

SHELBY HIGHSMITH

shelbyhighsmith (at) gmail.com

SUMMARY

Multidisciplinary researcher with experience in aerospace design, mechanical testing, failure analysis, manufacturing, technical and policy writing, communications, marketing and program management seeks a position in technology policy research, analysis and advocacy that contributes to national security.

EDUCATION

GEORGIA INSTITUTE OF TECHNOLOGY Atlanta, GA

PhD Mechanical Engineering, August 2007, GPA 3.92/4.00

Dissertation: *Development of Crack Path Prediction Criteria for 3-D Mixed Mode Loading*

Advisor: W. Steve Johnson

Minor: International Affairs, Sam Nunn Security Studies Program

MS Materials Science & Engineering, December 2003, GPA 3.91/4.00

Thesis: *Probabilistic Fatigue Crack Life Prediction in a Directionally Solidified Nickel Superalloy*

Advisor: W. Steve Johnson

UNIVERSITY OF NOTRE DAME Notre Dame, IN

BS Aerospace Engineering, Magna Cum Laude, May 1997

BA Philosophy, Magna Cum Laude, May 1997

HONORS & AWARDS

- National Science Foundation Graduate Research Fellowship, 2001 - 2005
- Sam Nunn Security Studies Fellowship, 2005 - 2006
- ARCS Foundation Fellowship, 2006 - 2007
- Georgia Tech Presidential Fellowship, 2001 - 2004
- ASTM E08 Committee Student Paper Award, 2006
- ASM-Atlanta Outstanding Graduate Student, 2003
- Honeywell Reward & Recognition: Contributions to Propulsion Technology, 1999; Contributions to Product Safety & Integrity, 1999; LF507 GPT Redesign Overspeed Tests, 1998; JETEC Proposal, 1998; UK-AZ Industrial Conference, 1997
- Goddard Award for Aerospace Design, 1997
- Dockweiler Medal for Philosophy, 1997
- Reilly Scholar in Arts & Letters/Engineering, 1996 - 1997
- Notre Dame Scholar
- Honor Societies: Tau Beta Pi; Sigma Gamma Tau; Phi Beta Kappa

PROFESSIONAL EXPERIENCE

1/01 - Present

GEORGIA INSTITUTE OF TECHNOLOGY Atlanta, GA

Graduate Research Assistant, Mechanical Properties Research Lab

- Perform mechanical characterization tests on aerospace material specimens
- Develop numerical models of specimens using boundary element analysis software
- Analyze failure features and microstructure through optical and electron microscopy
- Assist in failure analysis consulting with mechanical and material analyses
- Communicate progress and results to customers through reports and presentations

7/97 - 10/00

HONEYWELL ENGINES & SYSTEMS Phoenix, AZ

Program Manager, Propulsion Technology Development

- Led cross-functional teams in design and testing of advanced turbine engine technology
- Created rig assembly instructions and built development test hardware
- Designed and inspected research tooling and hardware
- Collaborated with and monitored vendors in manufacturing process development
- Communicated with customers through technical reports and direct marketing

Engineer, Product Safety & Integrity

- Led multi-site Honeywell team in TSB accident investigation of SwissAir 111, conducting teardown of auxiliary power system and preparing analytical findings report
- Assisted in several teardowns of engines and APUs for the NTSB and customers
- Conducted on-scene investigation of a general aviation accident
- Monitored Engineering's corrective action process in quality and flight safety issues

Test Engineer, Mechanical Properties Testing Laboratory

- Conducted HCF, LCF, and TMF tests of material specimens and engine components
- Prepared metallographic mounts and analyzed fracture surfaces
- Developed fixtures and furnaces for special test conditions

5/96 - 8/96

UNIVERSITY OF NOTRE DAME Notre Dame, IN

Research Assistant, Department of Aerospace & Mechanical Engineering

- Designed and modified test equipment for corrosion fatigue experiments
- Researched corrosion pit growth, geometry, and stress concentration factors
- Assisted in design of test specimens and modeling techniques

5/95 - 8/95 &
12/95 - 1/96

QUIET NACELLE CORPORATION Miami, FL

Engineering Assistant

- Collaborated with flight test engineers in data analysis for Stage III hushkits
- Assured quality of flight test data and recommended instrumentation repairs
- Programmed engine thrust model for low-bypass turbofan

**TEACHING
EXPERIENCE**

Mechanical Behavior of Materials (MSE 3003/3005) Fall 2006/Fall 2004

- Taught three lecture module on fundamentals of fracture mechanics and fatigue
- Contributed to test questions and graded homework

Creative Decisions and Design (ME 2110) Fall 2005

- Teaching assistant for one section of major design/build/test course
- Assisted professor with lab presentations and guided students on design projects
- Conducted machine shop training and supervised machining activities

Fundamentals of Fracture Mechanics (ME 7772) Spring 2005

- Taught three lecture module as part of Teaching Practicum course
- Covered historical and mathematical foundations of fracture analysis
- Contributed and graded several exam questions and conducted test review

**ENGINEERING
PUBLICATIONS &
PRESENTATIONS**

Highsmith, S. Jr., Johnson, W. S., and Pettit, R., "Design of specimens for 3-D mixed mode crack growth testing," submitted to Engineering Fracture Mechanics, January 2007.

Highsmith, S. Jr., and Johnson, W. S., "Elevated fatigue crack growth in directionally solidified GTD-111 superalloy," Fatigue & Fracture of Engineering Materials & Structures 29, January 2006.

Johnson, W. S., Wilson, A. C., and Highsmith, S. Jr., "Equivalent initial flaw size distribution determination for gas turbine blades based upon inspection data," Proceedings of ASME Turbo Expo 2005.

Highsmith, S. Jr., and Johnson, W. S., "Scatter in fatigue crack growth rate in a directionally solidified nickel-base superalloy," Journal of ASTM International 1(1), January 2004.

"New specimen designs for 3-D mixed mode crack growth studies," ASM-Atlanta meeting, Atlanta, GA, January 2007.

"New specimen designs for 3-D mixed mode crack growth studies," Student Paper Award, ASTM E08 Committee on Fatigue & Fracture conference, Atlanta, GA, November 2006.

"Probabilistic modeling of FCG in a DS superalloy," ASTM E08 Committee on Fatigue & Fracture conference, Tampa, FL, November 2003.

"Fatigue crack growth behavior & probabilistic life prediction in a DS superalloy," ASM-Atlanta meeting, Atlanta, GA, April 2002.

**OTHER INVITED
PRESENTATIONS**

"Online Organizing & Communications," YDG State Convention, Jekyll Island, GA, April 2007.

"Podcasting & Politics," Podcamp Atlanta, Emory University, March 2007.

"Netroots Communications I & II," Georgia Progressive Summit, Clark Atlanta University, January 2007.

"Podcasting for Nonprofits," Georgia for Democracy Community Night, Atlanta, GA, March 2006.

"Podcasting 101," Georgia Progressive Summit, Georgia State University, January 2006.

**SERVICE &
LEADERSHIP
ACTIVITIES**

- Young Democrats of Atlanta, 2004 - 2007
 - Communications Chair, 2005 - 2006
 - Launched first chapter podcast in national organization
 - Pioneered video-blogging in state chapter during 2006 campaign
 - Managed media releases, chapter marketing, internet presence, social networking
- Paper reviewer, Fatigue Congress 2006
- Engineering Students Without Borders, 2004 - 2005
 - Fundraising committee: helped prepare and deliver donor pitch to Southern Co.
 - Solicited equipment donations for site project in Honduras
- President, ASM Georgia Tech chapter, 2001 - 2002
- Mentor/Big Brother, Frank Elementary School, Guadalupe, AZ, 1999 - 2000

- Adult GED Program tutor, South Bend Center for the Homeless, 1996 - 1997
- Secretary, St. Edward's Hall Council, U. of Notre Dame, 1995 - 1996
- Recording Secretary, Tau Beta Pi, U. of Notre Dame, 1994 - 1997
- AIAA representative, Joint Engineering Council, U. of Notre Dame, 1993 - 1995
- Habitat for Humanity - Miami, 1990; Miami, 1992; South Bend, 1994; Atlanta, 2005
- Member ASME, AIAA, ASM/TMS, ASTM

**ADDITIONAL
QUALIFICATIONS**

- Confidential Security Clearance at Honeywell, 1999 - 2000
- Registered EIT, State of Indiana.
- Honeywell training: Six Sigma Greenbelt; Product Liability and Communication; Program Management; Weibull Analysis; MTS Testing Systems Operation.
- Experience with FORTRAN and VisualBasic programming; FRANC2D/FRANC3D (fracture mechanics analysis); Image-Pro (image analysis)
- Web design experience including HTML/CSS, Drupal, Wordpress, audio and video podcast production

REFERENCES

Available upon request