Hailong Chen, Ph.D.

Assistant Professor
University of Kentucky, Department of Mechanical Engineering
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EDUCATION

Doctor of Philosophy in Mechanical Engineering **07/2015**
Arizona State University, Tempe, AZ 85287

Master of Science in Mechanical Engineering **05/2012**
University of Florida, Gainesville, FL 32611

Bachelor of Science in Mechanical Engineering **07/2010**
Shanghai Normal University, Shanghai 201418, China.

PROFESSIONAL EXPERIENCE

Assistant Professor **08/2018-present**
Mechanical Engineering, University of Kentucky

Postdoctoral Computational Scientist **11/2015-08/2018**
Computational Model Development Group, Fuels Modeling & Simulation, Idaho National Laboratory

Postdoctoral Research Associate **07/2015-10/2015**
Complex Materials Group, Materials Science and Engineering, Arizona State University

Research Associate **08/2012-07/2015**
Mechanical Engineering, Arizona State University

RESEARCH PROJECTS

- **Multi-physics Simulations of RIA and LOCA Events with Post-Event Fuel Migration Experiments**
  Sponsor: Idaho National Laboratory
  Program: Laboratory Directed Research & Development (LDRD)
  Period: 10/2016-10/2019
  Brief: The nuclear fuels performance is heavily affected by the fracture of fuel pellets. The complex network of cracks causes the fuel outside diameter to expand, enhancing the thermal conductance across the pellet/cladding gap and decreasing the thermal conductivity within the fuel. This project aims to develop MOOSE-based capabilities needed to model fragmentation and large relative motion and interaction of fuel fragments in a Loss of Coolant Accident scenario using Peridynamics theory.

JOURNAL PUBLICATIONS

13. **H. Chen** (2018). Bond-associated Deformation Gradients for Peridynamic Correspondence Model. *Mechanics Research Communication*, 90, 34-41.

12. Y. Hu, **H. Chen**, B. W. Spencer, and E. Madenci (2018). Thermomechanical Peridynamic

Analysis with Non-uniform Domain Discretization. *Engineering Fracture Mechanics*, 197, 92-113.

11. **H. Chen**, and Y. Liu (2016). Deformation and Failure Analyses of Cross-ply Laminates Using a Nonlocal Discrete Model. *Composite Structures* 152, 1007-1013.

10. **H. Chen**, L. Meng, S. Chen, Y. Jiao and Y. Liu (2016). Numerical Investigation of Microstructure Effect on Mechanical Properties of Bi-continuous and Particulate Reinforced Composite Materials. *Computational Materials Science* 122, 288-294.

9. **H. Chen**, Y. Xu, Y. Jiao and Y. Liu (2016). A Novel Discrete Computational Tool for Microstructure-sensitive Mechanical Analysis of Composite Materials. *Materials Science and Engineering: A* 659, 234-241.

8. **H. Chen**, Y. Jiao and Y. Liu (2015). A Nonlocal Lattice Particle Model for Fracture Simulation of Anisotropic Materials. *Composites Part B: Engineering* 90, 141-151.

7. **H. Chen**, and Y. Liu (2015). A Nonlocal 3D Lattice Particle Framework for Elastic Solids. *International Journal of Solids and Structures* 81, 411-420.

6. **H. Chen**, Y. Jiao and Y. Liu (2015). Investigating the Microstructural Effect on Elastic and Fracture Behavior of Polycrystals Using a Nonlocal Lattice Particle Model. *Materials Science and Engineering: A* 631, 173-180.

5. **H. Chen**, E. Lin, Y. Jiao and Y. Liu (2014). A Generalized 2D Non-local Lattice Spring Model for Fracture Simulation. *Computational Mechanics* 54(6), 1541-1558.

4. E. Lin, **H. Chen** and Y. Liu (2014). Finite Element Implementation of a Non-local Particle Method for Elasticity and Fracture Analysis. *Finite Elements in Analysis and Design* 93, 1-11.

3. **H. Chen**, E. Lin and Y. Liu (2014). A Novel Volume-Compensated Particle Method for 2D Elasticity and Plasticity Analysis. *International Journal of Solids and Structures* 51(9), 1819-1833.

2. **H. Chen** and A. V. Kumar (2014). Method for Imposing Boundary Conditions on Reissner-Mindlin Plates for Analysis Using Structured Background Mesh. *Computers & Structures* 138(1), 1-11.

1. J. Lin, **H. Chen** and H. Mao (2010). Calculation of Follower Motion Error for a Swing Flat Face Follower Plate Cam, *Machine Design and Research* 26(2), 17-20. (In Chinese)

CONFERENCE PROCEEDINGS & PRESENTATIONS

(* indicates conference proceedings publication)

*13.** **H. Chen**, Y. Hu, and B. W. Spencer (2017). Peridynamics using Irregular Domain Discretization with MOOSE-Based Implementation. *Proceedings of the ASME 2017 International Mechanical Engineering Congress and Exposition*, IMECE2017-71527, Tampa, FL, USA.

12. **H. Chen**, Y. Hu, and B. W. Spencer (2017). Implicit Peridynamic Thermo-mechanical Formulations for Fracture Modeling. *ASCE Engineering Mechanics Institute Conference 2017*, San Diego, California, USA.

*11.** **H. Chen**, Y. Hu, and B. W. Spencer (2016). A Moose-based Implicit Peridynamic Thermo-mechanical Model. *Proceedings of the ASME 2016 International Mechanical Engineering*

Congress and Exposition, IMECE2016-65552, Phoenix, AZ, USA.

10. *** H. Chen** and Y. Liu (2016). A Nonlocal Lattice Particle Framework for Modeling of Solids. *Proceedings of the ASME 2016 International Mechanical Engineering Congress and Exposition*, IMECE2016-65557, Phoenix, AZ, USA.

9. **H. Chen**, Y. Jiao and Y. Liu (2015). Modeling Polycrystalline Materials via a Novel Nonlocal Lattice Particle Framework. *13th US National Congress on Computational Mechanics*, San Diego, California, USA.

8. *** H. Chen** and Y. Liu (2015). The Effective Elastic and Fracture Properties of Particulate Reinforced Composites Using a New Non-local Particle Method. *Proceedings of the 56th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference*, AIAA2015-1119, Kissimmee, FL, USA.

7. * E. Lin, **H. Chen** and Y. Liu (2015). Coupling between Non-local Particle and Finite Element Methods. *Proceedings of the 56th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference*, AIAA2015-0909, Kissimmee, FL, USA.

6. **H. Chen**, Y. Jiao and Y. Liu (2014). A Unified Framework for Microstructure Evolution and Property Quantification. *Society of Engineering Science 51st Annual Technical Meeting*, Purdue University, West Lafayette, Indiana, USA.

5. **H. Chen** and Y. Liu (2014). Fracture Simulation using a Non-local Particle Model. *Society of Engineering Science 51st Annual Technical Meeting*, Purdue University, West Lafayette, Indiana, USA.

4. *** H. Chen** and Y. Liu (2014). Static and Dynamic Fracture Simulation Using a Novel Particle Method with Multi-body Potentials. *Proceedings of the 55th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference*, AIAA2014-1332, National Harbor, MD, USA.

3. *** H. Chen** and Y. Liu (2014). A Novel Volume-Compensated Particle Method (VCPM) for Elasticity and Plasticity Analysis. *Proceedings of the 55th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference*, AIAA2014-0997, National Harbor, MD, USA.

2. **H. Chen** and Y. Liu (2013). A Novel Non-local Particle Model for Elasticity and Plasticity analysis of Solids. *ASME 2016 International Mechanical Engineering Congress and Exposition*, San Diego, California, US

1. *** H. Chen** and A. V. Kumar (2013). Implicit Boundary Approach for Reissner-Mindlin Plates. *Proceedings of the ASME 2013 33rd Computers and Information in Engineering Conference*, DETC2013-12714, Portland, Oregon, USA.

REPORTS

3. S. A. Pitts, S. R. Novascone, **H. Chen**, B. W. Spencer, S. Satpathy, R. J. Gardner, and J. D. Hales, Initial 1.5D BISON Simulation Verification and Validation, Idaho National Laboratory, Technical Report INL/EXT-17-42455, June 2017.

2. J. D. Hales, B. W. Spencer, A. Casagranda, S.A. Pitts, **H. Chen**, and S. R. Novascone, 1.5D BISON Simulation Capability, Idaho National Laboratory, Technical Report INL/EXT-16-40785, January 2017.

1. B. W. Spencer, W. Jiang, **H. Chen**, Y. Hu, C. Peco, and J. E. Dolbow, Evaluation of Relocation Effects Modeled using Discrete Fracture Models, Idaho National Laboratory, Technical Report INL/EXT-16-xxxxx, August 2016.

AWARDS & HONORS

- Exceptional Contributions Program Award. Idaho National Laboratory, 2016
- Student Paper Competition Award Final List. AIAA SciTech 2014
- University Graduate Fellowship Block Grant Award. Arizona State University, 2013
- Achievement Award for New Engineering Graduate Students. University of Florida, 2010-2012

SYNERGISTIC ACTIVITIES

- Member of Engineering Mechanics Institute (EMI), 2017-present
- Member of ASME, 2016-present
- Conference session Chair and co-Chair: ASME IMECE2016; ASME IMECE2017
- Technical reviewer for journals: Materials, Computational Materials Science, Materials & Design, Engineering Fracture Mechanics