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 (2016 Spring)   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

> **Solid mechanics, HUST**   Wuhan, China

Graduate Research Assistant   September 2008-November 2010

- **"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

Journal Articles

> **W. Tu** and M. J. Pindera, 2015. Dissipative response of unidirectional composites with two brittle constituents (in preparation).

> **W. Tu** and M. J. Pindera, 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. Pindera, 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. Pindera, 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. Pindera, 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.

Selected Conference Presentations

> **W. Tu** and M. J. Pindera, 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. Pindera, 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. Pindera, 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. Pindera, 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. Pindera, **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.