Wenlong Zhang

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SUMMARY

- 9 years of experience in non-linear FEM, Multi-physics, Material Mechanics, Adhesive Simulation, Fracture Mechanics, and Structural Dynamics
- High Proficiency in FEM software: Ansys, Abaqus, and LS-DYNA
- **Programming Language**: Python, Fortran, MATLAB, C++, OpenMP, MPI
- Strong problem solving and innovation skills, demonstrated by my 9 journal & 5 conference papers.
- Excellent communication skills. Team player. Strong multi-tasking ability.

EDUCATION

Ph.D. in Civil Engineering, University of Cincinnati (3.94/4), Cincinnati, OH 2019
B.S. in Civil Engineering, Beijing University of Civil Eng. & Architecture (3.82/4), Beijing, China 2013

CERTIFICATIONS

Deep Learning Specialization, Coursera 2022
Machine Learning, Standford University 2022

WORK EXPERIENCE

Senior Research & Development Engineer, **Ansys**, Canonsburg, PA Mar.2022 – Present

- Developed bending stiffness for reinforcement element that greatly improved the simulation efficiency of flexible circuits and composites.
- Developed inverse analysis for circuits and composites that can predict the undeformed shape based on the deformed shape and boundary conditions.
- Developed assumed natural strain (ANS) formulation for gasket elements to reduce shear locking.
- Ansys CEO Innovation Award Nominee

Research & Development Engineer II, **Ansys**, Canonsburg, PA Jul.2020 – Mar.2022

- Developed a model automation tool for inverse simulation and reduced the loop test model creation time by 95% (data based on customer feedback).
- Lead the testing for load stiffness feature and designed testing metrics.
- Conducted routine maintenance on Ansys APDL solver's code on both Linux and Windows systems.

Tech Support Engineer II, **Ansys**, Canonsburg, PA Jul.2020 – Mar.2022

- Leverage my knowledge in scientific computing by providing technical support to Ansys customers
- Major contributor (content creator, lecturer) for the Ansys Innovation Course, created 100+ tutorials

Research Assistant, (P&G) UC Simulation Center, Cincinnati, OH Nov.2013 – Feb.2019

- Created sophisticated FE models in **Abaqus** to optimize composite product manufacturing line design.
- Developed user-defined subroutines to model complex manufacture line boundary conditions.
- Developed Python scripts to accelerate modeling process and better visualize simulation results.
- Improved the understanding of failure modes of the diaper peeling through modelling **adhesive**s.

RESEARCH EXPERIENCE

Numerical Simulation of Crack Propagation Using Cohesive Zone Method, University of Cincinnati
Sept. 2013 – Feb.2019

- Improved the phase-field method for crack propagation simulation [1-3] (A published paper on this topic is listed as [1] in next sections)
- Implemented the phase field method into LS-DYNA through user-defined element and user-defined material [1-3]
- Implemented the Discontinuous Galerkin method into LS-DYNA through user-defined element [5].
- Improved the exponential **cohesive law**'s cyclic loading formulation for fatigue simulation [6, 11].
- Developed a fatigue prediction model for **adhesive joints** and implemented it into LS-DYNA's user-defined cohesive material model [7].
- Developed a modified **cohesive zone** enlargement approach and implemented it into LS-DYNA's user defined cohesive material for arbitrary crack propagation [8].
- Designed and implemented a parallel explicit dynamic FEM program for an impact problem using Fortran.

JOURNAL PUBLICATIONS

[1] **Zhang, W.**, & Tabiei, A. (2020). An Efficient Implementation of Phase Field Method with Explicit Time Integration. Journal of Applied and Computational Mechanics, 6(3), 373-382.

[2] **Zhang, W.,** Tabiei, A., & French, D. (2021). A numerical implementation of the length-scale independent phase field method. Acta Mechanica Sinica, 1-13.

[3] Tabiei, A., & **Zhang, W**. (2021). A local-domain based phase field method for crack propagation. International Journal for Computational Methods in Engineering Science and Mechanics, 22(1), 21-31.

[4] Tabiei, A., & **Zhang, W.** (2018). Composite laminate delamination simulation and experiment: a review of recent development. *Applied Mechanics Reviews*, *70*(3), 030801.

[5] **Zhang, W.,** Tabiei, A., & French, D. (2018). Comparison Between Discontinuous Galerkin Method and Cohesive Element Method: On the Convergence and Dynamic Wave Propagation Issue. International Journal for Computational Methods in Engineering Science and Mechanics, 19(5), 363-373.

[6] **Zhang, W**., & Tabiei, A. (2018). Improvement of an exponential cohesive zone model for fatigue analysis. Journal of Failure Analysis and Prevention, 18(3), 607-618.

[7] **Zhang, W**., & Tabiei, A. (2017). Fatigue life prediction of composite material's adhesive joints in automotive applications. *International Journal of Automotive Composites*, 3(1), 61-79.

[8] Tabiei, A., & **Zhang, W**. (2017). Cohesive element approach for dynamic crack propagation: Artificial compliance and mesh dependency. *Engineering Fracture Mechanics*, 180, 23-42

[9] Tabiei, A., & **Zhang, W.** (2016). Evaluation of various numerical methods in large scale FE simulation codes for 3d crack propagation. *International Journal of Structural Mechanics and Finite Elements*. 1(2), 44-66

CONFERENCE PUBLICATIONS

[10] Tabiei, A., & **Zhang, W.** (2016). Evaluation of various numerical methods in LS-DYNA® for 3D crack propagation. 14th International LS-DYNA Users Conference, Detroit, July 2016.

[11] **Zhang, W.** & Tabiei, A. (2016). A robust cohesive zone model for cyclic loading. 14th International LS-DYNA Users Conference, Detroit, July 2016.

[12] Tabiei, A. & **Zhang, W.** (2018). A zero-thickness cohesive element approach for dynamic crack propagation. 15th International LS-DYNA Users Conference, Detroit, July 2018.

[13] Tabiei, A. & **Zhang, W.** (2018). Fatigue Life Prediction of Composite Adhesive Joints using LS-DYNA. 15th International LS-DYNA Users Conference, Detroit, July 2018.

[14] Sandeep Medikonda, Sriraghav Sridharan, **Wenlong Zhang** (2020), Numerical Modeling of Granular Media using the Discrete Element Method (DEM), Ansys Mechanical Summit