921, Sandia National Laboratories, Albuquerque, NM and Livermore, CA, 2015.

TECHNICAL PRESENTATIONS

Invited Talks

1. "Peridynamic modeling of viscoplasticity and dynamic fracture." University of New Mexico, Mechanical Engineering. February 2010.

2. "Peridynamic modeling of viscoplasticity and dynamic fracture." University of Nebraska, Engineering Mechanics. April 2010.

3. "Unifying the mechanics of continuous and discontinuous media." 2011 International Workshop on Intensive Loading and its Effects. State Key Laboratory of Explosion Science and Technology, Beijing Institute of Technology. Beijing, China. December 2011.

4. "Hydraulic fracturing and its environmental impact: a short address of major public concerns." Presentation for the Center for Simulation, Visualization, and Real-Time Prediction participation in UTSA Earthweek 2012. April 2012.

5. "Unifying the mechanics of continuous and discontinuous media." Texas Tech University, Mechanical Engineering. April 2012.

6. “Unifying the mechanics of continuous and discontinuous media.” The Johns Hopkins University, Center for Advanced Ceramics and Metallic Systems. July 2012.

7. “Unifying the mechanics of continuous and discontinuous media.” Army Research Laboratory. February 2013.

8. “Peridynamics as a unified theory for heterogenous media, anomalous porous flow, and fracture.” The University of Texas at Austin, Department of Petroleum & Geosystems Engineering. October 2013.

9. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” Northwestern University, Department of Mechanical Engineering. January 2014.

10. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” The University of Texas at Austin, Department of Petroleum & Geosystems Engineering. March 2014.

11. “A model for nonlocal diffusion and fluid-driven fracture.” USACM/IUTAM Symposium on Connecting Multiscale Mechanics to Complex Material Design. Northwestern University. May 2014.

12. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” ExxonMobil - Corporate Strategic Research. July 2014.

13. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” Center for Mechanics of Solids, Structures and Materials, The University of Texas at Austin, Department of Aerospace Engineering and Engineering Mechanics. September 2014.

14. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” University of Illinos – Urbana-Champaign, Department of Aerospace Engineering. September 2014.

15. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” Institute for Computational Engineering Science, The University of Texas at Austin. October 2014.

16. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” Graduate Aerospace Laboratories, California Institute of Technology. January 2015.

17. “Nonlocal multiphysics for heterogeneous materials, anomalous diffusion, and fracture.” Total. March 2015.

18. “A multiphysics model for hydraulic fracture simulation.” Eighth International Workshop Meshfree Methods for Partial Differential Equations. Universität Bonn. September 2015.

19. “Isogeometric peridynamics.” USACM Thematic Workshop on Nonlocal Models in Mathematics, Computation, Science, and Engineering. Oak Ridge National Laboratory. October 2015.

20. “Nonlocal models for anamalous transport” Schlumberger EUREKA Fluid Mecahnics Mini-Workshop. Schlumberger-Doll Research Center. July 2016.

21. “Finite deformation constitutive models and mechanics of peridynamic mixtures.” Workshop on Non-local Material Models and Concurrent Multiscale Methods. Hausdorff Research Institute for Mathematics. Bonn, Germany. April 2017.

22. “Concepts and applications of peridynamics.” Babuška Forum Seminar. Institute for Computational Engineering and Science. The University of Texas at Austin. September 2017.

23. “Coupling FEM and meshfree peridynamics for the simulation of hydraulic fracturing.” Ninth International Workshop Meshfree Methods for Partial Differential Equations. Bonn, Germany. September 2017.

24. “Coupling FEM and meshfree peridynamics for the simulation of hydraulic fracturing.” USACM Thematic Workshop on Nonlocal Methods in Fracture. Austin, TX, January 2018

25. “Coupling FEM and meshfree peridynamics for the simulation of hydraulic fracturing.” Workshop on Meshfree Methods and Advances in Computational Mechanics, In celebration of Professor J.S. Chen’s 60th brithday. Dublin, CA. March 2019

26. “Coupling FEM and meshfree peridynamics for the simulation of hydraulic fracturing.” 15th National Congress on Computational Mechanics. Austin, TX. August 2019.

27. “Peridynamic modeling of large deformation and ductile fracture: a bond-associated, semi-Lagrangian, constitutive correspondence framework.” Tenth International Workshop Meshfree Methods for Partial Differential Equations. Bonn, Germany. September 2019.

28. “Peridynamic modeling of large deformation and ductile fracture” USACM Thematic Workshop on Experimental and Computational Fracture Mechanics. Baton Rouge, LA. February 2020.

29. “Applications of SciML in Petroleum Engineering.” XOM Optimization and Data Science Community Meeting. Virtual. February 2022.

30. “Applications of SciML in Petroleum Engineering.” (Keynote). Energy In Data Conference. Austin, TX February 2022.

31. “What it takes to be an Energy Data Scientist - A Panel Discussion.” (with M. Pyrcz). Center for Subsurface Energy & the Environment, The University of Texas at Austin. August 2022.

32. “Peridynamic modeling of ductile and quasi-brittle fracture.” **Conference Plenary**. Africomp 5. Cape Town, SA. November 2022.

33. “How Researchers Can Collaborate with AI – Panel Discussion” HPC in Energy Workshop. Houston, TX. March, 2024.

34. “Peridynamic modeling of ductile and quasi-brittle fracture.” **Plenary**. EUROMECH Colloquium 643: Advances in Peridynamic Modeling. Venice, Italy. September, 2024.

Conferences

1. “Viscoplasticity using peridynamics.” (with S.A. Silling and W. Chen) 10th US National Congress on Computational Mechanics. July 2009.

In rank of Assistant Professor

2. “Peridynamic Modeling of Localization in Ductile Metals.” (with D.J. Littewood and B.L. Boyce) International Workshop on Computational Mechanics of Materials IWCMM XXII. September 2012.

3. “Implicit time integration of an ordinary state-based peridynamic plasticity model with isotropic hardening.” (with D.J. Littlewood, J.A. Mitchell, M.L. Parks). SiViRT Simulation and Vizualization Symposium. November 2012.

4. “Implicit time integration of an ordinary state-based peridynamic plasticity model with isotropic hardening.” (with D.J. Littlewood, J.A. Mitchell, M.L. Parks). ASME IMECE 2012. November 2012.

5. “A Peridynamics Formulation of the Coupled Mechanics-Fluid Flow Problem”. (with A. Katiyar, H. Ouchi, M.M. Sharma). USACM Workshop on Nonlocal Damage and Failure: Peridynamics and other nonlocal methods. March 2013.

6. “Lessons Learned in Modeling Ductile Failure with Peridynamics”. (with D.J. Littlewood). USACM Workshop on Nonlocal Damage and Failure: Peridynamics and other nonlocal methods. March 2013.

7. “A Peridynamics Based Hierarchical Multiscale Modeling Framework Between Continuum and Atomistic Scales”. (with R. Rahman, A. Haque). USACM Workshop on Nonlocal Damage and Failure: Peridynamics and other nonlocal methods. March 2013.

8. “Two-Dimensional Semi-Analytic Solutions to the Linearized State-Based Peridynamic Equilibrium Equation”. (with J.T. O’Grady). USACM Workshop on Nonlocal Damage and Failure: Peridynamics and other nonlocal methods. March 2013.

9. “A novel hierarchical multiscale modeling framework for polyethylene systems using Peridynamics and molecular dynamics”. (with R. Rahman). 2013 Mach Conference, Annapolis, MD. April 2013.

10. “A non-local formulation for fluid flow and mass transport in porous media based on peridynamic theory”. (with A. Katiyar and M. Sharma). 12th US National Congress on Computational Mechanics. July 2013.

11. “Regularizing numerical simulations of strain-localization using a peridynamics-based plasticity formulation”. (with Md.I. Kahn, D.J. Littlewood, and J.A. Mitchell). International Workshop on Computational Mechanics of Materials, IWCMM XXIII. October 2013

12. “Bridging the length scales by linking the atomistic model with coarser peridynamic models through molecular dynamics simulation of Polyethylene”. (with R. Rahman). Mach Conference 2014. April 2014.

13. “A nonlocal poroelastic approach to fluid driven fracture.” (with J.R. York, A. Katiyar, H. Ouchi, M. Sharma). US National Congress on Theoretical and Applied Mechanics. June 2014.

14. “Reproducing Continuum Dynamics”. (with M. Bessa, W.K. Liu, T. Belytschko). World Congress on Computational Mechanics 2014. July 2014.

15. “A nonlocal poroelastic approach to fluid driven fracture.” (with J.R. York, A. Katiyar, H. Ouchi, M. Sharma). World Congress on Computational Mechanics XI. July 2014.

16. “An Overview of the Progress of Meshfree Particle Methods: From SPH to EFG to RKPM to Meshfree Peridynamics.” (with W.K. Liu, M. Bessa). Meshfree Methods for Large-Scale Computational Science and Engineering. October 2014.

17. “Fracture in plates and shells with peridynamic non-ordinary state-based models.” Meshfree Methods for Large-Scale Computational Science and Engineering. October 2014.

18. “An Ordinary State Based Plasticity Model For Peridynamics.” (with J.A. Mitchell). ASME 2014 International Mechanical Engineering Congress and Exposition. November 2014.

19. “Regularizing numerical simulations of shear-banding using a peridynamics-based plasticity formulation.” (with Md.I.H. Kahn). ASME 2014 International Mechanical Engineering Congress and Exposition. November 2014.

20. “Mesoscale Simulations Investigating the Effects of Shock Wave Stability in Granular Materials with Peridynamics.” (with R. Rahman, A. Peterson, T. Vogler). 13th US National Congress on Computational Mechanics. July 2015.

21. “Bending Failure in Peridynamic Plates.” (with J. O’Grady). ASME 2015 International Mechanical Engineering Congress and Exposition. November 2015.

22. “A peridynamic model for hydraulic fracture.” (with H. Ouchi, J.R. York, M.M. Sharma). Engineering Mechanics Institute Conference 2016. May 2016.

23. “A peridynamic model for hydraulic fracture.” (with H. Ouchi, J.R. York, M.D. Brothers, M.M. Sharma). SIAM Annual Conference. July 2016.

24. “A model for the transport of miscible fluids in the presence of anomalous diffusion.” (Keynote, with R. Tabasi). World Congress on Computational Mechanics XII. July 2016.

In rank of Associate Professor

25. “A variationally consistent approach to constrained motion.” 24th International Congress on Theoretical and Applied Mechanics. August 2016.

26. “A model for the transport of miscible fluids in the presence of anomalous diffusion.” (with R. Tabasi). USACM Thematic Workshop on Isogeometric Analysis and Meshfree Methods. October 2016.

27. “A finite deformation generalized correspondence theory for peridynamic material modeling” (with X. Xu). ASME 2016 International Mechanical Engineering Congress and Exposition. November 2016.

28. “A model for the transport of miscible fluids in the presence of anomalous diffusion.” 2017 SIAM Conference on Computational Science and Engineering. February 2017.

29. “Modeling hydraulic fracturing with a pressure dependent cap model and peridynamics.” (with J.R. York). EMI 2017. June 2017.

30. “Finite Deformation Constitutive Models and Mechanics of Peridynamic Mixtures.” (with X. Xu). 14th US National Congress on Computational Mechanics. July 2017.

31. “Coupling FEM and meshfree peridynamics for the simulation of hydraulic fracturing.” (with J.R. York) Ninth International Workshop Meshfree Methods for Partial Differential Equations. September 2017.
32. “A Finite Deformation Generalized Correspondence Theory for Peridynamic Material Modeling” (with X. Xu). ASME 2017 International Mechanical Engineering Congress and Exposition. November 2017.
33. “A Hypoelastic Constitutive Correspondence Model for Peridynamics.” (with M. Behzadnasab, X. Xu) US National Congress on Theoretical and Applied Mechanics. June 2018.
34. “Coupling FEM and meshfree peridynamics for the simulation of hydraulic fracturing.” (with J.R. York) ECCOMAS 6th European Conference on Computational Mechanics. Glasgow, UK. June 2018.
35. “Coupling FEM and meshfree peridynamics for the simulation of hydraulic fracturing.” (with J.R. York) World Congress on Computational Mechanics XIII. July 2018.
36. “Applications of SciML in Petroleum Engineering” AAPG Energy In Data Conference. Austin, TX. February, 2022.
37. “A machine-learning framework for peridynamic material models with physical constraints.” (with X. Xu and M. D’Elia) U.S. National Congress on Theoretical and Applied Mechanics. Austin, TX. June 2022.
38. “Multi-Output Physics-Informed Neural Networks for Forward and Inverse PDE Problems with Uncertainties” (with M. Yang) 17th U.S. National Congress on Computational Mechanics. Albuquerque, NM. July, 2023.
39. “Lessons learned in 15 years of peridynamics correspondence modeling” Quarter Century of Peridynamics. Tucson, AZ. April, 2024.
40. “The Rancher, the Hunter, the Renaissance Man” 16th World Conference on Computational Mechanics. Vancouver, BC. July, 2024.

Student Delivered

1. “Intragranular fracture and frictional effects in granular materials under pressure-shear loading.” (with A.M. Peterson and T.J. Vogler) 18th Biennial Intl. Conference of the APS Topical Group on Shock Compression of Condensed Matter held in conjunction with the 24th Biennial Intl. Conference of the Intl. Association for the Advancement of High Pressure Science and Technology (AIRAPT). July 2013.
2. “A complex-step method for tangent-stiffness calculation in a massively parallel computational peridynamics code.” (with M.D. Brothers and H.R. Millwater). 12th US National Congress on Computational Mechanics. July 2013.
3. “A peridynamic model of diffusive fluid flow through a deformable media.” (with J.R. York). 2013 SACNAS National Conference. October 2013.
4. “The Next Generation Model for Predicting the Growth of Complex Fracture Networks.” (with J.R. York). 2014 Hydraulic Fracturing and Sand Control Joint Industry Program Technical Review. April 2014.
5. “Peridynamic beams, plates, and shells: a non-ordinary state-based model.” (with J. O’Grady). Society of Engineering Science 2014. October 2014.

6. “Peridynamic beams, plates, and shells: a non-ordinary state-based model.” (with J. O’Grady). ASME 2014 International Mechanical Engineering Congress and Exposition. November 2014.

7. “A Peridynamic Model for Hydraulic Fracture.” (with H. Ouichi, A. Katiyar, M. Sharma). 13th US National Congress on Computational Mechanics. July 2015.

8. “Mesh-Free Non-ordinary Peridynamic Bending.” (with J. O’Grady). 13th US National Congress on Computational Mechanics. July 2015.

9. “Modeling of Contact and Non-Local Friction in a Peridynamic Framework.” (with J.R. York). 13th US National Congress on Computational Mechanics. July 2015.

10. “Modeling perturbed shock wave decay in granular materials with intra-granular fracture.” (with M. Behzadinasab and T.J. Vogler) 20th Biennial Intl. Conference of the APS Topical Group on Shock Compression of Condensed Matter. July 2017.

11. “A model for the transport of miscible fluids in the presence of anamalous diffusion.” (with R. Tabasi). ASME 2017 International Mechanical Engineering Congress and Exposition. November 2017.

12. “Ductile Fracture Modeling with Peridynamics.” (with M. Behzadnasab, X. Xu) US National Congress on Theoretical and Applied Mechanics. June 2018.

13. “Dynamic ductile fracture characterization with peridynamics: A Sandia Fracture Challenge study.” (with M. Behzadnasab) The Fourteenth Pan American Conference on Applied Mechanics (PACAM XVI). Ann Arbor, Michigan. May 2019.

14. “A stabilized hypoelastic constitutive correspondence model for peridynamics.” (with M. Behzadnasab) 2019 Minerals, Metals & Materials Society Annual Meeting & Exhibition (TMS 2019). San Antonio, Texas. March 2019.

15. “On the stability of the generalized, ordinary, finite deformation constitutive correspondence model of peridynamics.” (with M. Behzadnasab) ASME’s International Mechanical Engineering Congress & Exposition (IMECE 2018). Pittsburgh, Pennsylvania, November 2018.

16. “A peridynamic study of predicting ductile fracture in additively manufactured metal.” (with M. Behzadnasab) The 1st Annual Meeting of SIAM Texas-Louisiana Section. Baton Rouge, Louisiana. October 2018.

17. “Peridynamic modeling of dynamic fracture in metallic materials.” (with M. Behzadnasab) USACM Thematic Conference on Meshfree and Particle Methods: Applications and Theory (MFPM 2018). Santa Fe, New Mexico. September 2018.

18. “Dynamic fracture modeling of ductile materials with peridynamics.” (with M. Behzadnasab) 13th World Congress on Computational Mechanics / 2nd Pan American Congress on Computational Mechanics (WCCM 2018). New York City, New York. July 2018.

19. “Ductile fracture modeling with peridynamics.” (with M. Behzadnasab) 18th US National Congress of Theoretical and Applied Mechanics (USNC/TAM 2018). Chicago, Illinois. June 2018.

20. “Dynamic ductile fracture characterization with peridynamics: A Sandia Fracture Challenge study.” (with M. Behzadnasab) The Fourteenth Pan American Conference on Applied Mechanics (PACAM XVI). Ann Arbor, Michigan. May 2019.

21. “A stabilized hypoelastic constitutive correspondence model for peridynamics.” (with M. Behzadnasab) 2019 Minerals, Metals & Materials Society Annual Meeting & Exhibition (TMS 2019). San Antonio, Texas. March 2019.

22. “On the stability of the generalized, ordinary, finite deformation constitutive correspondence model of peridynamics.” (with M. Behzadnasab) ASME’s International Mechanical Engineering Congress & Exposition (IMECE 2018). Pittsburgh, Pennsylvania, November 2018.

23. “A peridynamic study of predicting ductile fracture in additively manufactured metal.” (with M. Behzadnasab) The 1st Annual Meeting of SIAM Texas-Louisiana Section. Baton Rouge, Louisiana. October 2018.

24. “Peridynamic modeling of dynamic fracture in metallic materials.” (with M. Behzadnasab) USACM Thematic Conference on Meshfree and Particle Methods: Applications and Theory (MFPM 2018). Santa Fe, New Mexico. September 2018.

25. “Dynamic fracture modeling of ductile materials with peridynamics.” (with M. Behzadnasab) 13th World Congress on Computational Mechanics / 2nd Pan American Congress on Computational Mechanics (WCCM 2018). New York City, New York. July 2018.

Poster

1. “Modeling perturbed shock wave decay in granular materials with intra-granular fracture.” (with M. Behzadinasab and T.J. Vogler) 20th Biennial Intl. Conference of the APS Topical Group on Shock Compression of Condensed Matter. July 2017.

2. “Intragranular fracture and frictional effects in granular materials under pressure-shear loading.” (with A.M. Peterson and T.J. Vogler) 18th Biennial Intl. Conference of the APS Topical Group on Shock Compression of Condensed Matter held in conjunction with the 24th Biennial Intl. Conference of the Intl. Association for the Advancement of High Pressure Science and Technology (AIRAPT). July 2013.

3. “A Peridynamic Model for Hydraulic Fracture.” (with J.R. York) USACM Thematic Workshop on Nonlocal Models in Mathematics, Computation, Science, and Engineering. Oak Ridge National Laboratory. October 2015.

4. “A stabilized, hypoelastic constitutive correspondence framework for peridynamics.” (with M. Behzadnasab) SIAM Conference on Computational Science and Engineering 2019 (SIAM-CSE19). Spokane, Washington. February 2019.

5. “Sandia Fracture Challenge 2017: peridynamic blind prediction of dynamic crack growth in ductile materials.” (with M. Behzadnasab) USACM Thematic Conference on Meshfree and Particle Methods: Applications and Theory (MFPM 2018). Santa Fe, New Mexico. September 2018.

6. "Sandia Fracture Challenge 2017: Peridynamics blind prediction of dynamic crack growth.' (with M. Behzadnasab) 13th World Congress on Computational Mechanics / 2nd Pan American Congress on Computational Mechanics (WCCM 2018). New York City, New York. July 2018.

SOFTWARE

Core developer for *Peridigm* open source peridynamics software

Website: https://peridigm.sandia.gov

Source Code: https://github.com/peridigm/peridigm

Various other projects developed and contributed to

Source Codes: https://github.com/johntfoster

BLOG

Contains various useful code snippets, examples, and resources primarily targeted to assist in students working under my supervision and other researchers in scientific computation.

Website: https://johnfoster.pge.utexas.edu/blog/

GRANT PROPOSALS

Funded

Role and Co-Investigators	Title	Agency	Grant Total (My Share)	Grant Period
PI	Peridynamic Simulation of Granular Materials Undergoing Shock Compression	Sandia National Laboratories	$32,597 ($32,597)	1/2012-12/2012
PI	Statistical coarse-graining of molecular dynamics into peridynamics	Subaward from ARL via Johns Hopkins University	$91,925 ($91,925)	1/2012-12/2012
co-PI, Sharma, M. (PI)	Fracture Design, Placement And Sequencing In Horizontal Wells, DE-FOA-0000724	National Energy Technology Laboratory	$1,592,451 ($275,250)	1/2012-12/2016
PI	Application of Peridynamics to Hydraulic Fracture Modeling	UTSA VPR	$18,927 ($18,927)	9/2012-8/2013
PI	Peridynamic simulation of pressure-shear experiments on granular media	Sandia National Laboratories	$29,071 ($29,071)	1/2013-12/2013
PI	Towards a multiscale failure modeling paradigm for polymers: statistical coarse-graining of molecular dynamics into peridynamics.	Subaward from ARL via The Johns Hopkins University	$91,925 ($91,925)	1/2013-12/2013
PI	Fiber failure modeling with peridynamics	Subaward from ARL via The Johns Hopkins University	$101,306 ($101,306)	1/2013-12/2013
PI	Predictive simulation of material failure using peridynamics-advanced constitutive modeling, verification, and validation, BAA-AFOSR-2012-0001	AFOSR	$360,000 ($360,000)	9/2013-12/2015

co-PI, Madenci, E. (PI),Bobaru, F. (co-PI), Chawla, N. (co-PI), Du, Q. (co-PI)	MURI Center for Material Failure Prediction Through Peridynamics, ONRBAA12-020	AFOSR	$7,500,000 ($959,153)	9/2013-12/2018
co-PI, Sharma, M. (PI)	GRA support for hydraulic fracture modeling with peridynmaics (Jason York)	IAP on Hydraulic Fracturing	$39,819 ($39,819)	1/2015-12/2015
PI	Nonlocal and fractional order methods for near-wall turbulence, large-eddy simulation, and fluid-structure interaction, ONRFOA14-012	ARO	$345,000 ($345,000)	1/2015-12/2018
co-PI, Sharma, M. (PI)	GRA support for hydraulic fracture modeling with peridynmaics (Jason York)	IAP on Hydraulic Fracturing	$33,845 ($33,845)	1/2015-12/2015
PI	Pulse Fracture Simulation	GE Global Research	$100,000 ($100,000)	1/2016-12/2016
co-PI, Sharma, M. (PI)	GRA support for hydraulic fracture modeling with peridynmaics (Shivam Agrawal)	IAP on Hydraulic Fracturing	$67,664 ($33,832)	1/2016-12/2019
PI	ASCeND: ASymptotically Compatible strong form foundations for Nonlocal Discretization.	Sandia National Laboratories	$300,000 ($300,000)	9/2018-10/2021
PI	Student and Postdoc Travel Support for the 15th US-NCCM in Austin, TX	NSF, Proj. No. 1935320.	$25,000 ($25,000)	1/2019-8/2019
co-PI, Pyrcz, M. (co-PI)	Hildebrand Seed Grant for Data Science Research Initiative	PGE	$50,000 ($25,000)	1/2019-12/2019
PI	Moncrief Grand Challenge: GFEM Framework for Reservoir Simulation of Unconventionals	Oden Institute	$75,000 ($75,000)	1/2019-9/2019
co-PI, Pyrcz, M. (co-PI)	DiReCT: Digital Reservoir Characterization Technology	DiReCT IAP	$960,000 ($420,000)	7/2019-8/2023
PI	MATNIP: Mathematical Foundations of Nonlocal Interface Problems	Sandia National Laboratories	$121,000 ($121,000)	9/2020-10/2022
PI	Assessing Capillary End Effects on Large Scale Tight Reservoir Drainage	American Chemical Society	$110,000 ($110,000)	1/2021-12/2023
co-PI, Espinoza, D (PI)	Hydrogen storage in salt caverns in the Permian Basin: Seal integrity evaluation and field test	DOE	$1,854,361 ($122,000)	9/2023-8/2026
co-PI, Lu, Y. (PI), Pyrcz, M. (co-PI)	Unconventional Well Optimization based on Machine Learning	University Lands	$75,000 ($25,000)	9/2023-8/2025
co-PI, Lu, Y. (PI), Pyrcz, M. (co-PI)	Unconventional Well Optimization based on Machine Learning	Hildebrand Seed Grant	$75,000 ($25,000)	9/2023-8/2025

		Totals	$14,094,591 ($3,805,350)
	Indicates awarded in rank		$3,713,025 ($1,281,832)
	Indicates research spending in rank		$5,369,449 ($1,779,138)

In Review

1. SciML at CAMINO: Sandia Supplementary University Partnerships Proposal. Sandia National Laboratories. 2023-2026. *PI*. Requested $525,000.
2. DOE Earthshot: Center for Multiscale Mechanics & Flow. Department of Energy LAB 23-2954, 2023-2027. Co-PI. Requested $20MM, Foster share: $909,274
3. Calcined Petroleum Coke as a High-Temperature Diagnostic Proppant for Geothermal Applications. Department of Energy DE-EE0007080, 2023-2026. Co-PI. Requested $1.5M

COURSES TAUGHT

PGE 310 - Numerical Methods and Programming (UT S2020-22)

PGE 334 - Reservoir Geomechanics (UT S2015, S2016, S2017, S2018)

PGE 383 - Advanced Geomechanics (UT F2014, F2015)

PGE 323M - Reservoir Engineering III (UT F2015-21)

Introduction to High-Performance Computing (UTSA F2012, F2013, S2014, UT S2018, F2018, S2019-23)

ME 6043 – Continuum Mechanics (UTSA F2012, F2014)

ME 4603 – Finite Element Analysis (UTSA F2011)

ME 400/500 – Numerical Methods (UNM F2010)

ADVISING AND RELATED STUDENT SERVICES

Graduate Students (Graduated)

PhD

Name	Title	Graduation Date	Program	Institution	Placement
Mingyuan Yang	Development of a physics-informed neural networks model for subsurface flow problems	8/2022	PGE	UT Austin	Postdoc at Peking University
Rambod Yousefzadeh Tabasi	Non-local methods in transport phenomena	5/2022	EM	UT Austin	Apple

Xiao Xu	Homogenization techniques for constitutive modeling in peridynamics: from analytical methods to machine learning	5/2022	CSEM	UT Austin	Banma Network Technology
Mayowa Olugbenga Oyedere (co-advised w/ K. Gray)	Improved torque and drag modeling using traditional and machine learning methods	5/2021	PGE	UT Austin	Postdoc at UT Austin
Yu Leng	Numerical analysis of reproducing kernel collocation method for linear nonlocal models	5/2020	PGE	UT Austin	Los Alamos National Lab
Shivam Agrawal (co-advised with M. Sharma)	An integrated peridynamics-finite volume based multi-phase flow, geomechanics and hydraulic fracture model	12/2019	PGE	UT Austin	SparkCognition
Masoud Behzadinasab	Peridynamic modeling of large deformation and ductile fracture	5/2019	EM	UT Austin	PTC
Jason York	Advanced hydraulic fracture modeling: peridynamics, inelasticity, and coupling to FEM	5/2018	PGE	UT Austin	Artemis Capital
James O'Grady	Peridynamic beams, plates, and shells: A nonordinary, state-based model	12/2014	ME	UTSA	Army Research Lab

MS

Name	Title	Graduation Date	Program	Institution	Placement
Muhannad Alabdullateef	Enhancing Spontaneous Imbibition Analysis Through Advanced Optimization Algorithms in Julia Programming Language	8/2024	PGE	UT Austin	PGE student at UT-Austin
Fehmi Ozbayrak (co-advised with M. Pyrcz)	A Novel Spatial Bagging Algorithm for Predictive Ensemble Machine Learning	5/2024	PGE	UT Austin	PGE student at UT-Austin
Nelson Morrow	Scientific Machine Learning in Torque and Drag Drillstring Calculations	5/2024	EM	UT Austin	Startup
Ruoyu Wang (co-advised with L. Lake & M. Pyrcz)	Neural Network-Based Forecasting: Dynamic Modeling of Reservoir Parameters using the Capacitance-Resistance Model	12/2023	PGE	UT Austin	ExxonMobil
Mohammad Suaid	A three-dimensional simulation of triaxial tests on Mancos Shale using peridynamics and the microplance constitutive model (M7)	8/2023	PGE	UT Austin	Saudi Aramco

Odai Elyas	Application of Euler-Bernoulli Finite Element Methods for Torque and Drag Model Verification	12/2022	PGE	UT Austin	PhD student at MIT
Akhil Potla (co-advised with L. Lake)	Assessing the predictability and uncertainty of Capacitance Resistance Models	5/2022	EM	UT Austin	Sandia National Laboratories
Katy Hanson (co-advised with E. van Oort)	Isogeometric analysis : applications for torque and drag models, drillstring and bottom-hole assembly design	5/2018	PGE	UT Austin	Applied Research Laboratories
Xiao Xu	Peridynamic model of poroelasticity based on Hamilton's principle	5/2021	PGE	UT Austin	PhD student at UT Austin
Eric Lynd (co-advised with Q. Nguyen)	An exploration of the IGA method for efficient reservoir simulation	5/2017	PGE	UT Austin	US Army Aberdeen Proving Ground
Sai Uppati	Investigation of pulse fracturing via peridynamics modeling and simulation	12/2016	PGE	UT Austin	SparkCognition
Amanda Peterson	Intragranular fracture and frictional effects on wave propagation through granular media	5/2014	ME	UTSA	AFRL
Md. Imran Khan	Shear band regularization with peridynamics	12/2014	ME	UTSA	
Michael Brothers	A comparison of different methods for calculating tangent-stifess matrices in a massively parallel computational peridynamics code	12/2013	ME	UTSA	
Jason York	A novel approach to torsional Kolsky bar material testing with pulse-shaping capabilities	12/2012	ME	UTSA	PhD student at UT Austin
Arron Werthiem	Report: Building and Testing a Kolsky (split-Hopkinson) Pressure Bar Materials Impact Testing Apparatus	12/2012	ME	UTSA	

Graduate Students (In Progress)

PhD

1. Elnara Rustamzade *co-advised with M. Pyrcz*
2. Barun Das (PGE)
3. Shaika Aldossary (PGE)
4. Syed Talha Tirmizi (PGE) *co-advised with M. Hesse*
5. Muhannad Alabdullateef (PGE)

MS

1. Dinghan Wang (PGE) *co-advised with M. Pyrcz & Y. Lu*

Postdoctoral Researcher's Supervised

1. James O'Grady, Ph.D. (UT)
2. Rezwanur Rahman, Ph.D. (UTSA/UT)
3. Shamima Yasmin, Ph.D. (UTSA)

Undergraduate Research Assistants

1. P. Eric Briseno, B.S.M.E. 2013
2. Robert Knobles, B.S.M.E. 2014 (Baker-Hughes)
3. Robert Brothers
4. Jason Crandall
5. Sam Petzold – Moncrief Summer Intern

ACADEMIC-RELATED PROFESSIONAL AND PUBLIC SERVICE

Conferences/Workshops Organized

1. US National Congress on Computational Mechanics 15

   Conference Chair

   Held in Austin, TX, July 28-August 1, 2019

   http://15.usnccm.org

2. Workshop on Nonlocal Methods in Fracture

   Sponsered by the US Association for Computational Mechanics.

   Held in Austin, TX, Janruary 15-16, 2018

   http://nmf2018.usacm.org

3. Workshop on Isogeometric Analysis and Meshfree Methods

   Sponsered by the US Association for Computational Mechanics.

   Held at UCSD, October 10-12, 2016

   http://iga-mf.usacm.org

4. Workshop on Meshfree Methods for Computational Science and Engineering

   Sponsered by the US Association for Computational Mechanics.

   Held at UCF, October 27-28, 2014

http://mmlcse2014.usacm.org

5. Workshop on Nonlocal Damage and Failure: Peridynamics and other nonlocal models.

   Sponsered by the US Association for Computational Mechanics.

   Held at UTSA Downtown Campus, March 11-12, 2013

   http://ndf2013.usacm.org

Mini-symposia Organized

1. Damage and Fracture. USACM Conference on Meshfree and Particle Methods: Applications and Theory. September 2018.
2. Advances in Meshfree Methods and Peridynamics. EMI 2018.
3. Peridynamic Modeling of Material Behavoir. ASME IMECE 2017.
4. Peridynamic Modeling and Simulation. USACM USNCCM13.
5. Computational Geomechanics. EMI 2016.
6. Modeling of Material Failure Using Approaches Beyond Locality: A Celebration of Dr. Stewart Silling's 60^{th} Birthday, ASME IMECE2016
7. Advances in Galerkin and Collocation Meshfree Methods, WCCM 2016.
8. Corrosion Damage and Stress Corrosion Cracking: Experiments, Modeling, and Computations, ASME IMECE2015
9. Advances in nonlocal/peridynamic modeling: Symposia in honor of Dr. Stewart Silling's 55^{th} birthday, ASME IMECE2012.
10. Multiscale methods and nonlocal theories for complex material behavior. USACM USNCCM12.
11. Multiscale Modeling of Dynamic Material Behavior, SEM Annual Conference 2014.
12. Multiscale Modeling of Dynamic Material Behavior, SEM Annual Conference 2013.
13. Multiscale Modeling of Dynamic Material Behavior, SEM Annual Conference 2012.

ADMINISTRATIVE AND COMMITTEE SERVICE

Committee Assignments

Department

PGE Undergraduate Studies 2015-2017

PGE Graduate Admissions Committee 2015-2017

PGE Department Awards Committee 2014-2017

Graduate Committee 2013-2014 (UTSA)

Faculty Search Committee 2013-2014 (UTSA)

Department Promotional Activities 2012-2013 (UTSA)

Seminar 2011-2012 (UTSA)

University

Cockrell School Engineering Honors 2015-2017

Undergraduate Research Day Planning Committee 2013-2014 (UTSA)

Student Organization Advisor

Programming for Engineers & Scientists 2016

Tau Beta Pi 2013-2014 (UTSA)

Formula SAE Car Team 2013-2014 (UTSA)

ASSOCIATE EDITOR

Journal of Peridynamics and Nonlocal Modeling

REVIEWER FOR

Journals

Computational Geosciences, Journal of Applied Mechanics, Computational Methods in Applied Mechanics and Engineering, Journal of Computational Particle Mechanics, Journal of Microelectromechanical Systems, Computational Mechanics, Int. Journal of Fracture, Applied Mathematics & Computation, Int. Journal of Impact Engineering, Engineering Fracture Mechanics, Experimental Mechanics, Review of Scientific Instruments, Int. Journal of Multiscale Computational Engineering, Int. Journal of Solids and Structures, CMC: Computers, Materials, & Continua, Journal of Mechanics of Materials and Structures.

Books

Split Hopkinson (Kolsky) Bar. W. Chen and B. Song. Springer 2010.

Book Proposals

CRC Press

ORGANIZATIONS

Society of Petroleum Engineers, US Association for Computational Mechanics, Pi Tau Sigma - Mechanical Engineering Honor Fraternity, Tau Beta Pi - National Engineering Honor Society, American Society of Mechanical Engineers, American Institute of Aeronautics and Astronautics, Society for Experimental Mechanics – Dynamic Behavior of Materials Technical Division Committee Member, DYMAT, American Society for Engineering Education

VITA

John T. Foster is an professor in the Departments of Petroleum and Geosystems Engineering and Aerospace Engineering and Engineering Mechanics (by courtesy) at the University of Texas at Austin. He is co-founder and CTO of Daytum. He received his BS and MS in mechanical engineering from Texas Tech University and PhD from Purdue University. He is a registered Professional Engineer in the State of Texas. During his career in research he has been involved in many projects ranging from full scale projectile penetration field tests, to laboratory experiments using Kolsky bars, to modeling and simulation efforts using some of the world's largest computers. His research interests are in experimental and computational mechanics and multi-scale modeling with applications to geomechanics, impact mechanics, fracture mechanics, and anomalous transport processes. Additionally, he has interest in fundamental theoretical advancement of the peridynamic theory of solid mechanics. His teaching interests are in all areas of theoretical and computational mechanics.