

WENQIONG (WEN) TU

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Objective: Use established CAE expertise to help company to solve problems and power innovation

Qualifications:

- Over 6 years of experience in structural and stress analysis via various finite element software
- Proficiency in analysis of composite materials and code development for solid mechanics application
- Hard-working engineer with strong critical thinking, problem solving and learning capabilities, friendly personality and good communication skills

Education

University of Virginia (UVA), PhD (May 2016)

Charlottesville, VA, US

- Applied mechanics in Civil Engineering; GPA 3.9/4.0

Huazhong University of Science and Technology (HUST)

Wuhan, China

- **M. S.** in Solid Mechanics, 2010, GPA 3.8/4.0; **B. S.** in Engineering Mechanics, 2008, GPA 3.7/4.0

Skills: Abaqus, ANSYS, LS-DYNA, fe-safe, Isight, 3DEXPERIENCE, HyperMesh, Matlab, Python, Fortran

Work Experience

➤ **Dassault Systèmes Simulia Corp**

Minneapolis, MN

Technical Intern

June 2015- November 2015

- **“Industrial consulting project on 3D fracture modeling via 3D cohesive elements”**
 - Utilized python to insert cohesive elements between 2D elements and extruded 2D mesh to 3D mesh
 - 3D fracture simulation under bending and under pin punch loading by taking contact into account
- Extensive training with Abaqus in the class of Modeling Fracture and Failure, Writing User Subroutines, Contact and Convergence Issue, Flexible Multibody Systems, Abaqus/Explicit: Advanced Topics and training in Fe-safe (fatigue package), Isight (automation and optimization package) and 3DEXPERIENCE platform
- Resolved customer problems in a timely manner through independent research and by collaborating with team members and tested training workshops for Boeing
- Critically examined all workshops in the training class of Analysis of Composite Materials with Abaqus 6.14 and Abaqus 2016 and carefully revised the workshop notes, models’ python script files

➤ **Applied mechanics, UVA**

Charlottesville, VA

Graduate Research Assistant

January 2011- present

- **“Investigation of damage evolution in composite materials”**
 - Developed an efficient numerical tool in modeling crack initiation and propagation with excellent stability
 - Simulated fiber/matrix debonding in SiC/Ti composites and damage evolution in cross-ply laminates
 - Two peer-reviewed articles have been published in the project
- **“Micromechanics analysis of fiber-reinforced periodic materials via Abaqus”**
 - Created unit cells in Abaqus CAE and automated the application of periodic conditions via python script
 - Applied unit strain and analyzed the unit cell 6 times to obtain a complete set of homogenized properties
 - Simulated the fiber/matrix debonding via cohesive elements and generated the macro-responses
- **“Finite deformation analysis and optimization of bio-inspired materials”**
 - Developed an efficient homogenization-based Particle Swarm Optimization (PSO) method
 - Optimized unit cell architectures of heart-valve chordae tendineae using parallelized PSO algorithm via HPC clusters
 - Research results are published in a journal article and featured by the Global Medical Discovery website

- **“Study of the delamination of fiber/Aluminum laminates under low-velocity impact”**
 - Simulated delamination between single plies via Cohesive Zone Model (CZM) in LS-DYNA
 - Quantitated plastic effects of Al plies in absorbing impact energy and in reducing delamination between plies
 - Identified the preferred stacking sequence for laminates with strong delamination resistance
 - **“Strength analysis and optimization of Carbon Fiber Reinforced Plastic (CFRP) joints”**
 - Designed CFRP joints with AutoCAD and created 3D finite element model in ANSYS
 - Predicted the delamination bearing strength of CFRP joints considering contact effects
 - Optimized the delamination bearing strength via PSO approach by varying ply angles
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Journal Articles

- **W. Tu** and M. J. Pinder, 2015. Dissipative response of unidirectional composites with two brittle constituents (in preparation).
 - **W. Tu** and M. J. Pinder, Damage Evolution in Cross-Ply Laminates Revisited via CZM-Based Finite-Volume Homogenization, Composites Part B: Engineering, 2016, 86, 40-60.
 - A. Katz, C. Trinh, J. Wright, **W. Tu**, M. J. Pinder, Plastic Strain Localization in Periodic Materials with Wavy Brick-and-Mortar Architectures and Its Effect on the Homogenized Response, Composites Part B: Engineering, 2015, 68, 270-278.
 - **W. Tu** and M. J. Pinder, Cohesive Zone-Based Damage Evolution in Periodic Materials via Finite-Volume Homogenization, Journal of Applied Mechanics, 2014, 81: 101005(1-16).
 - **W. Tu** and M. J. Pinder, Targeting the Finite-deformation Response of Wavy Biological Tissues with Bio-inspired Material Architectures, 2013, Journal of the Mechanical Behavior of Biomedical Materials, 2013, 28: 291-308.
 - **W. Tu**, J. Chen, J. Wei, Study on the Delamination of Fiber-metal Laminates under Low-velocity Impact, Chinese Journal of Solid Mechanics, 2012, 33(2): 182-188.
 - W. Peng, J. Chen, J. Wei., **W. Tu**, Optimal Strength Design for Fiber Metal Laminates, Journal of Composite Materials, 2010, 45: 237-254.
 - W. Peng, J. Chen, M. Gu, **W. Tu**, A Particle Swarm Optimization(PSO) Algorithm for Minimizing Interlaminar Normal Stresses at the Free-edge of Composite laminates, Mechanical Science and Technology for Aerospace Engineering, 2009, 28(11): 1496-1500.
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Selected Conference Presentations

- **W. Tu** and M. J. Pinder, CZM-Based FVDAM Analysis of Damage Evolution in Cross-Ply Laminates, American Society for Composites 30th Technical Conference, Sep 28-30, 2015, East Lansing, MI.
- **W. Tu**, Y. Yang and M. J. Pinder, Evaluation of homogenized moduli of composite materials with Finite-Volume micromechanics and Abaqus, SIMULIA Regional User Meetings, Sep 22-23, 2015, Minneapolis, MN.
- **W. Tu** and M. J. Pinder, A Unified Methodology for the Homogenization of Periodic Materials with Damage, the 4th International Conference on Integrity, Reliability and Failure, June 23-27 2013, Funchal, Portugal, pp. 793-794.
- **W. Tu**, Z. Tang, M.J. Pinder, Interfacial Damage Mechanics of Composite Materials Via Finite-Volume Micromechanics, 20th Annual International Conference on Composite Materials, July 22-28, 2012, Beijing, CHINA.
- M.J. Pinder, **W. Tu**, M. Cavalcante, K. Bixel, Microstructural Effects in Tailoring the Response of Engineered Bio-Materials, 2012 NSF CMMI Engineering Research and Innovation Conference, July 9–12, Boston.