

Scott E. Stapleton
Curriculum vitae

EDUCATION

- 2012 Ph.D., Aerospace Engineering, University of Michigan, Ann Arbor, MI (GPA: 3.9)
Dissertation: The Analysis of Adhesively Bonded Advanced Composite Joints using
Joint Finite Elements
Advisor: Prof. Anthony M. Waas
- 2011 M.S., Aerospace Engineering, University of Michigan, Ann Arbor, MI (GPA: 3.9)
- 2007 M.S., Mechanical Engineering, University of Utah, Salt Lake City, UT (GPA: 4.0)
Thesis: Energy Absorption of Sandwich Panels in Edgewise Compression
Advisor: Prof. Daniel O. Adams
- 2007 B.S., Mechanical Engineering, University of Utah, Salt Lake City, UT (GPA: 3.9)
- 2006 B.A., German, University of Utah, Salt Lake City, UT (GPA: 3.9)

PROFESSIONAL APPOINTMENTS/EMPLOYMENT

- 2015-Pres Assistant Professor, Department of Mechanical Engineering, University of
Massachusetts Lowell, Lowell, MA
- 2014-2015 Post-Doctoral Researcher, Institute for Applied Mechanics, RWTH Aachen
University, Aachen, Germany
- 2012-2014 Research Group Leader: Simulation of Fiber-Reinforced Composites, Institute for
Textile Technology, RWTH Aachen University, Aachen, Germany
- 2009-2012 Graduate Student Research Program Fellow, Materials and Structures Branch,
NASA Glenn, Cleveland, OH
- 2011, Aug Invited Visiting Scholar, Institute for Textile Technology, RWTH Aachen
University, Aachen, Germany
- 2008-2012 Graduate Student Research Assistant, U of Michigan Composite Structures
Laboratory, Ann Arbor, MI
- 2007 Sum. Senior Design Intern, Alliant Techsystems Inc., Magna, UT
- 2003-2007 Research Assistant, University of Utah Composites Lab, Salt Lake City, UT

PUBLICATIONS

Refereed Journal Articles

- 2014 Stapleton, S. E., Gries, T., Pineda, E. J., and Waas, A. M., "Adaptive Shape Functions
and Internal Mesh Adaptation for Modeling Progressive Failure in Adhesively
Bonded Joints," *Int J of Solids and Structures*, 51: 18, 2014. DOI:
10.1016/j.ijsolstr.2014.05.022

- Rypl, R., Chudoba, R., Mörschel, U., Stapleton, S. E., Gries, T., and Sommer, G., "A Novel Tensile Test Device for Effective Testing of High-Modulus Multi-Filament Yarns," *J of Industrial Textiles*, 2014. DOI: 10.1177/1528083714521069
- Stapleton, S. E., Waas, A. M., Arnold, S. M., and Bednarczyk, B. A., "Co-rotational Formulation for Bonded Joint Finite Elements," *AIAA Journal*, 52 : 6, 2014. DOI:10.2514/1.J052422
- 2012 Stapleton, S. E., Waas, A. M., and Arnold, S. M., "Functionally Graded Adhesives for Composite Joints," *Int J of Adhesion and Adhesives*, 35: 36-49, 2012. DOI:10.1016/j.ijadhadh.2011.11.010
- 2011 Stapleton, S. E., Bednarczyk, B. A., and Waas, A. M., "Modeling Progressive Failure of Bonded Joints Using a Single Joint Finite Element," *AIAA Journal*, 49: 8, 2011. DOI: 10.2514/1.J050889
- 2010 Stapleton, S. E. and Adams, D. O. "Structural Enhancements for Increased Energy Absorption in Composite Sandwich Structures," *J Sandwich Struct and Mat*, 13: 137, 2010. DOI: 10.1177/1099636210378951
- 2009 Stapleton, S. E. and Adams, D. O., "Core Design for Energy Absorption in Sandwich Composites," *J Comp Mat*, 43: 175, 2009. DOI: 10.1177/0021998308099225
- 2008 Stapleton, S. E. and Adams, D. O., "Crush Initiators for Increased Energy Absorption in Composite Sandwich Structures," *J Sandwich Struct and Mat*, 10: 331, 2008. DOI: 10.1177/1099636208091737

Book Chapters

- 2011 Ahn, J., Stapleton, S. E., and Waas, A. M., "Advanced Modeling of the Behavior of Bonded Composite Joints in Aerospace Applications," in *Composite Joints and Connections*, edited by Comanho, P., and Tong, L., Woodhead, 2011. ISBN-13: 978 1 84569 990 1

Theses

- 2012 Stapleton, S. E., "The Analysis of Adhesively Bonded Advanced Composite Joints using Joint Finite Elements," *PhD Thesis*, University of Michigan, Ann Arbor, MI, 2012.
- 2007 Stapleton, S. E., "Energy Absorption of Sandwich Panels for Automotive Applications," *Master's Thesis*, University of Utah, Salt Lake City, UT, 2007.

NASA Technical Memorandums

- 2014 Stapleton, S. E., Gries, T., Waas, A. M., and Pineda, E. J., "Adaptive Shape Functions and Internal Mesh Adaptation for Modelling Progressive Failure in Adhesively Bonded Joints," NASA/TM-2014-218333, September 2014.
- 2012 Stapleton, S. E. and Waas, A. M., "The Analysis of Adhesively Bonded Advanced Composite Joints Using Joint Finite Elements," NASA/CR—2012-217606, April 2012.
http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20120008558_2012008569.pdf

- 2011 Stapleton, S. E., Waas, A. M., and Arnold, S. M., “Functionally Graded Adhesives for Composite Joints,” NASA/TM-2011-217202, December 2011.
http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20120001792_2012001772.pdf
- 2010 Stapleton, S. E., Bednarczyk, B. A., and Waas, A. M., “Modeling Progressive Failure of Bonded Joints Using a Single Joint Finite Element,” NASA/TM-2010-216824, November 2010.
http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20110000526_2010047157.pdf

Conference Proceedings

- 2014 Islam, M. S., Prabhakar, P., Krieger, H., Stapleton, S. E., and Gries, T., “Prediction of Damage due to Compaction during Manufacturing of Textile Composites” *ECCM-16th European Conference on Composite Materials*, Seville, Spain, 2014.
- 2012 Stapleton, S. E., Waas, A. M. Bednarczyk, B. A., and Arnold, S. M., “Co-rotational Formulation for Bonded Joint Finite Elements” *53rd AIAA/ASME/ASCE/AHS/ASC SDM Conference*, Honolulu, HI, 2012.
- 2011 Stapleton, S. E., Waas, A. M. and Bednarczyk, B. A., “Bonded Joint Elements for Structural Modeling and Failure Prediction” *52nd AIAA/ASME/ASCE/AHS/ASC SDM Conference*, Denver, Co, 2011.
- 2010 Stapleton, S. E. and Waas, A. M., “Reduced-Order Modeling of Adhesively Bonded Joints Using an Enhanced Joint Finite Element” *54th Int. SAMPE Symp*, Salt Lake City, UT, October, 2010.
- Stapleton, S. E., Waas, A. M., and Bednarczyk, B. A., “Modeling Progressive Failure of Bonded Joints Using a Single Joint Finite Element” *51st AIAA/ASME/ASCE/AHS/ASC SDM Conference*, Orlando, FL, 2010.
- 2009 Stapleton, S. E. and Waas, A. M. “Macroscopic Finite Element for a Single Lap Joint,” *50th AIAA/ASME/ASCE/AHS/ASC SDM Conference*, Palm Springs, CA, 2009.
- 2008 Van Otten, J., Stapleton, S. E., Adams, D. O., and Nailadi, C., “Design Considerations for Energy Absorption in Automotive Sandwich Composites,” *53rd Int. SAMPE Symp*, Long Beach, CA, May, 2008.
- 2007 Stapleton, S. E., Adams, D. O., and Nailadi, C., “Edgewise Impact Testing of Automotive Sandwich Composites,” *52nd Int. SAMPE Symp*, Baltimore, MD, June, 2007.

AWARDS AND HONORS

- 2013 RWTH Start-Up Funds for project “Functionally Graded Adhesives,” 20,000€ ranked 1/95
- 2010 Harry H. Hilton Student Paper Award in Structures at the 51st AIAA SDM Conference, \$500, ranked 1/30
- 2009 NASA Graduate Student Research Program (GSRP) Fellowship Award, \$30,000/year, 3years
- 2009 American Society of Composites (ASC) PhD Student Scholarship Award , \$1000
- 2007 Dean’s Honors at Graduation Award, University of Utah

- 2007 SAMPE Student Leadership Award
- 2005 Mechanical Engineering Departmental Scholarship, full-tuition, 1 year
- 1999 University of Utah Presidential Scholarship, full-tuition, 4 years
- 1994 Eagle Scout Award, BSA

TECHNICAL PRESENTATIONS

Invited Talks

- 2014 “Manufacturing-Inspired Composite Characterization and Modeling,” Dept. of Mechanical Engineering, University of Utah, Salt Lake City, UT, March 2014
- “Manufacturing-Inspired Composite Characterization and Modeling,” Dept. of Mechanical and Nuclear Engineering, Kansas State University, Manhattan, KS, Dec 2014
- “Enabling Lightweight Composite Structures through Manufacturing-Inspired Research,” Dept. of Mechanical and Biomedical Engineering, Boise State University, Boise, ID, Dec 2014

Conference Participation

- 2014 “Quasi-Static Micro-Mechanical Representative Volume Element Modeling of Dry Fiber Bundles”, *11th World Congress on Computational Mechanics (WCCM XI/ECCM V/ECFD VI)*, Barcelona, Spain, July 2014
- “Micro-Mechanical Representative Volume Element Modeling of Dry Fiber Bundles,” *2nd International Glass Fiber Symposium*, Aachen, Germany, May 2014.
- 2013 “Functionally Graded Adhesives for Increased Strength of Adhesively Bonded Composite Joints,” *2nd Int. Conference on Structural Adhesive Bonding (AB2013)*, Porto, Portugal, July 2013
- 2011 “Functionally Graded Adhesives for Adhesively Bonded Composite Joints,” *16th Int. Conference on Composite Structures (ICCS16)*, Porto, Portugal, June 2011
- “Bonded Joint Elements for Structural Modeling and Failure Prediction” *52nd AIAA/ASME/ASCE/AHS/ASC SDM Conference*, Denver, Co, 2011
- 2010 “Functionally Graded Adhesives for Improving the Efficiency of Bonded Composite Joints,” *American Society of Composites (ASC) Conference*, Dayton, OH, Sept 2010
- “Reduced-Order Modeling of Adhesively Bonded Joints Using an Enhanced Joint Finite Element,” *USNCTAM*, State College, PN, July 2010
- “Reduced-Order Modeling of Adhesively Bonded Joints Using an Enhanced Joint Finite Element” *54th Int. SAMPE Symp*, Salt Lake City, UT, October, 2010
- “Modeling Progressive Failure of Bonded Joints Using a Single Joint Finite Element” *51st AIAA/ASME/ASCE/AHS/ASC SDM Conference*, Orlando, FL, 2010
- 2009 “Macroscopic Finite Element for an Adhesive Joint,” *Workshop on Multi-Scale Modeling of Composites*, Cleveland, OH, July 2009
- 2007 “Edgewise Impact Testing of Automotive Sandwich Composites,” *52nd Int. SAMPE Symp*, Baltimore, MD, June, 2007

Other Presentations

- 2008 “Strength and Durability of Joints for Space Vehicle Structures at Elevated Temperatures,” *NASA Constellation University Institutes Project kick-off meeting*, Langley, VA, Feb 2008
- 2007 “Energy Absorption in Sandwich Panels,” *Utah SAMPE Chapter Meeting*, Salt Lake City, UT, March 2007
- 2005 “Experimental Testing and Analytical Analysis of Sandwich Panels in Edgewise Compression,” *Automotive Composites Consortium Contractor’s Meeting*, Detroit, MI, Jan 2005(+ May and Sept 2006, Jan 2007)

TEACHING EXPERIENCE

RWTH Aachen University

- Lecture: “Rheological Creep Models,” Werkstoffmechanik (Mechanics of Materials), FS 2014
- Lecture: “Production Simulations,” Faserverbundwerkstoffe II (Composites II), SS 2014-2012
- Lecture: “Intro to Multi-Scale Modeling,” Special Topics in Textile Engineering, SS 2014
- Lecture: “Composite Layup Design,” Faserverbundwerkstoffe I (Composites I), SS 2014
- Lecture: “Textile Technology,” Faserverbundwerkstoffe II (Composites II), FS 2013

University of Michigan

- TA: Aircraft and Spacecraft Structures (AE 315), FS 2007, WS2008, FS2011

Teaching Education

- 2013 EXACT qualification for Academic Teaching, RWTH Aachen University
Leading Simple, Grundl-Leadership Akademie
- 2007 Teaching in Higher Education, University of Utah

Student Theses/Projects Advised

- 2014 Carsten Aßhoff (MS, RWTH), Benedikt Kolblinger (PA, RWTH), Patrick Bishop (BS, RMIT Melbourne), Nizar Amor (SA/DA, RWTH), Phillip Seinsche (BA, RWTH), Gerd Kreuter (SA, RWTH)
- 2013 Kyle Watts (BS, Michigan State U), Yasser Taman (MS, U Torino)
- 2012 Scott Just (BS, U Delaware), Andrew Beauchemin (BS, U Delaware)

RESEARCH PROJECTS

- 2014-2015 “Hybrid Scaffold for a Transcatheter Tissue-Engineered Aortic Valve”, Seed Fund, Integrated Interdisciplinary Institute of Technology for Medicine, RWTH Aachen University
- 2013-2016 “Simulation of Spreading of Carbon Fibers*,” Industry Funded, +400K€

- 2013 “Functionally Graded Adhesives*,” Start-Up Fund, Exploratory Research Space, RWTH Aachen University
- 2013 “Characterization of carbon fiber NCFs*,” Industry Funded, +20K€
- 2013 “Composite market & strategy study,” Industry Funded, +50K€
- 2009-2012 “Modeling, Characterization, and Experimental Validation of Composite Adhesive Joints*,” GSRP Program, NASA Glenn Research Center
- 2007-2005 “Sandwich Composite Concepts for Automotive Applications,” Automotive Composites Consortium

*Authored proposal

JOURNAL REVIEWER

International Journal of Adhesion and Adhesives

Journal of Adhesion

International Journal for Numerical Methods in Engineering

Journal of Applied Mechanics

Journal of Sandwich Structures and Materials

Engineering Fracture Mechanics

International Journal of Physical Sciences

Simulation: Transactions of the Society for Modeling and Simulation International

COMMUNITY INVOLVEMENT / LEADERSHIP

- 2015 Organizing Committee, 3rd ECCOMAS Young Investigators Conference
- 2012-2014 Fold-In (multidisciplinary origami research group), RWTH Aachen University
- 2008-2009 Volunteer ESL Instructor, Ann Arbor, MI
- 2007 Graduate Student Advisory Committee, University of Utah
- 2006 Co-Founder and President Kiteboarding Club, University of Utah
- 2005-2007 Utah SAMPE Chapter
- 2005 Vice President Delta Phi Alpha (German Honors Society), University of Utah
- 2005-Pres Tau Beta Pi (Engineering Honors Society)
- 1999-2001 Missionary for the Church of Jesus Christ of Latter-Day Saints, Munich, Germany