William Matthew Peterson

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Summary

Excellent ability to plan, execute, and communicate work, specializing in Linear and Nonlinear Finite Element Analysis, progressive damage and fracture models.

Skills

Programming
- Fortran, Python, Matlab, C, SQLite, GCC, Git, Fox GUI Toolkit

Software and Technology
- Abaqus, ANSYS, SolidWorks, MS Office, Windows, Linux

Leadership and Communication
- Lab instructor
- Conference & journal publications
- Technical reports & design reviews

Lab Experience
- Fabrication & mechanical testing of fiber-reinforced composites and adhesive joints
- Digital Image Correlation (DIC)

Education

Ph.D. Mechanical Engineering   2011 – 2018 (Exp.)
Montana State University   *Bozeman, MT*

M.S. Mechanical Engineering   *2009 – 2011*
Montana State University   *Bozeman, MT*

B.S. Mechanical Engineering   *2004 – 2009*
Montana State University   *Bozeman, MT*

Experience

PhD Candidate/Graduate Research Assistant   *Aug. 2011 – Present*
Montana State University, Composites Research Group   *Bozeman, MT*
- Developed a novel computational framework for efficient adaptive progressive fracture analysis.
- Verification & validation (V&V) of numerical models for wind energy and aerospace projects.
- Prepared and presented technical reports, project reviews, and journal publications.
- Worked with other (internal/external) engineers to complete tasks and resolve technical issues.

Visiting Scholar   *July 2014*
Sandia National Laboratories, Wind Energy & Water Power Technologies   *Albuquerque, NM*
- Ultrasonic non-destructive testing (NDT) of composite materials, 1-week training.

Engineering Analyst/Consultant   *Dec. 2010 – Feb. 2011*
AutoPilot   *Bozeman, MT*
- Developed numerical models with large strain, contact, and hyperelastic materials.
- Presented technical reports and presentations to CEO and potential clients.
- Established collaborative partnership with design & prototyping firm.

Graduate Teaching Assistant   *Aug. 2009 – July 2011*
Montana State University, Mechanical and Industrial Engineering   *Bozeman, MT*
- 3-Semester Lead Lab Instructor for undergraduate course, *"Intro to Finite Element Analysis."*
- Troubleshoot user analysis codes and respond to requests for assistance.

Engineering Intern *Sept. 2008 – Feb. 2009*
Quantum Composers, Inc. *Bozeman, MT*
- Production-level fabrication and assembly of electronic pulse generators.

Engineering Intern *May 2008 – Sept. 2008*
Montana State University, Space Science and Engineering Labs (SSEL) *Bozeman, MT*
- Design, machining, and testing of antenna deployment system of E1-P nanosatellite ([link](#)).

Selected Publications & Conference Proceedings

Peterson, W. M., and Cairns, D. S. (2016). "A Selectively Activated Extrinsic Cohesive Model," *57th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*. AIAA SciTech, San Diego, CA. Paper AIAA 2016-0735 ([link](#)).

Peterson, W. M., and Cairns, D. S. (2015). "Modeling Crack Growth with Selectively Activated Cohesive Elements," *Composites & Advanced Materials Expo* (CAMX), Dallas, TX. Paper TP15-0294 ([link](#)).

Woo, K., **Peterson, W. M.,** and Cairns, D. S. (2014). "Selective Activation of Intrinsic Cohesive Elements," *Journal of Applied Mathematics and Physics*, Vol. 2, No. 12, pp. 1061-1068 ([link](#)).

Selected Research Portfolio

Mathematical Formulation of the Interior Penalty Discontinuous Galerkin Method *April 2018*
- Derivation of the IP-DGM for the implementation of an advanced interface element ([link](#)).

Robot Kinematics and Artificial Neural Networks *May 2014*
- Forward & inverse kinematics of a 3-DOF parallel manipulator using neural nets and Matlab ([link](#)).

Viscoplastic Material Models and Displacement-Based Formulation for FEA *April 2014*
- Strain-hardening and strain-rate sensitive models for displacement-based FEA ([link](#)).

Selected Open-Source Projects

FortranHashDict: A Dictionary Data Structure for Fortran 2003+ *Dec. 2017*
- A fast, easy-to-use data structure using a hashtable, singly-linked lists, and OOP ([link](#)).

UTRI3: A User-Element Subroutine for Abaqus *Dec. 2017*
- A 2D linear triangle User-Element (UEL) for Abaqus/Standard, using OOP techniques ([link](#)).

Professional Activities, Leadership, and Service

- **Certificate:** Engineer in Training (EIT)
- **Member:** American Society of Mechanical Engineers (ASME)
- **Member:** Toastmasters Intl.
- **Volunteer:** FIRST Robotics Competition