Composites Manufacturing & Simulation Center

JOSHUA DUSTIN

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Dr. Dustin brings a pragmatic perspective on composite structure design, manufacture, analysis and test to the CMSC. His interest in composite materials grew from his love for skiing, biking, and watersports which he developed into a successful career in the aerospace industry. He has worked in a wide range of areas including:

- Development of automated vacuum bagging technologies for autoclave processing
- Adhesive bonding of metallic and composite structure
- Multi-scale modeling of composite materials
- Progressive failure analysis of composite structure via advanced non-linear FEA
- Mechanical and physical test method development
- Progressive failure analysis method development and validation
- Advanced non-destructive evaluation including in-situ techniques for identification of failure initiation and mapping failure propagation
- Composite design allowables including test selection, design and statistical data reduction on tape, fabric, braid, and carbon/glass hybrid material architectures

Dr. Dustin holds a M.S.E. and Ph.D. from Purdue University's School of Aeronautics and Astronautics and a B.S. in Mechanical Engineering from Brigham Young University. He serves on the Materials Technical Committee for the AIAA concentrating primarily on ICME initiatives. He holds a US patent in the area of composite material testing and has multiple pending patent applications in addition to his conference proceedings and other technical publications.

Primary Research Interests

- Composite manufacture process modeling and manufacturing method development
- Mechanical test method design and development
- Analysis method validation

Patents

J.J. Esposito, J.S. Dustin, US Patent #9464975, "Composite Test Specimen," (Oct 2016)

Publications & Patent Applications

J.S. Dustin, J.J. Esposito, A.W. Baker, US Patent Application #14/326646, "Strength Testing of a Flatwise Material Coupon," (July 2014)

G. Freihofer, J. Dustin, H. Tat, A. Schulzgen, S. Raghavan. Stress and structural damage sensing piezospectroscopic coatings validated with digital image correlation. AIP Advances, (2015).

J.S. Dustin, "Stress and Strain Field Singularities, Micro-cracks, and Their Role in Failure Initiation at the Composite Laminate Free-Edge," Ph.D. Dissertation, Purdue University, (2012).

J. S. Dustin, R.B. Pipes. "Free-Edge Singularities Meet the Microstructure: Important Considerations", Composites Science & Technology, (2012).

A. Ritchey, J. Dustin, J. Gosse, R.B. Pipes. Self-Consistent Micromechanical Enhancement of Continuous Fiber Composites, Advances in Composite Materials, InTech (2011).

R. B. Pipes, J. Goodsell, A. Ritchey, J. Dustin, J. Gosse. Interlaminar Stresses in Composite Laminates: Thermoelastic Deformation. Composites Science and Technology 70 (2010).

J.S. Dustin, "Strength Predictions of Bonded Joints Using the Critical CTOA Criterion," Masters Thesis, Purdue University, (2009).

T. Boswell, J.S. Dustin, M.D. Ridges, C. Robinson, US Patent Application #US 20080083493 A1, "Reusable mechanical fastener and vacuum seal combination," (April 2006).