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Lei Li

Ph.D.

Work & Research Interests

I am interested in high-performance computational mechanics and integrated computational materials engineering (ICME), with a focus on multiscale and multiphysics modeling of deformation and failure in complex structural and material systems. My goal is not merely understanding and developing computational approaches for the solution of forward problems, but also in incorporating the high-fidelity models into design optimization for inverse design-seeking applications in the broad areas of civil and infrastructural engineering, mechanical engineering, aerospace and automobile engineering, material science, nuclear engineering, as well as advanced manufacturing.

Education

2018 **Ph.D. in Civil Engineering**, *University of Notre Dame*, Notre Dame, IN, USA.

- *Advisor:* Prof. Kapil Khandelwal
- *Dissertation:* Topology optimization of structures with microstructural and elastoplastic-damage effects

2012 **M.S. in Structural Engineering**, *Hunan University*, Changsha, Hunan, China.

- *Advisor:* Prof. Yan Xiao
- *Thesis:* Research on creep property of glubam and modern bamboo composite structure

2009 **B.E. in Civil Engineering**, *Hunan University*, Changsha, Hunan, China.

Professional Experience

Research Experience

9/2022-now **Senior Computational Scientist III**, *Energy & Environmental Directorate*, PNNL, Richland, WA.

Research Topic: High-performance, high-fidelity multi-scale and multi-physics simulations for advanced manufacturing and nuclear engineering.

8/2021-8/2022 **Computational Scientist II**, *Physical & Computational Sciences Directorate*, PNNL, Richland, WA.

Research Topic: High-performance meshfree method for solid-phase processing (SPP) and computational structural/material mechanics.

- Carried out high-resolution meshfree SPH simulations for solid-phase processing (SPP) problems (e.g., friction extrusion, ShAPE, FSW/FSP, cold spray, friction riveting, etc.) using high-performance computing;

- Developed high-fidelity computational models to understand material mechanical response under extreme working conditions and linking process, structure, property, and performance for advanced manufacturing;
- Developed discrete element method (DEM) model to simulate powder compaction and DEM-SPH-FEM coupled model for friction extrusion of MMC rods;
- Developed physics-based material constitutive models for SPP, and implemented them in user-defined material subroutine under Fortran scripting environment that can be embedded in the meshfree SPH simulation framework.

1/2020-7/2021 **Post Doctorate Research Associate C**, *Physical & Computational Sciences Directorate*, PNNL, Richland, WA.

Research Topic: Meshfree method for solid-phase processing and computational material mechanics.(*Mentor:* Dr. Ayoub Soulami)

- Developed robust meshfree smoothed particle hydrodynamics (SPH) model for thermomechanically coupled solid-phase processing (SPP) problems;
- Developed microstructure-based FE models in support of the hot-rolling fabrication process of U-10Mo fuel foil;
- Carried out FEA for advanced manufacturing and joining processes under extreme conditions, such as metal shearing, high-speed riveting, tribometer testing.

10/2018-12/2019 **Postdoctoral Scholar**, *Department of Structural Engineering*, UCSD, San Diego, CA.

Research Topic: Multiscale and multiphysics topology optimization for additive manufacturing. (*Advisor:* Prof. Hyunsun Alicia Kim)

- Developed high performance computational multiscale models for thermal-mechanical-fluid coupled problems;
- Carried out concurrent structural and material design using multiscale topology optimization based via the SLP level set method;
- Coupled fluid pressure load, self-weight, thrust load and thermal expansion together into level set based topology optimization for jet engine design;
- Developed high performance and parallel computing algorithms for decoupled concurrent multiscale topology optimization under C++ and Python scripting environment;
- Worked as a core member on 4 projects funded by NASA, DARPA, Rolls-Royce and NSF;
- Mentored 2 master students and 5 undergraduate students to carry out research on design for additive manufacturing using topology optimization.

08/2012-09/2018 **Research Assistant**, *Department of CEEES*, University of Notre Dame, Notre Dame, IN.

Research topic: Optimal structural designs using linear and nonlinear topology optimization. (*Advisor:* Prof. Kapil Khandelwal)

- Implemented Lemaitre coupled damage model, CrachFEM uncoupled damage model, implicit nonlocal damage model and micromechanical-based Gurson-Tvergaard-Needleman (GTN) model with shear effect modification for the structural strength and softening analyses, respectively;
- Combined various damage models into density-based topology optimization for damage-resistant energy absorbing structural design with specific numerical treatments to deal with the numerical instability issues;
- Realized the Bauschinger effect in metals under cyclic loads based on the kinematic hardening model. Proved that the Bauschinger effect has negative effect in energy dissipation capacity in the topology optimized structure, and this effect becomes more prominent with more loading cycles;

- Implemented the Hoffmann plasticity model to simulate the plastic anisotropy. Utilized the enhanced assumed strain (EAS) element to address the locking issue and incorporated the Hoffmann model into topology optimization;
- Proposed a unified path-dependent adjoint sensitivity analysis framework for topology optimization with a wide range of transient nonlinear coupled systems;
- Captured the material microstructural length-scale effects using Mindlin's elasticity with microstructure theory and gradient elasticity theory. Incorporated both theories into topology optimization based on higher-order elements for design of structure with length-scale effect;
- Developed efficient dual sequential approximation (DSA) algorithms for structural and topology optimization problems;
- Participated in two research projects funded by NSF, helped advisor writing two research proposals submitted to NSF and one of them: "Physics-Based, Nonlinear, Multi-scale, Topology Optimization Framework for Designing Additively Manufactured Energy Dissipating Structural Fuses for Steel Building Systems ($388,813.00)" get funded in 05/2018.

09/2009- 05/2012 **Research Assistant**, *Department of CE*, Hunan University, Changsha, Hunan, China.

Research Topic: Experimental and numerical studies of the creep behavior of glubam. (*Advisor:* Prof. Yan Xiao)

- Tested the basic mechanical behaviors of glued laminated bamboo (GluBam) material under tension, compression and shear, etc.;
- Designed and conducted the creep testing of GluBam material as well as the full-scale composite CFRP-reinforced GluBam beam;
- Derived the numerical model for predicting the long-term creep deformation in GluBam beam, and verified the model by experimental data.

Teaching Experience

10/2019 **Guest Lecturer**, *Department of Structural Engineering*, UCSD.

- SE 285, Structural Optimization (Grad), Fall 2019.
- SE 286, Design Optimization for Additive Manufacturing (Grad), Fall 2019.

5/2019 **Lecturer**, *Center for Extreme Events Research, Department of Structural Engineering*, UCSD.

- Short Course on Topology Optimization for Additive Manufacturing, Interdisciplinary Training and Networking in Engineering and Next Generation in Simulation and Experimentation.

10/2018 **Guest Lecturer**, *Department of Structural Engineering*, UCSD.

- SE 286, Design Optimization for Additive Manufacturing (Grad), Fall 2018.

08/2012- 05/2018 **Teaching Assistant**, *Department of CEEES*, University of Notre Dame.

- CE 40270, Reinforced Concrete Design (Undergrad), Spring 2018;
- CE 60260, Advanced Structural Analysis I (Grad), Spring 2015;
- CE 40270, Reinforced Concrete Design (Undergrad), Fall 2014;
- CE 40280, Structural Steel Design (Undergrad), Spring 2014;
- CE 20150, Statics (Undergrad), Fall 2012, Fall 2013;
- CE 30210, Structural Analysis (Undergrad), Spring 2013.

Awards and Honors

2022 **MP-1 Task Outstanding Performance Award**, *Department of Energy*, USA.

2017 **CRC Award for Computational Sciences and Visualization**, *Notre Dame Center for Research Computing* , USA. [Link to news].

2017 **Zahn Research Travel Grant**, *Notre Dame College of Engineering*, USA.

2015 **Chinese Government Award for Outstanding Self-Financed Student Abroad**, *Chinese Scholarship Council*, China. [Link to news].

2014 **Notebaert Professional Development Award**, *Notre Dame Graduate School*, USA.

2015-2018 **GSU Conference Presentation Grant**, *Notre Dame Graduate Student Union*, USA.

2012 **Outstanding Graduate Student Award of Hunan University**, *Hunan University*, China.

2012 **Outstanding Graduate Student Award of Hunan Province**, *Hunan Province Department of Education*, China.

2010-2011 **Excellent Graduate Student Cadres Award**, *Hunan University*, China.

2009-2011 **First Class Scholarship for Graduate Students**, *Department of Education*, China.

Invited Talks

Damage Resistant Inelastic Designs using Topology Optimization. *International Workshops on Advances in Computational Mechanics IV (IWACOM-IV)*, Nagoya, Japan, September 17, 2020.

Topology Optimization of Structures and Materials with Elastoplastic-damage and Length-scale Effects. *Chongqing University*, Chongqing, China, March 14, 2020.

Topology Optimization of Structures and Materials with Elastoplastic-damage and Length-scale Effects. *Utah State University*, Logan, Utah, USA, March 9, 2020.

Design of Failure Resistant Energy Dissipating Systems using Structural Topology Optimization. *University of British Columbia*, Kelowna, BC, Canada, Nov 13, 2019. (Declined)

Multiphysics Topology Optimization Design for Aerospace Engineering Application. (Webinar talk) *Rolls-Royce*, Derby, UK, September 5, 2019.

Design of Failure Resistant Energy Dissipating Systems using Structural Topology Optimization. *Clarkson University*, Potsdam, New York, USA, April 1, 2019.

Peer-reviewed Journal Publications

Published & Accepted Papers & Closures

[35] B.K. Milligan, **L. Li**, M. Komarasamy, T. Roosendaal, A. Soulami, and S. Whalen. Cladding and butt-joining dissimilar aluminum alloys simultaneously via shear assisted processing and extrusion. *JOM*, 2023. DOI: 10.1007/s11837-023-05855-x.

[34] W.E. Frazier, **L. Li**, K.S. Choi, Y. Fu, Z. Xu, V. Joshi, and A. Soulami. Microstructure-process relationships in monolithic U-10Mo fuel foil single-pass rolling: a simulation parameter study. *Journal of Nuclear Materials*, 2023. 154271. DOI: 10.1016/j.jnucmat.2023.154271.

[33] **L. Li**, M. Reza-E-Rabby, N. Overman, T. Wang, S. Whalen, and A. Soulami. Meshfree simulation and analysis of contact conditions and microstructure evolution in shear assisted processing and extrusion. *Materials & Design*, 2022, 221. 111010. DOI: 10.1016/j.matdes.2022.111010.

[32] **L. Li**, A. Fortier, D.R. Tamayo, V. Joshi, and A. Soulami. Minimizing thickness variation in monolithic U-10Mo fuel foil and Zr interlayer during hot rolling: A microstructure-based finite element method analysis. *Materials Today Communications*, 2022, 32. 103910. DOI: 10.1016/j.mtcomm.2022.103910.

[31] Y. Fu, W.E. Frazier, K.S. Choi, **L. Li**, Z. Xu, V. Joshi, and A. Soulami. Prediction of grain structure after thermomechanical processing with sensitivity analysis and machine learning surrogate in U-10Mo alloy. *Scientific Reports*, 2022, 12. 10917. DOI: 10.1038/s41598-022-14731-8.

[30] B. Gwalani, Q. Pang, A. Yu, W. Fu, **L. Li**, M. Pole, C. Roach, S. Mathaudhu, T. Ajantiwalay, M. Efe, S. Hu, M. Song, A. Soulami, A. Rohatgi, Y. Li, P. Sushko, and A. Devaraj. Extended shear deformation of the immiscible CuNb alloy resulting in nanostructuring and oxygen ingress with enhancement in mechanical properties. *ACS Omega*, 2022, 7(6). 13721-13736. DOI: 10.1021/acsomega.1c07368.

[29] S Li, **L. Li**, A. Soulami, C.A. Powell, S. Mathaudhu, A. Devaraj, and C. Wang. In-situ observation of deformation twin associated sub-grain boundary formation in copper single crystal under bending. *Materials Research Letters*, 2022: 114214. DOI: 10.1016/j.scriptamat.2021.114214.

[28] W.E. Frazier, **L. Li**, B. Gwalani, J. Silverstein, A. Devaraj, A. Soulami, and P.V. Sushko. An approach for the microstructure-sensitive simulation of shear-induced deformation and recrystallization in Al-Si alloys. *Metallurgical and Materials Transactions A*, 2022: 1-21. DOI: 10.1007/s11661-022-06606-4.

[27] **L. Li**, V. Gupta, X. Li, A.P. Reynolds, G. Grant and A. Soulami. Meshfree simulation and experimental validation of extreme thermomechanical conditions in friction stir extrusion. *Computational Particle Mechanics*, 2021, 8(0): 1-21. DOI: 10.1007/s40571-021-00445-7.

[26] S. Li, M. Olszta, **L. Li**, B. Gwalani, A. Soulami, C.A. Powell, S. Mathaudhu, A. Devaraj, and C. Wang. In-situ TEM observation of shear induced microstructure evolution in Cu-Nb alloy. *Scripta Materialia*, 2021, 205(0): 114214. DOI: 10.1016/j.scriptamat.2021.114214.

[25] T. Wang, **L. Li**, M.R. Pallaka, H. Das, S. Whalen, A. Soulami, P. Upadhyay and K.S. Kappagantula. Mechanical and microstructural characterization of AZ31 magnesiumcarbon fiber reinforced polymer joint obtained by friction stir interlocking technique. *Materials & Design*, 2020, 198(0): 109305. DOI: 10.1016/j.matdes.2020.109305.

[24] B. Gwalani, M. Olszta, S. Verma, **L. Li**, A. Soulami, E. Kautz, S. Pathak, A. Rohatgi, P. Sushko, S. Mathaudhu, C.A. Powell and A. Devaraj. Extreme shear-deformation-induced modification of defect structures and hierarchical microstructure in an AlSi alloy. *Natural Communication Materials*, 2020, 1(1): 1-7. DOI: 10.1038/s43246-020-00087-x.

[23] **L. Li** and K. Khandelwal. Topology optimization of energy dissipating plastic structures with shear modified Gurson-Tvergaard-Needleman (GTN) model. *Journal of Structural Engineering*, 2020, 146(11): 04020229. DOI: 10.1061/(ASCE)ST.1943-541X.0002790.

[22] T. Wang, P. Upadhyay, M. Reza-E-Rabby, X. Li, **L. Li**, A. Soulami, K.S. Kappagantula and S. Scott. Joining of thermoset carbon fiber reinforced polymer and AZ31 magnesium alloy sheet via friction stir interlocking. *The International Journal of Advanced Manufacturing Technology*, 2020, 109(3): 689-698. DOI: 10.1007/s00170-020-05717-9.

[21] **L. Li**, Z. Du and H.A. Kim. Design of architected materials for thermoelastic macrostructures using level set method. *JOM*, 2020, 72(0): 1734-1744. DOI: 10.1007/s11837-020-04046-2.

[20] Y.Zhu, R. Kiran, J. Xing Z. Pan and **L. Li**. A modified micromechanics framework to predict shear involved ductile fracture in structural steels at intermediate and low-stress triaxialities. *Engineering Fracture Mechanics*, 2020, 225(0): 106860. DOI: 10.1016/j.engfracmech.2019.106860.

[19] **L. Li**, G. Zhang and K. Khandelwal. Failure resistant topology optimization of structures using nonlocal elastoplastic-damage model. *Structural and Multidisciplinary Optimization*, 2018, 58(4): 15891618. DOI: 10.1007/s00158-018-1984-5.

[18] J. Liu, A. Gaynor, S. Chen, Z. Kang, K. Suresh, A. Takezawa, **L. Li**, J. Kato, J. Tang, C.L. Wang, L. Cheng, X. Liang and A.C. To. Current and future trends in topology optimization for additive manufacturing. *Structural and Multidisciplinary Optimization*, 2018, 56(6): 24572483. DOI: 10.1007/s00158-018-1994-3.

[17] R. Alberdi, G. Zhang, **L. Li** and K. Khandelwal. A unified framework for nonlinear path-dependent sensitivity analysis in topology optimization. *International Journal for Numerical Methods in Engineering*, 2018, 115(1): 1-56. DOI: 10.1002/nme.5794.

[16] R. Kiran, **L. Li** and K. Khandelwal. Closure to "Complex perturbation method for sensitivity analysis of nonlinear trusses" by Ravi Kiran, Lei Li and Kapil Khandelwal. *ASCE Journal of Structural Engineering*, 2017, 143(12): 07017006. DOI: 10.1061/(ASCE)ST.1943-541X.0001919.

[15] **L. Li** and K. Khandelwal. Design of fracture resistant energy absorbing structures using elastoplastic topology optimization. *Structural and Multidisciplinary Optimization*, 2017, 56(6): 1447-1475. DOI: 10.1007/s00158-017-1735-z.

[14] **L. Li**, G. Zhang and K. Khandelwal. Design of elastoplastic structures under cyclic loads using topology optimization. *Structural and Multidisciplinary Optimization*, 2017, 56(2): 391-412. DOI: 10.1007/s00158-017-1671-y.

[13] **L. Li**, G. Zhang and K. Khandelwal. Topology optimization of energy absorbing structures with maximum damage constraint. *International Journal for Numerical Methods in Engineering*, 2017, 112(7): 737-778. DOI: 10.1002/nme.5531. [**One of the top 20 most downloaded recent papers between 07/2016 and 06/2018.**]

[12] **L. Li**, G. Zhang and K. Khandelwal. Topology optimization of structures with gradient elastic material. *Structural and Multidisciplinary Optimization*, 2017, 56(2): 371-390. DOI: 10.1007/s00158-017-1670-z.

[11] **L. Li** and K. Khandelwal. Topology optimization of geometrically nonlinear trusses with spurious eigenmodes control. *Engineering Structures*, 2017, 131(0): 324-344. DOI: 10.1016/j.engstruct.2016.11.001.

[10] G. Zhang, **L. Li** and K. Khandelwal. Topology optimization of structures with anisotropic plastic materials using enhanced assumed strain elements. *Structural and Multidisciplinary Optimization*, 2017, 55(6): 1965-1988. DOI: 10.1007/s00158-016-1612-1.

[9] R. Kiran, **L. Li** and K. Khandelwal. Complex perturbation method for sensitivity analysis of nonlinear trusses. *ASCE Journal of Structural Engineering*, 2016, 143(1): 04016154. DOI: 10.1061/(ASCE)ST.1943-541X.0001619.

[8] **L. Li** and K. Khandelwal. Topology optimization of structures with length-scale effects using elasticity with microstructure theory. *Computers & Structures*, 2015, 157(0): 165-177. DOI: 10.1016/j.compstruc.2015.05.026.

[7] R. Kiran, **L. Li** and K. Khandelwal. Performance of cubic convergent methods for implementing nonlinear constitutive models. *Computers & Structures*, 2015, 156(0): 83-100. DOI: 10.1016/j.compstruc.2015.04.011.

[6] **L. Li** and Y. Xiao. Creep behavior of glubam and CFRP-enhanced glubam beams. *ASCE Journal of Composites for Construction*, 2015, 20(1): 04015028. DOI: 10.1061/(ASCE)CC.1943-5614.0000585.

[5] **L. Li** and K. Khandelwal. An adaptive quadratic approximation for structural and topology optimization. *Computers & Structures*, 2015, 151(0): 130-147. DOI: 10.1016/j.compstruc.2015.01.013.

[4] **L. Li** and K. Khandelwal. Volume preserving projection filters and continuation methods in topology optimization. *Engineering Structures*, 2015, 85(0): 144-161. DOI: 10.1016/j.engstruct.2014.10.052.

[3] Y. Xiao and **L. Li**. Long-term loading behavior of a full-scale glubam bridge model. *ASCE Journal of Bridge Engineering*, 2014, 19(9): 04014027. DOI: 10.1061/(ASCE)BE.1943-5592.0000600.

[2] **L. Li** and K. Khandelwal. Two-point gradient-based MMA (TGMMA) algorithm for topology optimization. *Computers & Structures*, 2014, 131(0): 34-45. DOI: 10.1016/j.compstruc.2013.10.010.

[1] Y. Xiao, R. Yang, B. Shan, L. She and **L. Li**. Experimental research on mechanical properties of glubam. *Journal of Building Structures*, (in Chinese), 2012, 33(11): 150-157. https://article_en/cjfdtotal-jzjb201211019.

Conference Presentations & Posters & Proceedings

[43] K. Balusu, **L. Li**, K. Choi, and A. Soulami. Coupling smoothed particle hydrodynamics with finite element method to simulate residual stresses from friction stir processing (**Proceeding**). *ASME IMECE 2022*, Columbus, OH,USA Oct 30-Nov 2, 2022.

[42] A. Soulami, W.E. Frazier, Y. Fu, K. Choi, **L. Li**, C.A. Lavender, and V.V. Joshi. ICME and ML framework to predict the microstructure during U-10Mo fuel fabrication (**Poster**). *IAEA NuMAT 2022*, Gent, Belgium, Oct 24-28, 2022.

[41] A. Soulami, **L. Li**, Z.F. Huber, C.A. Lavender, and V.V. Joshi. Microstructure-based finite element analysis of thermophysical properties of unirradiated U3Si2-Al dispersion fuel (**Poster**). *IAEA NuMAT 2022*, Gent, Belgium, Oct 24-28, 2022.

[40] A. Soulami, W.E. Frazier, Y. Fu, **L. Li**, K. Choi, Z. Xu, and V.V. Joshi. Microstructure-based finite element analysis of thermophysical properties of unirradiated U3Si2-Al dispersion fuelICME and ML Modeling framework of U-10%wt Mo fabrication processes. *MS&T 2022*, Pittsburgh, PA, USA, Oct 9-12, 2022.

[39] R. Kalsar, B.J. Schuessler, X. Ma, J.T. Darsell, T. Wang, S. Niverty, **L. Li**, A. Soulami, D.R. Herling, and V.V. Joshi. Development of hierarchical aluminum-based metal matrix composites using friction extrusion. *MS&T 2022*, Pittsburgh, PA, USA, Oct 9-12, 2022.

[38] D. Ramirez-Tamayo, **L. Li**, B.J. Schuessler, V.V. Joshi, and A. Soulami. Effect of processing parameters on the mechanical performance of high velocity joining (HiVe) through finite element modeling. *MS&T 2022*, Pittsburgh, PA, USA, Oct 9-12, 2022.

[37] B.J. Schuessler, D. Ramirez-Tamayo, S. Niverty, **L. Li**, A. Soulami, D.R. Herling, and V.V. Joshi. Solid phase joining of AA6061-T6 joints via high velocity riveting. *MS&T 2022*, Pittsburgh, PA, USA, Oct 9-12, 2022.

[36] S. Niverty, R. Kalsar, A. Naccarelli, T. Eden, A. Soulami, **L. Li**, G.J. Grant, D.R. Herling, and V.V. Joshi. Optimization of the microstructure and performance of aluminum alloy cold spray coatings on cast magnesium alloy substrates. *MS&T 2022*, Pittsburgh, PA, USA, Oct 9-12, 2022.

[35] V.V. Joshi, A. Soulami, Z. Xu, **L. Li**, K. Choi, Y. Fu, W.E. Frazier, E. Conte, S. Imhoff, T. Mason, Z.F. Huber, M. Erin, J. Rick, L. Erik, and C.A. Lavender. Process modeling of U-10Mo and U3Si2 using integrated computational materials engineering. *RERTR 2022*, Vienna, Austria, Oct 2-5, 2022.

[34] **L. Li**, A. Soulami, V.V. Joshi, C.A. Lavender, K.P. Brooks, and Z.F. Huber. Modeling of thermophysical properties in a uranium silicide dispersion fuel to support conversion of HFIR to LEU fuels. *RERTR 2022*, Vienna, Austria, Oct 2-5, 2022.

[33] K. Choi, **L. Li**, A. Soulami, V.V. Joshi, C.A. Lavender, K.P. Brooks, and Z.F. Huber. Modeling insights in forming and rolling complex geometries of highly loaded uranium silicide dispersion fuels. *RERTR 2022*, Vienna, Austria, Oct 2-5, 2022.

[32] Z.F. Huber, E.R. Conte, V.V. Joshi, A. Soulami, D.R. Merkel, D.T. Clelland, K. Choi, **L. Li**, P. Upadhyay, K.P Brooks, M.A. Rossite, and C.A. Lavender. Fabrication process research and development to support HFIR LEU silicide conversion. *RERTR 2022*, Vienna, Austria, Oct 2-5, 2022.

[31] A. Soulami, **L. Li**, G.J. Grant, J. Fernandez dos Santos, and C.A. Powell, Meshfree modeling framework for friction stir welding and processing of Al alloys. *ISFSWP 2022*, Lüneburg, Germany, Sep 28-30, 2022.

[30] W.E. Frazier, Y. Fu, **L. Li**, and R. Devanathan, Surrogate model to predict microstructure and mechanical properties in stainless steel cladding under reactor operating conditions. *ASM IMAT 2022*, New Orleans, LA, USA, Sep 12-15, 2022.

[29] **L. Li**, X. Li, A.P. Reynolds, G.J. Grant, and A. Soulami. Numerical simulation and analysis of solid phase processing: a validated friction extrusion smoothed particle hydrodynamics model (**Poster**). *TMS ICME 2022*, Lake Tahoe, Nevada, USA, April 24-28, 2022.

[28] A. Soulami, W.E. Frazier, K. Choi, **L. Li**, Z. Xu, Y. Fu, and C.A. Lavender. ICME modeling of fabrication of U-10%wt Mo alloys. *TMS ICME 2022*, Lake Tahoe, Nevada, USA, April 24-28, 2022.

[27] S. Li, **L. Li**, B. Gwalani, M.J. Olszta, A. Soulami, P. Sushko, C.A. Powell, S. Mathaudhu and A. Devaraj. In-situ TEM observation of bending induced sub-grain boundary formation in copper single crystal. *Microscopy & Microanalysis 2021 (M&M 2021)*, Virtual, August 1-5, 2021. DOI: 10.1017/S1431927621011739.

[26] S. Li, N. Chen, B. Gwalani, M.J. Olszta, **L. Li**, A. Soulami, P. Sushko, A. Rohatgi, Y. Li, C.A. Powell, S. Mathaudhu, A. Devaraj, S. Hu and C. Wang. Dynamic observation of shear induced reversible low angle grain boundary formation in metals. *2021 MRS Spring Meeting & Exhibit*, Virtual, April 17-23, 2021.

[25] A. Devaraj, T. Liu, C. Park, M.J. Olszta, B. Gwalani, **L. Li**, W. Fu, Q. Pan, S. Sinogeikin, A. Soulami, Y. Li, P. Sushko, S. Mathaudhu and C.A. Powell. In-situ analysis of microstructure evolution of metallic alloys under high-speed rotational shear deformation. *TMS 2021 Annual Meeting & Exhibition*, Virtual, March 15-18, 2021.

[24] Y. Fu, W. Frazier, K. Choi, **L. Li**, Z. Xu, V. Joshi and A. Soulami. A sensitivity analysis of microstructure-based model for U-10Mo hot rolling and annealing. *TMS 2021 Annual Meeting & Exhibition*, Virtual, March 15-18, 2021.

[23] **L. Li**, V. Joshi and A. Soulami. Modeling and analysis of the effects of the microstructure on U-10Mo fuel thickness variation during hot rolling. *TMS 2021 Annual Meeting & Exhibition*, Virtual, March 15-18, 2021.

[22] W. Frazier, K. Choi, **L. Li**, Z. Xu, V. Joshi and A. Soulami. Effect of microstructure and rolling treatment on static recrystallization behavior in monolithic U-10Mo fuel foils. *TMS 2021 Annual Meeting & Exhibition*, Virtual, March 15-18, 2021.

[21] **L. Li**, X. Li, A. Reynolds, G. Grant and A. Soulami. Numerical simulation and analysis of solid phase processing: a validated friction extrusion smoothed particle hydrodynamics model. *TMS 2021 Annual Meeting & Exhibition*, Virtual, March 15-18, 2021.

[20] W. Frazier, B. Gwalani, **L. Li**, A. Soulami, A. Devaraj and P. Sushko. A simulation survey of recrystallization behavior in Al-xSi microstructures under shear loading conditions. *TMS 2021 Annual Meeting & Exhibition*, Virtual,March 15-18, 2021.

[19] X. Li, M. Reza-E-Rabby, **L. Li**, A. Soulami, G. Grant and A. Reynolds. Effect die geometry on rate-controlled friction extrusion. *TMS 2021 Virtual*, March 15-18, 2021.

[18] A. Soulami, **L. Li**, W.E. Frazier, K. Choi, C.A. Lavender and V.V. Joshi. Effect of microstructure and rolling treatment on thickness variation and static recrystallization behavior in monolithic U-10Mo fuel foils. *European Research Reactor Conference 2020 (RRFM-2020)*, Helsinki, Finland, October 12-15, 2020.

[17] **L. Li**, A. Neofytou, R. Paiva, A. Keskin and H.A. Kim. Topology optimization of a turbomachinery casing structure using the level set method. *2020 ASME Turbo Expo Virtual Event*, London, England, September 21-25, 2020. DOI: 10.1115/GT2020-16036.

[16] **L. Li**, G. Grant and A. Soulami.Numerical simulation and analysis of solid phase processing using smoothed particle hydrodynamics. *2020 PNNL Postgraduate Research Symposium*, Richland, USA, August 28, 2020.

[15] **L. Li** and H.A. Kim. Multiscale topology optimization of thermoelastic structures using the level set method. *2020 AIAA SciTech Forum*, Orlando, Florida, USA, January 6-10, 2020. DOI: 10.2514/6.2020-0890.

[14] **L. Li** and H.A. Kim. Multiscale topology optimization of compliant mechanisms using level set method. *15th U.S. National Congress on Computational Mechanics (USNCCM-15)*, Austin, Texas, USA, July 28-August 1, 2019.

[13] **L. Li**, Z. Du and H.A. Kim. Design of architected materials using multiscale level set topology optimization. *15th U.S. National Congress on Computational Mechanics (USNCCM-15)*, Austin, Texas, USA, July 28-August 1, 2019.

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Journal Editor & Reviewer

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Journal of Materials in Civil Engineering, *Reviewer*

Engineering Fracture Mechanics, *Reviewer*

Engineering Optimization, *Reviewer*

Journal of Structural Engineering, *Reviewer*

International Journal for Numerical Methods in Engineering, *Reviewer*

Structural and Multidisciplinary Optimization, *Reviewer*

Mechanics Research Communications, *Reviewer*

Engineering Structures, *Reviewer*

Optimization Methods and Software, *Reviewer*

Acta Mechanica Sinica, *Reviewer*

Advances in Structural Engineering, *Reviewer*

International Journal of Damage Mechanics, *Reviewer*

Computational Particle Mechanics, *Reviewer*

Steel and Composite Structures, *Reviewer*

Professional Affiliations

U.S. Association of Computational Mechanics (*USACM*)

Earthquake Engineering Research Institute (*EERI*)

American Society of Civil Engineers (*ASCE*)

International Society for Structural and Multidisciplinary Optimization (*ISSMO*)

Engineering Mechanics Institute (*EMI*)

The Minerals, Metals & Materials Society (*TMS*)

Core Courseworks

- Nonlinear Structural Analysis
- Nonlinear Solid Mechanics
- Applied/Computational Probability in Engineering
- Computational Inelasticity
- Structural Fracture and Fatigue
- Structural Dynamics
- Finite Element Method
- Partial Differential Equations
- Numerical Methods
- Applied Bayesian Statistics
- Applied Probability