Curriculum Vitae of Anthony M. Waas

Felix Pawlowski Collegiate Professor of Aerospace Engineering, and
Professor of Mechanical Engineering (courtesy),
Department of Aerospace Engineering,
The University of Michigan
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Ann Arbor, MI 48109-2140

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Education

Ph.D. in Aeronautics with a minor in
Applied Mathematics
California Institute of Technology, Pasadena — June 1988

M.S. in Aeronautics — June 1983
California Institute of Technology, Pasadena

B.Sc in Aeronautics with First Class Honors — June 1982
Imperial College, University of London, U.K.

ACGI — June 1982
City and Guilds Institute, London, U.K.

Academic Positions

University of Washington, Seattle

Boeing Endowed Chair and Chairman of the William Boeing Department of Aero-Astro D
January 2015-present

University of Michigan, Ann Arbor

Assistant Professor of Aerospace Engineering without tenure	Jan. 1988 - Aug. 1994
Associate Professor of Aerospace Engineering with tenure	Sept. 1994–Aug. 2000
Professor of Aerospace Engineering with tenure	Sept. 2000 – present
Professor of Mechanical Engineering,	Jan. 2005-present
Felix Pawlowski Professor of Aerospace Engineering,	Jan.2009 - present

Imperial College, University of London, UK

Visiting Professor, Dept. of Aeronautics — May 2012 - present

Ford Motor Company, Scientific Research Laboratories
Visiting Scientist (on sabbatical leave) Jan. 1995 - Aug. 1995

California Institute of Technology
Visiting Professor June 2002 – Sept.2002

Research Fellow Oct. 1987 - Dec. 1987

Graduate Research Assistant July 1983 - July 1987
Advisors: Prof. C.D. Babcock, jr.
Prof. W.G. Kanuss Sept. 1987 – Jan.1988

Graduate Teaching Assistant
Statics and Dynamics of Solids Sept. 1982 – Jun.1983
Teacher: Prof. C.D. Babcock, jr.

Other positions

Ford Motor Company, Scientific Research Laboratories
Visiting Scientist (on sabbatical leave) Jan. 1995 - Aug. 1995

Research and Scholarly Expertise

Lightweight aerospace and automotive structures, with a focus on manufacturability, structural stability, structural integrity and damage tolerance. Deformation response of composite structures, textile composite structures, ceramic matrix "hot" structures, and multi-material structures for aerospace applications. Mechanics of “natural” structures and materials, specifically bio-tissues and bio-joints.

Author/Co-author of over 200 refereed archival papers in scientific journals, editor/co-editor of several books and book chapters, author and contributor to monographs, over 250 papers in conference proceedings, in addition to other papers, chapters in books, technical reports, and holder of 2 patents (4 US patents pending).

PI or coPI of external sponsored research by NASA, AFOSR, ARO, ARL, ONR, NSF, DoE and other US government agencies, aerospace and automotive industry. Consultant to multiple industries in various capacities, most recently with the Boeing Company in connection with the 787 Dreamliner airplane. One of two academic consultants to the NASA Engineering Safety Center (NESC), Structures Technical Discipline Team.

Professional Affiliation

1) *American Institute of Aeronautics and Astronautics* - **Fellow**

2) *American Society of Mechanical Engineers* - **Fellow**
3) *American Academy of Mechanics* - **Fellow**
4) *American Society of Composites* - Member
5) *American Association for the Advancement of Science* - Member

Administrative Experience at the University of Michigan

(a) Provost Faculty Advisory Council, University of Michigan, 2013 – present
(b) College of Engineering (CoE) Research Advisory Committee, 2012-present
(c) CoE Executive Committee, 2006-2011
(meets with the Dean regularly to discuss various issues related to CoE matters, such as, decisions on tenure and promotion, CoE strategic directions, reviews of departments, and review of other units within CoE. Discussion of annual CoE budget); Faculty size: 368 tenure or tenure-track faculty and 250 research professors/scientists. The work of this committee involves decisions associated with most aspects of the CoE.
(d) Chairperson, CoE Honors and Awards Committee, 2004.
(e) Member, College of Engineering Honors and Awards Committee, 2003.
(f) Associate Chairperson, Aerospace Engineering Department, University of Michigan, 2003 – 2005.
(g) Chair of the Graduate Program, Aerospace Engineering, University of Michigan, January 1998- December 2002.
(h) Member, University of Michigan Board in Control of Intercollegiate Athletics, 1999-2002
(i) Chair, CoE Rules Committee - 1997-1998.
(j) College of Engineering (CoE) Rules Committee - 1995-1997.
(k) Director, Composite Structures Laboratory, Aerospace Engineering, University of Michigan, 1988-present.

Honors and Awards

1) Stephen S. Atwood award for Scholarly Excellence, UM CoE – 2014 – the highest honor that can be earned by a CoE faculty member.
2) American Society of Composites Outstanding Researcher Award, 2013
3) Royal Aeronautical Society Literature Award (Silver Award 2012) for paper, " Ng, W., Friedmann P.P., Waas A.M., and McNamara, J.J., Thermomechanical behavior of a damaged thermal protection system: experimental correlation and influence of hypersonic flow, The Aeronautical Journal, Vol 115, No 1165 pp 69-82, 2011".
4) Ted Kennedy Family Collaborative Research Award, CoE, University of Michigan, 2012.
5) Harry and Lois Hilton Best Paper Award, AIAA 53rd SDM 2012, paper co-authored by Pineda (student) and Waas.
6) American Society of Composites Best Paper Award, AIAA 53rd SDM 2012, paper co-authored by Wang Jie (student), Hai Wang and Waas.

7) Recipient of the United States Army Director's Award for Excellence, Grad. Student Brian Justusson – summer 2011.
8) Amelia Earhart Award to Grad. Student Pavana Prabhakar, 2011.
9) Fellow, AIAA, 2010
10) Elected General Chair, 54th AIAA/ASME/ASCE/ASC Structures, Structural Dynamics and Materials Conference, Boston, MA, 2013.
11) Harry and Lois Hilton Best Paper Award, AIAA 51st SDM 2010, paper co-authored by Stapleton (student), Bednaryck and Waas.
12) Jefferson Goblet Best Paper Award, AIAA 50th SDM 2009, paper co-authored by RudraRaju (student), Salvi, Garikipati and Waas.
13) Elected Technical Chair, 49th AIAA/ASME/ASCE/ASC Structures, Structural Dynamics and Materials Conference, Chicago, Il, 2008.
14) Robert Caddell Research Award, University of Michigan, ME Department, 2007.
15) AIAA Sustained Service Award, 2006
16) David Liddle Research Award, College of Engineering, University of Michigan, 2006.
17) Fellow, American Society of Mechanical Engineers (ASME)
18) Fellow, American Academy of Mechanics (AAM)
19) SAE Ralph Teetor Award, 1995
20) American Academy of Mechanics Junior Research Award, 1997
21) Jefferson Goblet Best Paper Award, AIAA SDM 2004, paper co-authored by Rakow (student) and Waas.
22) Rackham Graduate School Fellowship, 1990
23) Combined Research, Teaching and Service Excellence Award, Department of Aerospace Engineering, 2000.
24) Research Excellence Award, Department of Aerospace Engineering, 1998.
25) Teaching Excellence Award, Department of Aerospace Engineering, 1995.
26) William F. Ballhaus Aeronautics Prize for best doctoral thesis, Caltech, 1988.
27) Special Tuition Fellowship Award, Caltech, 1983-87.
28) Imperial College Special Scholarships for BSc. Performance, 1979-1982.
29) Royal Aeronautical Society Prize of Imperial College, UK, for meritorious performance in the B.Sc degree – 1982.

Graduate Student Supervision (all at UM)

(a) Ph.D students

1. T. Kashangaki (Aero) - **co-chair** - graduated 1992, Director of Engineering, Futron Corporation, Washington, DC.
2. S.J. Song (Aero) - **chair** - graduated December, 1993, Research Engineer, Chrysler, MI.
3. A. Khamseh (Aero) - **chair** - graduated April 1994, Senior Engineer, Chrysler, MI.
4. L. Fu (Aero) - **chair** - graduated April 1994, Senior Engineer, Boeing Airplane Company (formerly McDonnell Douglas), Long Beach, CA, currently, vice-President, Microsoft, China..
5. E. Senocak (Aero) - **chair** - graduated April 1994, Associate Prof., Istanbul Technical Univ., Turkey.

6. K. Shahwan (Aero) - **chair** - graduated Feb. 1995, Senior Engineer, Chrysler, MI.
7. L. Kistler (Aero) - **chair** - graduated March 1996, Senior Engineer, Boeing Commercial Airplane, Seattle, WA.
8. D.G. Lee (Aero) -**co-chair**- graduated April 1996, Research Professor, Korea Aerospace Research Institute, Korea.
9. M. Hilburger (Aero) - **chair** – graduated April 1998, Senior Engineer, NASA Langley Research Center, Mechanics and Durability Branch.
10. S.H. Lee (Aero) - **chair** – graduated June 1998, Engineering Specialist, GM Research and Development Labs.
11. J. H. Ahn (Aero) – **chair** – graduated Oct. 1999, Chief Structures Engineer, General Atomics, now at Boeing Company, Seattle.
12. J. Chung (Aero) – **chair** –graduated Oct. 2000, Assistant Professor, Kyungwon University, Korea
13. S. C. Quek (Aero) – **chair** – graduated August 2002. Associate Research Professor, Tufts University, MA. Chief Engineer, Ming Yan Wind Power, China
14. C. Yerramalli (Aero) – **chair** – graduated February 2003. Senior Engineer, GE R and D Labs, Albany, New York. Now, Structures Engineer, Ming Yan Wind Power, North America.
15. J. Rakow (Aero) – **chair** – graduated October 2004. Chief Technical Specialist, Exponent Inc., Palo Alto, CA.
16. S. Li (ME) – **co-chair** (with M. Thouless) – graduated, 2004, Intel Labs, Shanghai, China.
17. S. Basu (Aero) – **chair** – graduated, September 2005. Technical Specialist, Granherne, Inc., Houston, TX.
18. Yingxin Gao (ME) - **co-chair** (with A. Wineman) – graduated 2007. Assistant Professor, Mechanical and Aerospace Engineering, Cornell University.
19. Shunjun Song (Aero) – **chair** – graduated 2007. Technical Specialist, United Technology Center, NY.
20. Ce (Robert) Sun (Aero) – **co-chair** (with M. Thouless) – graduated, June 2007. Research Fellow, United Technology Center, NY.
21. W.Ng (Aero) - **co-chair** (with P. Friedmann) – graduated, August 2007. Assistant Professor, Singapore Institute of Technology, Singapore.
22. Peter Gustafson (Aero) – **chair** – graduated, March 2008. Assistant Professor, Mechanical Engineering, Western Michigan University.
23. Wooseok Ji (Aero) - **chair** – graduated, August 2008. Assistant Professor, Mechanical Engineering, UNIST, Korea
24. Sam Huang (Aero) - **chair** – graduated, April 2008. Research Fellow, AFRL Materials Directorate. Now, Assistant Professor, Mechanical Engineering, SUNY-Stony Brook, NY.
25. Sungmin Lee (ME) **– co-chair** (with N. Vlahopoulos) – graduated January 2010. Postdoctoral Fellow, NAME, UM
26. Mark Pankow (ME) – **chair** – graduated, April 2010. Assistant Professor, Mechanical and Aerospace Engineering, North Carolina State University, Raleigh, NC.

27. Sangmin Lee (ME) **– co-chair** (with V. Sundararaghavan) – graduated, December 2010. Postdoctoral Scholar, UM.
28. Shiva Rudra Raju (ME) – **co-chair** (with K. Garikipati) – graduated, January 2011. Postdoctoral Fellow, UM.
29. Christian Heinrich (AE) – **co-chair** (with A. Wineman) – graduated, February 2011. SogiTech, Hamburg, Germany
30. Evan Pineda (ME) – **chair** – graduated, December 2011, currently, NASA Glenn Research Center, Cleveland, OH.
31. Scott Stapleton (AE) – **chair** – graduated, February 2012, equivalent of Asst. Professor, Aachen University, Germany, May 1, 2012.
32. Pavana Prabhakar (Aero) - **chair** – graduated, December, 2012. Assistant Professor, Mechanical Engineering, University of Texas, El Paso.
33. Eugene Kheng (ME) – **chair** – graduated, January, 2014.
34. Paul Davidson (ME) - **chair** – graduated, May 2013. GE R&D, Niskayuna, NY.
35. Nhung Nguyen (ME) - **co-chair** – graduating, May 2014
36. Royan D'Mello (Aero) - **chair** – graduated, March 2014
37. Dianyun Zhang (Aero) - **chair** – graduated, March 2014
38. Lucas Hansen (Aero) - **chair** – expected graduation, December 2014
39. Zachary Kier (Aero) - **chair** – expected graduation, April 2015
40. Pascal Meyer (Aero) - **chair** – expected graduation, December 2014
41. Brian Justusson (ME) - - **chair** – expected graduation, April 2015
42. Jiawen Xie (Aero) – **chair** – expected graduation, December 2015
43. Ashith Joseph (Aero) – **chair** – expected graduation, December 2015
44. Solver Thorsson (Aero) – **chair –** expected graduation, April 2017
45. Deepak Patel (Aero) - **chair –** expected graduation, September 2017
46. Armanj Hasanyan (Aero) - **chair –** expected graduation, September 2017

(b) MS Students

1) E. Miniatt (Aero, MS) - Stress concentration at a sharp edge in a contact problem. June 1988 - April 1990.
2) L. Fu (Aero, Ph.D.) - Mechanics of composites - Neutral holes in Orthotropic sheets. Winter 1989, currently Ph.D. candidate.
3) A. Khamseh (Aero, MS) - Arrangement of holographic interferometer.June 1988, currently Ph.D. candidate.
4) Feasibility study on measurement of high frequency mode shapes of thin beams. June 1988, currently Ph.D. candidate.
5) E. Eisele (Aero, MS) - Approximate solution to thermally loaded five layer stack. Fall 1989 - present.
6) A. Grover (Aero, MS) - Parametric resonance and the effects of shear on beams. Fall 1989.
7) Niranjan Chitale (Aero, MS) - Blister Delamination in a composite plate. April 1992.

8) David Karoski (Aero, MS) - Effect of defects on load carrying capability of the human spine. Dec. 1991.
9) Greg Blueme (Mat'l Sci, MS) - Compression after impact of tough resin composites. April 1992.
10) A. Rocha & S. Ali - Buckling analysis of Conical Shell for Pegasus rocket (FEM) Summer 1992.
11) A. Khan - A layer wise theory for vibration & buckling of laminated beams.Fall 92.
12) J. Comiez - FEM analysis of unilateral buckling of rectangular plates.Winter 1993.
13) M.Hillburger - Biaxial tests on HDPE layered cruciform specimens Fall 1993.
14) Shuching Quek - High speed capture of impact damage initiationFall 94/Winter 95.
15) Robert Bories - Development of instrumentation for single fiber tension/torsion testing Winter/Fall 1995.
16) J.C. Ahn, MS project - Torsional Response of Glass fiber composites, 1995.
17) Balachandar Krishnaswamy - Models for Fiber Bridging - Winter 1996.
18) Mark Iadicola - Digital Image Processing - Summer 1996.
19) H. Ramakrishna – Composite flexplate design – Spring/Summer 1998.
20) D. Hoogkamer – Explosion strengths of cylinders – Spring/Summer 1998.
21) Chun Li – Cosserat Theory and Application to Honeycombs – Spring/Summer 1998.
22) B. Thuruthimattam – Stress transfer in viscoelastic composites – Summer 1998.
23) R. Mora – Measurement of the Cosserat and Micropolar Constants of Honeycombs – Spring/Summer 1998.
24) R. Olabisi – Development of a finite element for modeling bone as a cosserat continuum, 2000.
25) Z. Guerra – Novel structural concepts for enhanced energy absorption of tubular structures, 2001.
26) A. Salvi (Aero MS) – Effect of Strain Rate on Interfacial Toughness in Fiber Tow Composites, 2003.
27) W. Ng – Delamination Buckling and Growth – Experiments and Finite Element Simulation, 2002.
28) E. Waldorf – Manufacturing of Carbon Nanotubes, 2002.
29) K. Waldorf – Characterization of Carbon Nanotube Reinforced Composites, 2002.
30) D. Langlais – Toughness Enhancement Of Coir Fiber Reinforced Cement Composites, 2001.
31) R. Mora – Micropolar Theories For Cellular Materials (MS Thesis), 2000.
32) M. Stec – Buckling of Sandwich Rings, 2001.
33) Jason Bone (NAME) – Crack propagation in patched aluminum plates, 2002.
34) E. Mellquist – Size effects in the compressive crushing of honeycombs, 2002.
35) Shunjun Song – Compressive Response of Woven Composites, 2003.
36) Kara Charles – Buckling of Rotating Cylinders under Thermal Loads, 2003.
37) Diana Light – A composite model for muscle – 2002-03.
38) A. Salvi (Aero MS) – Static and Dynamic Fracture of Braided Composites, 2005.
39) K. I. Salas (MS) – Convective heat transfer in metal foams, 2005.

40) N. Nimalarasa (MS) – Postbucklling analysis of carbon nanotubes, 2008.
41) G. Theiss (MS) – Manufacturing induced effects on Textile Composite Panel response, 2008.
42) Brian (Chongyu) Wang (MS) – Design of a braided composite wind blade, 2010
43) Sophia Guntupalli (MS) – Dynamic crush response of honeycombs, 2010
44) Royan D'Mello (MS) – Ring buckling under point loads, 2010
45) Kevin Lim - Design and Analysis of a Braided Composite Wind Blade, 2011.
46) Jiawen Xie - Buckling of periodic structures, Fall2011/W2012
47) David Singer, Design of a braided textile composite wind turbine blade
48) Tim Brooks, Folding and buckling of sheets to maximize energy absorption

Undergraduate Special Student Projects

1) L. Kistler - Construction of impact drop tower. Summer 1989, Winter 1989.
2) S. Heifetz, Y. Mak - Three point bend tests for thick laminated beams. Fall 89.
3) S. Heifetz - Design of table top compression test device.Summer 1988, Fall 1988.
4) S. Heifetz - Design of Aero 302 lab experiment; stress concentration around circular and elliptical cutouts. Summer 1989, Fall 1989.
5) C. Beebe - Testing of table top compression test device. Summer 1989.
6) J. Tan - Finite Element Analysis of inplane fiber microbuckling. Winter 1992.
7) S. Ahn & J. D'Souza - Unilateral buckling of rectangular laminated plates.Winter 1992
8) T. Kauffman - Materials for medical prostheses. Fall 1992
9) Scott Campbell - Biaxial tests on plexiglass Winter 1995
10) Marc Weiser - Biaxial tests on plexiglass Winter 1995
11) Matt Fago (Ed Stalker Fellow) - Holographic Interferometry Winter 1995
12) Erik Thomson (Ed Stalker Fellow -Single Fiber Tension/Torsion testsSummer 1994
13) Alyson Moskwa (MEAM) - Biaxial Tests of Plastics Summer 1997
14) Raphael Mora (Stalker Fellow) - Behavior of Plastic Honeycombs Summer 1997
15) Raphael Mora – Response of Miniature Aluminum Diaphragms for Drug Delivery Systems – Summer 1998.
16) N. Green - Failure of Layered Plastics, 1998.
17) A. Hussein – Time Dependent Debonding – (American University, Cairo – Exchange student), 2000
18) E. Mellquist – Transverse crushing behavior of circular cell polycarbonate honeycomb, 2000
19) M. St. Charles – Size effects in the torsional response of fiber composites, 2001.
20) J. Donovan – Compressive crushing of circular cell honeycombs, 2001.
21) M. st. Charles – Manufacturing of coir fiber reinforced composites, 2002.
22) E. Mellquist – Size effects in the compressive crushing of honeycombs, 2001.
23) E. Rosenberg – Size effects in the compressive failure of wood, 2003.
24) Y. Luo – Cooling efficiency of metal foams, 2003.
25) J. Gianetti – High strain rate response of braided composites, 2003.
26) R. Chan – Fictitious and factual compatibility in linear elasticity – 2003.

27) K.I. Salas – Convective heat transfer in metal foams, 2004
28) J. Banker – Bolted joints under high temperature, 2005
29) D. Tuman, B. Eagen and E. Kheng, Mechanical properties of eucleptella shells, 2005.
30) Edwin Kang – Properties of the feather shaft of a Turkey, summer 2007
31) C. Gromek – Pin connected lap joint failure as a function of operating temperature, summer 2007
32) D. Zhang – Integrated textile composite antennae structures – summer 2008
33) C. Attard – Design and implementation of split Hopkinson pressure bar – summer 2008
34) B. Justusson – Shock tube panel testing – summer 2009
35) Adam Oleshove – Design and construction of a narrow cross-section shock tube – Fall-Summer 2009-10.
36) A. Sayles (UG) – AFM mesurements of composite tow properties – Summer/Fall 2009/Winter 2010
37) Dan Detone – Torsional response of solid polymer rods – Fall 2009-Summer 2010
38) Liz Spencer (UG) - In-situ tests using SEM, 2010-2011
39) Cyrus Kosztowny - Manufacturing and Testing of Braided Composite VARTM panels, 2011
40) Deshakthi Alahakoon - SEM in-situ testing of crack growth in fiber composites, 2011
41) Rehan Newaz – Method of cells for analyzing laminates with cutouts
42) Michael Kaplan – Numerical analysis of textile laminated plates with cutouts

Visiting Students

1. M. Stec - Sweden, Ring Buckling Studies, 2007
2. Pascal Meyer, Aachen, summer 2009
3. Vincent Wang Jie - Shanghai Jiatong University, China - Impact damage tolerance of sandwich panels, 2011.
4. Marco Petrolo, University of Torino, 2011.
5. Fabian Gemmecke, Aachen University, 2012
6. Jens Wind, Arhaus University, Denmark, 2013
7. Mariana Maiaru, Politecnico di Torino, 2013

Postdoctoral Students

1. Kuba Pawlowski, Warsaw University, Dekaban Exchange, 1997
2. De Xie, 2002-2006
3. Wooseok Ji, 2010-2013 December
4. Mark Pankow, 2010-2012
5. Trisha Sain, 2011 Jan. – 2013 August
6. Susanta Ghosh, 2011 Jan. – 2013 February
7. Siva RudraRaju, Feb. 2012-Dec. 2012.

8. Pavana Prabhakar, January 2013 – August 2013
9. Wu Xu, November 2012 - present

Research Collaborators in Past 10 years (other than students)

Alan Wineman, Peretz Friedmann, Ellen Arruda, Nick Kotov, Michael Thouless, Krishna Garikipati, Nick Vlahopoulos, Quim Martins, Sam Daly, John Halloran, Antoine Naaman, Michael Keidar, Khaled Shahwan, Ray Boeman, Ari Caliskan, Jessica Schroeder, Pablo Zavaterri, Xinran Xiao, Omer Faruque, Steve Harris, De Xie, Yaning Li, Damodar Ambur, Cheryl Rose, Brett Bednarcyk, Steve Arnold, Craig Collier, Phil Yarrington, Phil Bogert, Arun Satyanarayana, Alex Tessler, John Kieffer, Max Shtein, Joerg Lahann, Zdenek Bazant, Ferhun Caner, Lyle Deobald, Gerry Mabson, Doug Carper, Ron Nimmer, Shu Quek, Chandra Yerramalli, Waseem Faidi, Peter Gustafson, Veera Sundararaghavan, Gerald Mabson, Steve Wanthal, Mostafa Rassaian

Short Courses and Workshops

1) Finite Element Methods - W.J. Anderson, et al. - (participant) UM - Summer 1989
2) ONR Workshop and Review on Thick Composites, Univ. of Maryland-presenter Summer 1992
3) ONR Workshop on Composites and Failure Mechanics-presenter Fall 1994
4) Lecturer, Summer Course in Finite Element Methods, UM, Summer 1995,1996, 1997
5) AFOSR Workshop in Mechanics of Materials-presenter, Nov. 1997
6) UM-Technical University of Warsaw Exchange Program Workshop – May 2001
7) UM-Warsaw Institute Workshop on Bone Growth and Remodeling - August 2004
8) CISM Udine – Lectures on Modeling of Composites October 2012

Courses Taught at U of M

1) Structural Mechanics I - Ae 314 Winter 1988
2) Structural Mechanics II - Ae 414 Fall 1988
3) Structural Mechanics II - Ae 414 Winter 1989
4) Mechanics of Fibrous Composites - Ae 516 Fall 1989
5) Experimental Methods - Ae 302 Winter 1990
6) Structural Mechanics II- Ae 414 Fall 1990
7) Experimental Methods - Ae 302 Fall 1990
8) Mechanics of Fibrous Composites - Ae 516 Winter 1991
9) Structural Mechanics II - Ae 414 Fall 1991
10) Mechanics of Fibrous Composites - Ae 516 Winter 1992
11) Structural Mechanics I - Ae 314 Winter 1992
12) Elastic Stability I - Ae 518 Fall 1992
13) Structural Mechanics I - Ae 314 Winter 1993
14) Mechanics of Fibrous Composites - Ae 516 Winter 1993

15) Structural Mechanics II - Ae 414	Fall 1993
16) Introduction to Aerospace Engineering - Ae 200	Winter 1994
17) Mechanics of Fibrous Composites - Ae 516	Winter 1994
18) Structural Mechanics II - Ae 414	Fall 1994
19) on Sabbatical Leave	Winter 1995
20) Structural Mechanics II - Ae 414	Fall 1995
21) Mechanics of Fibrous Composites - Ae 516	Fall 1995
22) Elastic Stability I - Ae 518	Fall 1996
23) Mechanics of Fibrous Composites - Ae 516	Fall 1996
24) Instrumentation and Measurement - Ae 301	Winter 1997
25) Instrumentation and Measurement - Ae 301	Fall 1997
26) Mechanics of Fibrous Composites - Ae 516	Win. 1998
27) Structural Mechanics II - Ae 414	Spring 1998
28) Elastic Stability I - Ae 518	Fall 1998
29) Mechanics of Fibrous Composites - Ae 516	Win. 1999
30) Structural Mechanics I – Ae315	Fall 1999
31) Mechanics of Fibrous Composites – Ae516	Winter2000
32) Introduction to Solid Mechanics – Ae285	Fall 2000
33) Elastic Stability – Ae518	Winter2001
34) Space Systems Design – Ae483 (two lectures)	Winter 2001
35) Mechanics of Fibrous Composites – Ae516	Fall 2001
36) Introduction to Solid Mechanics – Ae285	Winter 2002
37) Sabbatical – Fall 2002	
38) Structural Mechanics II – Ae315	Winter 2003
39) Elastic Stability – Ae518	Fall 2003
40) Introduction to Solid and Structural Mechanics – Ae215	Winter 2004
41) Mechanics of Fibrous Composites – Ae516	Fall 2004
42) Structural Mechanics II – Ae315	Winter 2005
43) Structural Mechanics I – Ae215	Fall 2005
44) Mechanics of Composites – Ae516	Winter 2006
45) Elastic Stability, Ae518	Fall 2006
46) Structural Mechanics 1	Winter 2007
47) Mechanics of Composites – Ae516	Fall 2007
48) Instrumentation and Measurement – Ae305	Winter 2008
49) Elastic Stability, Ae518	Fall 2008
50) Advanced Flight Structures, Ae495	Winter 2009
51) Elastic Stability, Ae518	Fall 2009
52) Sabbatical	Winter 2010
53) Elastic Stability, Ae518	Fall 2010
54) Mechanics of Composites – Ae516	Winter 2011
55) Structural Mechanics II – Ae315	Fall 2011
56) Mechanics of Composites – Ae516	Winter 2012
57) Advanced Flight Structures – Ae495	Fall 2012
58) Mechanics of Composites – Ae516	Winter 2013

59) Mechanics of Composites – Ae516 Fall 2013
60) Advanced Flight Structures – Ae495 Winter 2014

Grants and Contracts at the University of Michigan
(Unless otherwise stated, I have acted as the sole PI of the projects listed below)

1) Compressive failure in delaminated laminates in the presence of a cut out — OVPR, University of Michigan, 4/1/89 through 12/31/89, $3500.00. 1 GSRA.

2) Fiber buckling in laminated plates — NASA Langley Research Center, 10/1/89 through 9/30/90, $31,620.00. 1 GSRA.

3) Failure mechanisms in laminated composites — Rackham Faculty Grant, 01/01/90-06/30/90, $4667.00.

4) Failure of composite ring structures - Minority Office, OVPR, University of Michigan, 6/1/91 through 9/30/91, $5300.00. 1 GSRA.

5) Compressive failure of delaminated laminates - Air Force (AFOSR) Engineering Research Initiation Grant, 9/1/91 through 8/31/92, $22,000.00. 1 GSRA.

6) Failure mechanisms of laminates containing cutouts - NASA Langley Research Center, 6/1/91 through 5/31/92, $39,000.00. 1 GSRA.

7) Compressive failure of thick composites - Office of Naval Research (ONR), 5/1/91 through 4/30/93, $119,500.00. Extended 1/1/94 - 12/31/94, $49,986.00. 1 GSRA.

8) Effect of impact damage on residual strength of laminates - NASA Grad. Res. Studentship award, $22,000.00 per year up to three years. $66,000.00. 1 GSRA.

9) Unilateral buckling of plates - OVPR, University of Michigan, 5/1/93 through 8/31/93, $3600.00. 1 GSRA.

10) Development of a Constitutive Model for High Density Polyethylene - Ford Motor Company - 8/15/93 - 12/31/93, $ 28,000. 1 GSRA.

11) Multidisciplinary Design Fellowships and Curriculum Changes - Phase I Proposal Development (CO-PI with J. Eisley, K. Powell, P. Washabaugh, V. Coppola and A. Gallimore - 10/01/93 - 9/30/94, $ 50,000, NASA Space Grant Consortitum. 1 GSRA.

12) A real time processor and diagnostic equipment for closed loop control experiment - CO-PI with D.Bernstein, L. Bernal, V. Coppola, W. Dahm, E. Gilbert,

P. Kabamba, N. McClamroch, P. Roe and P. Washabaugh, NSF, - 08/01/93 - 7/31/94, $ 61,187

13) Failure Criteria for Composites - AFOSR, 4/15/95 - 4/30/98, $172,000.00. 1 GSRA.

14) Biaxial Loading frame for the study of multiaxial failure criteria for composites, US DOD, DURIP Program, 8/15/95-8/14/96, $245,000.00

15) Development of a Constitutive Model for High Density Polyethylene - Ford Motor Company - 8/15/93 - 12/31/93, $ 28,000. Jan. 94 - April 94, supplement $5,000.00

16) Fatigue tests on sheet steel under reversed cyclic bending- Toyota Motor Company - 2/15/94 - 6/15/94, $ 13,000. 1 GSRA.

17) Failure Criteria for Composites - Michigan Materials Processing Institute - 4/15/95 - 4/14/98, $ 129,000.00 , Alan Wineman (MEAM) is co-PI. 1 GSRA.

18) Optimal design of structures incorporating smart materials – ARPA(now DARPA), 9/1/94-8/31/97, $480,000.00, Co-PI with P. Washabaugh. 2 GSRA's.

19) Response of thick shells under combined loading -NASA Langley, GSRA Student Award to Mark Hilburger, 6/1/94-5/31/97, $66,000.00. 1 GSRA.

20) Japan Technology Management Program -UM/AFOSR, Travel Grants, Feb. 94, $3,800.00, 2/1/95-12/31/95- $3,000.00., August '96 - $1,500.00.

21) Biaxial Tests and their implications for numerical simulation of crash, Automotive Composites Consortium, USCAR, July 1997-June 1998, $78,000. 1 GSRA.

22) Compressive Failure of Fiber Composites – US Army Research Office(ARO), May 1998 – May 2001, $230,982. 1 GSRA.

23) Biaxial Behavior of Fiber Reinforced Composites – Implications for Numerical Tools in Crash Energy Computations, NSF Mechanics and Materials, 12/15/99 – 11/30/2001, $150,000. 1 GSRA.

24) Dynamic Compressive Failure of Fiber Composites, DoD ARO DURIP Program, $370,000, Dec. 1998 – Dec. 1999.

25) Instrumentation for Smart Materials and Smart Composites, DoD AFOSR DURIP Program, Co-PI with J. A. Shaw, $411,000, Dec. 1997 – Dec. 1998.

26) Life and Durability Prediction of Elastomer, Rubber and Polymer Composite Components, NSF Civil and Mechanical Systems, Co-PI with J.A. Shaw, A.S. Wineman (PI), Oct. 1, 1999 – Aug. 31, 2002, $350,370. 1.5 GSRA's

27) Effects of Strain Rate on Energy Absorption of Composite Tubes, USAMP, $38,000, 15 Sept. 1999 – 14 March, 2000. 1 GSRA.

28) Design of a Composite Flexplate, DaimlerChrysler Challenge Fund for Research, $70,601, 15 Sept. 1999 – 14 Sept. 2000. 1 GSRA.

29) Biaxial Response and Failure of Carbon Fiber Reinforced Composites – Automotive Composites Consortium USCAR, 10/15/99 – 05/31/2002, $158,489.00. 1 GSRA.

30) Response of Strongly Anisotropic Laminated Panels Under Combined Loads, NASA Langley RC, $52,000, 1 January 2000 – 01/31/2002, 1 GSRA.

31) Instrumentation and Computational Infrastructure for Characterizing the Response and Failure of Polymer Matrix Composites, US ARO, DURIP Program, $165,000, 3/31/01 to 3/30/02.

32) Static and Dynamic Shear Response and Failure of Carbon Fiber Reinforced Polymer Matrix Stitched Lamina, US DoE, ACC, $81,117, 1/15/01 – 6/14/02, 1 GSRA.

33) Methodologies for modeling the strength of adhesively bonded structures – GM Research Center, $343, 264, co-PI with M. Thouless, Oct. 2001 – Sept. 2003, 2 GSRA's.

34) Computational and Experimental schemes for adhesive debonding-Phase 1 – US DoE ACC, $53, 914, 03/01/01 – 02/28/02, 1 Post doctoral fellow.

35) Computational and Experimental schemes for adhesive debonding-Phase 2/3 – US DoE ACC, 04/10/02 – 09/30/04, $235,898.00, 1 Post doctoral fellow.

36) Mechanical Characterization of Zytel–GM Research Labs, 03/20/02 – 09/19/02, $17,753.00, 1 MS student.

37) Progressive Failure of Strongly Anisotropic Laminated Panels Under Combined Loads, NASA Langley RC, $172,000, 1 January 2003 – 06/30/05, 1 GSRA

38) Static and Dynamic Response and Failure of Carbon Fiber Braided Composites, US DoE, ACC, $219,018, 06/15/02 – 08/31/05, 1 GSRA.

39) NASA URETI on Reusable Launch Vehicles, Co-PI with a "team" from UM, U.Maryland and U. Washington. Responsible for one Ph.D student and 5% acad.yr salary and summer support, Total Budget $5,977,916.00, 8/19/02-8/18/07.

40) Tailoring Properties Of Advanced Composites With Optimal Microstructures, K. Kishimoto, Anil Wijeyewickrema and A. Waas, International Collaboration between Tokyo Inst. Of Technology and Univeristy of Michigan, April 2002-three years, Monobusho, Japan Ministry of Education.

41) Post-peak characterization of 2D Triaxially Braided Composites, US DoE ACC, 02/01/04 – 12/31/06, $229,255.00, 1 GSRA.

42) Adhesively-Bonded Dual Phase Steel Structures: Characterization and Modeling Strategies for Strength Prediction (with M.D. Thouless), $360,491.00, GM Research Company, 04/01/04-09/30/07, 1 GSRA

43) Integrated thermal structures for responsive space access/long range strike vehicles, US DoD-Air Force/Anteon Corporation, $32,211, 12/20/2004 – 9/30/2005. Extension pending for 24 months, $120,000.

44) In-plane properties of plain-weave Z-pinned composites, US ARO, $282,987.00, 06/01/05 – 08/31/08, 1 GSRA.

45) Boeing Company, PI-Damage Progression and Failure Using Cohesive Elements in Finite Element Codes: An Investigation to Improve Convergence Incorporating Physics Based Modeling Techniques, $430,362.00, 11/01/2005-4/30/2008, 5% acad. yr. salary and summer support, 1 GSRA.

46) US ARO, PI-In-plane properties of plain-weave Z-pinned composites, $261,145.00, 06/01/2005 – 5/31/2008, 1 GSRA.

47) GE R and D, -PI Durability of Bonded Joints, $25,000, 9/1/07-4/30/08.

48) STTR AFOSR – Comet Technology, Inc., PI- *Failure Initiation Predictors for Reliability Based Design of Hybrid Composites*, 11/1/08 – 8/14/09, $52,948.

49) MKP Structural Design Associate, Inc., *Characterization of Novel Armor Materials*, $42,656, 4/01/2008-8/31/2009.

50) General Electric Co, *Tests on Specialized Structural Joints for GE*, $45,133, 06/01/2007 – 5/31/2009.

51) ONR, Co-PI with Arruda (ME) and Khotov (ChemEng.), *Basic Research in the Inherent Toughening Mechanism in Polymeric Materials at High Strain Rates*, $1,240,045, 3/16/2006-12/31/2009, 10% acad. Yr salary, 1 GSRA. Eugene Kheng 50%.

52) NASA, Collier Research Corp, *A Multiscale, Validated, Physics-Based Progressive Failure Modeling Tool for Advanced Composite Structures*, $184,608, 3/27/2007-1/31/2010, ½ summer support, 1 GSRA. Evan Pineda 50%.

53) NASA, Co-PI, *EFEA Developments for Metallic/Composite Rotorcraft Configurations*, $600,000, 01/01/2007 – 12/31/2010, ½ summer support.

54) Dept of Energy, U.S. CAR *Modeling of the Manufacturing Process Induced Effects on the Matrix Properties of Textile Composites*, $520,786, 9/01/2007 – 2/28/2010, ½ summer support, 2 GSRA's. Christian Heinrich 25%.

55) NASA Co-PI, *Constellation University Institute Project (CUIP)*, $4,617,396, 10/01/2007 – 5/31/2009, 1-1/2 summer support, 1 GSRA.

56) U.S. DOD Army, T.E.A.M., Inc. *Deformation Response Characterization of 3D Textile Composites for Armor Applications*, $171,000, 9/01/2007 – 8/31/2009, 0.3 summer support. Mark Pankow 50%.

57) General Motors Corporation Co-PI, *Development and Analysis of Validation Structures for Adhesive Bonding*, $173,667, 4/01/2008-6/30/2009.

58) U.S. DOD Army DURIP *Instrumentation for Characterizing Dynamic Failure of Glass Fiber Textile Composites for Armor Applications, $146,873, 6/01/2008-5/31/2009.*

59) DOE – U.S. AMP *Size Effects in Textile Composites*, $200,602, 1/01/2007-6/30/2010, 10% AY, 1 GSRA 50%.

60) ONR, Co-PI with Arruda (ME) and Khotov (ChemEng.), *Basic Research in the Inherent Toughening Mechanism in Polymeric Materials at High Strain Rates*, $1,540,045, 3/16/2006-12/31/2010, 10% acad. Yr salary, 1 GSRA 50%.

61) NASA, Collier Research Corp, *A Multiscale, Validated, Physics-Based Progressive Failure Modeling Tool for Advanced Composite Structures*, $281,099, 3/27/2007-12/31/2010, ½ summer support, 1 GSRA 50%.

62) NASA, Co-PI, *EFEA Developments for Metallic/Composite Rotorcraft Configurations*, $600,000, 01/01/2007 – 12/31/2010, ½ summer support.

63) Dept of Energy, U.S. CAR *Modeling of the Manufacturing Process Induced Effects on the Matrix Properties of Textile Composites*, $550,786, 9/01/2007 – 12/31/2010, ½ summer support, 2 GSRA's 25%.

64) U.S. DOD Army, T.E.A.M., Inc. *Deformation Response Characterization of 3D Textile Composites for Armor Applications*, $271,000, 9/01/2007 – 8/31/2010, 0.3 summer support. 1 GSRA 50%.

65) General Motors Corporation Co-PI, *Development and Analysis of Validation Structures for Adhesive Bonding*, $173,667, 4/01/2008-6/30/2009, 5% AY and partial Post Doc.

66) NASA, Collier Research Corp. *Modeling Fracture and Failure in Laminated Composites Using the Variational Multiscale Cohesive Method (VMCM)*, $182,700, 8/21/2008-12/31/2010, ¼ summer support. 1 GSRA 50%.

67) U.S. DOD Air Force /Comet Technology Corporation *Failure Initialization Predictors for Reliability-Based Design of Hybrid Composite Materials*, $330,000, 1/01/2010-12/31/2011, ¼ AY, 1 GSRA, 1 PostDoc.

68) Albany Engineered Composites, Inc. *Specimen Size and Shape Effects in Split Hopkinson Bar Testing of 3D Textile Composites*, $60,000, 11/15/2008-9/14/2009, partial Post Doc.

69) General Motors Global Research. *Fracture, Toughness (Interface Model I and Mode II) of Dissimilar Materials for Composite Structures*, $33,933, 5/31/2009-12/31/2009, 1 GSRA 50%.

70) U.S. DoE – *Wind Turbine Process Monitoring* – subcontract from GE, $60,000, 1/12/2010 – 12/31/2010, 1 GSRA.

71) U.S. DOD Army Research Labs – Albany Engineered Composites, Inc. *Impact Drop Tower and Split Hopkinson Pressure Bar (SHPB) Testing of 3D Albany Textile Composites*, $70,000, 9/15/2009-9/14/2010, 1 GSRA.

72) U.S. DOD Army *Hierarchical Engineered Materials and Structures*, $273,235, 8/15/2009 – 8/14/2012, 1 week summer and 1 GSRA.

73) U.S. DOD Army Research Labs – Albany Engineered Composites, Inc. *Deformation Response of 3D Hybrid Textile Composites*, $200,000, 4/15/2009-4/14/2011, 1 summer and 1 GSRA.

74) U.S. DOD Navy/ONR *Design, Manufacture, and Analysis of Tough, Nanostructure-Reinforced High-performance Polymers*, $372,416, 1/1/2010-12/31/2012, 1 summer and 1 GSRA.

75) DARPA - NextGen Aeronautics, Inc. *Materials Engineering Logic at the Nano and Micro Scales (MELANS)*, $1,290,640, 11/1/2010-9/30/2012, 5% AY and 1 GSRA

76) NASA – NSTRF – Cyrus Kostowny, 66k per year for 5 years; start: September 1, 2012

77) NASA – NSTRF – Zach Kier, 66k per year for 5 years; start: September 1, 2010

78) GE Aviation *Deformation, Damage, and Failure Mechanisms in Ceramic Matrix Composites (CMC Program)*, $2,950,000, 9/14/2010-12/31/2014, 1 summer and 2 GSRAs.

79) Boeing, *Structural Technologies Development,* $1,451,250, 11/15/2010-12/31/2014, 5% AY and 2 post-doctoral fellows, 2 GSRAs.

80) U.S. DOD AFOSR, Multi-scale Analysis of Woven Ceramic Matrix Composites $313,235, 1/15/2013 – 1/14/2016, 1 summer month and 1 GSRA.

81) U.S. DOD Army, Multi-scale Analysis of Progressive Failure of Woven Polymer Matrix Composites $313,235, 4/15/2013 – 4/14/2016, 1 summer month and 1 GSRA

82) U.S. DoE - USAMP, Validation of Material Models for Automotive Carbon-Fiber Composite Structures via Physical Testing (Including Crash) $199,470, 9/15/2012 – 9/14/2014, 2% AY and 1 Post Doc

83) GE Aviation,ICM2, Integrated Computational Methods for Composite Materials (ICM^2) - Cure Kinetics and Micromechanics $463,636, 1/1/2013 – 12/31/2015, 5% of one summer month (yr1), 7% of one summer month (yr1), 8% of one summer month (yr3) and 1 Post Doc

84) Lockheed Martin - Assess and Quantify the Benefits of Applying Damage Tolerant Design Principles to Advanced Composite Aircraft Structure, 4/1/2013-12/31/2014, 70k, I GSRA

85) US DoE – Composites Manufacturing Center Proposal; PI-Byron Pipes – Purdue, Concept Paper Submitted, 4/22/2014 - $140 Million over 10 years, subcontract to UM expected.

Publications
Refereed Journals, Transactions or Archives

1) A. Waas, C.D. Babcock,jr. and W.G. Knauss, "A Mechanical Model for Elastic Fiber Microbuckling," J. Applied Mechanics, Vol. 57, No. 1, pp. 138-149, March 1990.

2) A. Waas, C.D. Babcock,jr. and W.G. Knauss, "An Experimental Study of Compression Failure of Fibrous Laminates in the Presence of Stress Gradients," International Journal of Solids and Structures, Vol. 26, No. 9/10, pp. 1071-1098, 1990.

3) A. Waas, C.D. Babcock,jr. and W.G. Knauss, "An Experimental Study of the Initiation and Progression of Damage in Compressively Loaded Composite Laminates in the Presence of a Circular Cut Out," AIAA Journal, Vol. 29, No. 3, pp. 436-443, 1991.

4) E. Miniatt, A. Waas and W.J. Anderson, "An Experimental Study of Stress Singularities at a Sharp Corner in a Contact Problem," Experimental Mechanics, pp. 281-286, Sept. 1990.

5) A. Waas, "Initial Postbuckling Behavior of Beams on a Non-linear Elastic Foundation," Mech. Res. Communications, Vol. 17 (4), pp. 239-248, July-August 1990.

6) K. Shahwan and A. Waas, "One-Sided Buckling of a Long Orthotropic Plate," ASME Trans. J. of Eng. Materials and Technology, Vol. 113, No. 4, pp. 396-403, Oct. 1991.

7) M.B. Zochowski, A. Waas, W. Anderson and E. Miniatt, "Reduction of contact stress by use of relief notches," Experimental Mechanics, pp. 271-276, Sept. 1991.

8) Lei Fu and A. Waas, "Buckling of Polar and Rectilinearly Orthotropic Annular Plates," in J. of Composite Structures, 22, 1992, pp 47-57.

9) A. Waas, "Initial Postbuckling Behavior of Shear Deformable Laminated Beams," Int. J. of Nonlinear Mechanics, pp. 817-832, Sept. 1992.

10) A. Khamseh and A. Waas, "Failure of uniply model composites under compression," ASME Trans. J. of Eng. Materials and Technology, 114, pp. 304-310, July 1992, pp. 304-310.

11) A. Waas, "Effect of Interphase on Compressive Strength of Unidirectional Laminates," ASME Trans. J. of Applied Mech., 59 No. 2, June 1992, pp. S183-S188.

12) S.J. Song and A. Waas, "A Nonlinear Elastic Foundation Model for Crack Growth in Laminates," J. Composites Engineering, Vol. 3, No. 10, pp945-959, 1993.

13) K. Shahwan and A. Waas, "A Mechanical Model for the Unilateral Buckling of Rectangular Plates," Int. J. of Solids & Structures, Vol. 31, No.1, pp75-89, 1994.

14) Lei Fu and A. Waas, "Initial Postbuckling of Laminated Thick Composite Rings Subjected to External Pressure - 2D Analysis," ASME Trans. J. of Applied Mechanics, vol. 62, No.2, pp338-345, 1995.

15) S.J. Song and A. Waas, "Mode I Fracture in Laminates,"J. Engineering Fracture Mechanics, vol. 49, No. 1, pp17-28, 1994.

16) S.J. Song and A. Waas, "Modeling Crack Growth in Laminates via a Novel Strength Criterion," ASME Trans, J. of Eng. Materials and Technology, vol. 116, No. 4, pp512-516, 1994.

17) S.J. Song and A. Waas, " An energy based model for mixed mode failure of laminated composites" AIAA Journal , vol. 33, No. 4, pp739-745, 1995.

18) J. Comiez, A. Waas and K. Shahwan, "Delamination Buckling: Experiment and Analysis" Int. J. Solids and Structures, vol. 32, No. 6/7, pp767-782, 1995.

19) E. Senocak and A. Waas, ''The Design of Neutrally Reinforced Cutouts in Symmetrically Laminated Plates", Mechanics of Composite Materials and Structures, vol. 2, pp71-89, 1995.

20) E. Senocak and A. Waas, ''Optimally Reinforced Cutouts in Laminated Shells", Int.J.Mech.Sciences, Vol. 38, No. 2, pp121-140, 1995.

21) S.H. Lee and A. Waas, "Initial Postbuckling behavior of a finite beam on an elastic foundation", Int. J. Nonlinear Mechanics., Vol. 31, No. 3, pp313-328, 1996.

22) Lei Fu and A. Waas, "Response of Laminated Thick Composite Rings Subjected to External Pressure " Composite Structures, vol. 31, pp325-338, 1995.

23) C.R. Schultheisz and A. M. Waas, "Compressive Failure in Composites, Part 1: Testing and Micromechanical Theories," invited by Prof. A.D. Young, FRS, in Progress in Aerospace Sciences, vol. 32, No. 1, pp 1-42, 1996.

24) A. M. Waas and C.R. Schultheisz, "Compressive Failure in Composites, Part 2: Experimental Studies," invited by Prof. A.D. Young, FRS, in Progress in Aerospace Sciences, vol. 32, No. 1, pp 43-78, 1996.

25) A. Khamseh and A. Waas, "Failure Mechanisms of Graphite/Epoxy Laminated Composites under Biaxial Planar Compression, ASME Trans. J. Eng. Materials and Technology, vol. 119, pp56-64, 1997.

26) K. Shahwan and A. Waas, Non-self-similar decohesion along a finite interface of unilaterally constrained delaminations, Proc. Royal Soc. (U.K.), 1997, part A, vol. 453, pp515-550, March 1997.

27) M. Hilburger, A. Waas and J. Starnes, jr., "Modeling the Dynamic Response and Establishing Post-Buckling/Post Snap-thru Equilibrium of Discrete Structures via a Transient Analysis", ASME Trans. J. Applied Mechs, Vol. 64, No. 3, pp590-595, 1997.

28) D.G. Lee and A. Waas, "Stress Analysis of Laminated Composite Annular Disks Subjected to a Concentrated Load Using Layer-wise Zig-Zag Theory", J. Advanced Composite Materials, vol. 6, No. 4, pp261-278, 1997

29) Deoggyu Lee and Anthony M. Waas, Stability Analysis of a Rotating Multi-Layer Annular Plate with a Stationary Frictional Follower Load, Int. J. Mech. Sciences, vol. 39, No. 10, pp1117-1138, 1997.

30) L. Kistler and A. M. Waas, Impact Response of Cylindrically Curved Laminates including a large deformation scaling study, Int. J. Impact Engineering, vol. 21, No.1-2, pp61-75, 1998.

31) S. J. Song and A.M. Waas, "Effects of Shear Deformation on Buckling and Free Vibration of Laminated Plates ", J. Composite Structures, vol. 37, No. 1, pp33-43, 1997.

32) K. Shahwan and A. Waas, "Buckling of Unilaterally Constrained Infinite Plates," ASCE J. Engineering Mechanics, vol. 124, No. 2, pp127-136, 1998.

33) Deoggyu Lee, Anthony M. Waas and Bruce H. Karnopp, Analysis of a Rotating Multi-Layer Annular Plate Modeled via Layer-Wise Zig-Zag Theory: Free Vibration and Transient Analysis, Computers and Structures, vol. 66, No.2-3, pp313-335, 1998.

34) L. S. Kistler and A.M. Waas, Effect of inplane boundary conditions and membrane stresses on the impact response of curved laminated plates, Int.J. Solids and Structures, 36: (9) 1311-1327 March 1999

35) L. Kistler and A.M. Waas, Experiment and Analysis on the Response of Curved Laminated Composite Panels subjected to Low Velocity Impact, Int.J. Impact Engineering, 21: (9) 711-736 Oct. 1998

36) A. Waas, J.H. Ahn and A.R. Khamseh, "Compressive Failure of Notched Uniply Composite Laminates", Composites Part B, vol 29B, pp75-80, 1998.

37) J. H. Ahn and A. Waas, "A Micromechanics-Based Finite Element Model for Compressive Failure of Notched Uniply Composite Laminates under Remote Biaxial Loads", Trans. ASME J.Eng. Materials and Technology, vol. 121, pp360-366, July 1999.

38) M. Hilburger, J. Starnes, jr., and A. Waas, Response of Composite Shells with Cutouts to Internal Pressure and Compression Loads, AIAA Journal, 37: (2) 232-237, Feb. 1999

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40) Fago MJ, and Waas AM, "Experimental Investigation of the Behavior of Edge Delaminations Using Holographic Interferometry," Opt. Eng 37 (5): 1420-1428 May 1998.

41) Shahwan KW, and Waas AM, "Buckling Of Unilaterally Constrained Plates: Applications to the Study Of Delaminations in Layered Structures," J Franklin I 335B (6): 1009-1039 Aug 1998.

42) Yuan, J., Takeda, N. and Waas, A.M., "A note on the data processing in the split Hopkinson pressure bar tests", Experimental Techniques, 22(5), pp21-21, Oct. 1998.

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218) Brian Justusson, Mark Pankow, Anthony M. Waas, Failure of 3D woven composites, to be presented at the Material Science & Technology 2011, Columbus, Ohio, 16th-20 October 2011.

219) E.J. Pineda, A.M. Waas, B.A. Bednarcyk, C.S. Collier (2010). Multiscale Modeling of Progressive Microdamage and Transverse Cracking in Fiber Reinforced Laminates. *16th U.S. National Conference of Theoretical and Applied Mechanics, 27 June – 2 July, State College, PA*.

220) E.J. Pineda, A.M. Waas, B.A. Bednarcyk, P.B. Bogert, A. Satyanarayana, C.S. Collier (2010). On the Use of Schapery Theory for Progressive Failure Analysis of Notched Laminated Composites, *ASME International Mechanical Engineering Congress & Exposition, 12-18 November, Vancouver, British Columbia, Canada.*

221) Royan J. D'Mello, Sophia Guntupalli and Anthony M. Waas, "Response of honeycombs to crush loading," ASME Applied Mechanics and Materials Division Conference (McMAT), May 30th to June 1st, Chicago, IL, 2011.

222) M. Pankow, A.M. Waas, C.F. Yen, S. Ghiorse, "High rate compression response of 3D woven composites," Deformation and Fracture of Composites 11, Cambridge, UK, 2011.

223) M. Pankow, A.M.Waas, C.F. Yen, S. Ghiorse, "The high rate deformation response of 3D woven composites," International Conference on Composite Materials 18, Jaeju Island, Korea, 2011.

224) M. Pankow, A.M. Waas, C.F. Yen, S. Ghiorse, "Response of 3D woven composites to high rates of loading," US National Congress on Computational Mechanics, Minnesota, 2011.

225) M. Pankow, B. Justusson, A.M. Waas, C.Yen, 3D Digital Image Correlation using a single high-speed camera for out-of-plane displacements at high rates. ICEM

Conference, Portugal, 2012

226) M. Pankow, C.F. Yen, A. Salvi, B. Justusson, A.M. Waas. Effect of Woven Architecture on Shear fracture of 3D Woven Composites. ICNMMCS Conference, Torino, Italy 2012

227) M. Pankow, C.F. Yen, B. Justusson, A.M. Waas. High Strain Rate Deformation Response of 3D Woven Composites Subjected to Compression and Tension. ECCM Conference, Venice, 2012

228) D. Zhang, A.M. Waas, C.F. Yen, and S. Ghiorse, "Modeling failure mechanisms of 3D orthogonal interlock hybrid textile composites in flexure", *23th International Congress of Theoretical and Applied Mechanics*, Beijing, China, August 19-24, 2012

229) D. Zhang, A.M. Waas, C.F. Yen, and S. Ghiorse, "Prediction of kink band formation in 3D textile glass fiber composites using a multi-scale modeling strategy", *19th International Conference on Composites/Nano Engineering*, Shanghai, China, July 24-30, 2011

230) M. Pankow, C.F. Yen, M. Rudoplh, B. Justusson, D. Zhang, A.M. Waas. Mechanical Testing of Hybrid 3D Woven Composites. AIAA-2012-1572, AIAA-SDM Conference, 2012

231) Justusson B, Pankow M, Waas AM. "Thickness effects on failure mechanisms of 2D woven composites" American Society for Composites 27th Technical Conference. Arlington, TX. 1-4 October 2012. pp. 1984-1993

232) M.Pankow, A.M. Waas, C.F. Yen, and S. Ghiorse. Mechanical properties of hybrid 3D woven composties. American Society of Composites Conference, Montreal, CA 2011.

233) M.Pankow, A.M. Waas, C.F. Yen, and S. Ghiorse. Response of 3d woven composites to high rates of loading. USNCCM 11, 2011.

234) M. Pankow, A.M. Waas, C.F. Yen, and S. Ghiorse. Determining delamination resistance of 3D woven composites. ASME McMat, 2011.

235) M. Pankow, A.M. Waas, C.F. Yen, and S. Ghiorse. High rate compression response of 3D woven composites. Deformation and Fracture of Composites 11, 2011.

236) E. J. Pineda, A. M. Waas, B. A. Bednarcyk, C. S. Collier. (2011). A multiscale progressive damage analysis design tool for advanced composite structures. 16th

International Conference on Composite Structures, 28-30, June, Porto, Portugal.

237) Davidson P, Waas AM, Effect of non-equilibrium phenomenon in mode-I fracture, 16th International Conference on Composite Structures (ICCS 16), Porto, Portugal, 28-30 June 2011,

238) B. A. Bednarcyk, E. J. Pineda, B. A. Lerch. (2011). Multiscale analysis of damage progression and failure in honeycomb sandwich panel compression after impact tests. 16th International Conference on Composite Structures, 28-30, June, Porto, Portugal.

239) E. J. Pineda, B.A. Bednarcyk, S. M. Arnold (2011). Multiscale modeling of progressive damage and failure in PMCs. PMC Peer Review, 5-6, October, NASA Glenn Research Center, Cleveland, OH.

240) E. J. Pineda, A. M. Waas, B. A. Bednarcyk. (2012) Progressive failure of a unidirectional fiber-reinforced composite using the method of cells: Discretization objective results. 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 23-26 April, CP2012-1539, Honolulu, Hawaii.

241) E. J. Pineda, A. M. Waas. (2012) A thermodynamically-based mesh objective work potential theory for predicting intralaminar progressive damage and failure in fiber-reinforced laminates. 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, 23-26 April, CP2012- 1612, Honolulu, Hawaii.

242) Davidson P, Waas AM, Yerramalli C, Chanrasekar K, Faidi W, Effect of Fiber Waviness on the Compressive Strength of Unidirectional Carbon Fiber Composites, 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu, HI, CP2012-1422, Apr 23-26, 2012.

243) Davidson P, Waas AM, Effect of non-equilibrium phenomenon in mode-I fracture, 16th International Conference on Composite Structures (ICCS 16), Porto, Portugal, 28-30 June 2011.

244) R. J. D'Mello and A. M. Waas, “Synergistic energy absorption in the axial static compressive response of filled honeycombs,” 2012 Joint conference of the Engineering Mechanics Institute and the 11th ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability, University of Notre Dame, June 17-20, Notre Dame, IN, 2012.

245) D'Mello R. J and Waas A. M., "Synergistic energy absorption in the in-plane static compression response of filled honeycombs," ACMSM 22, Sydney, Australia, December 11–14, 2012.

246) C. Heinrich, A.M. Waas, Investigation of progressive damage and fracture in laminated composites using the smeared crack approach, AIAA CP2012-1537, 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Honolulu, HI ,Apr. 23 – 26, 2012.

247) W. Ji, A.M. Waas, R. Raveendra, Progressive failure analysis method of a Pi joint with uncertainties in fracture properties, AIAA CP2012-1217605, 53nd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Honolulu, HI, Apr. 23-26, 2012

248) Davidson P, Waas AM, Open hole compressive strength prediction of laminated composite plate, American Society for Composites 27th Technical Conference, Arlington, TX, Oct 1-3, 2012

249) W. Ji, A.M. Waas, R. Raveendra, Reliability-based progressive failure analysis method for advanced composite structures, 26th Annual Technical Conference American Society for Composites, Montreal, QC, Canada, Sep. 26-28 2011.

250) W. Ji, A.M. Waas, R. Raveendra, Probability-based analysis for modeling failure mode interaction progressive damage in laminated composite structures with an initial delaminaion, 18th International Conference on Composite Materials, Jeju, Korea, Aug. 21-26 2011.

251) W. Ji, A.M. Waas, Z.P. Bazant, M. Gattu, Q. Yu, Correct work-conjugate stress and strain measures for accurate numerical modeling of finite deformation, Keynote presentation, 11th US National Congress on Computational Mechanics, Minneapolis, MN, Jul. 25-29, 2011.

252) Z.T. Kier, A.M. Waas, J.I. Rome, V.K. Goyal, P. Schubel, G. Steckel, D. Patel, and Y. Kim, "Modeling Failure of 3D Fiber Reinforced Foam Core Sandwich Structures with Defects," 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Honolulu, HI, Apr. 23-26, 2012.

253) Ji, W. and Waas, A. M., Progressive failure analysis method of a Pi joint with uncertainties in fracture properties, AIAA CP2012-1544. 53rd AIAA / ASME / ASCE /

AHS / ASC Structures, Structural Dynamics, and Materials Conference, Honolulu, HI, April 23–26, 2012.

254) Ji, W., Waas, A. M. and Raveendra, R., Reliability-based progressive failure analysis method for advanced composite structures, 1170, 26th American Society of Composites Annual Technical Conference, Montreal, QC, Canada, September 26-28, 2011.

255) Nhung Nguyen, Alan Wineman, Anthony Waas, Contact Problem of a Fluid-Filled Nonlinear Viscoelastic Spherical Membrane between Rigid Parallel Plates, International Mechanical Engineering Congress & Exposition, Denver, CO, Nov. 12-17, 2011.

256) P. Prabhakar and A.M. Waas, The Interaction of Failure Modes in the Compression Response and Failure of Laminated Composites, Proceedings of the 53rd AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, CP2012-1895, Honolulu, Hawaii, April 2012.

257) Sain, T., Yeom, B., Arruda, E.M. and Waas, A. M.,Constitutive modeling of polymer nanocomposites; Towards simultaneously high stiffness and high damping nanocomposites, ASME Conference on Smart Materials, Adaptive structures and Intelligent Systems (SMASIS conference 2012), Stone Mountain, Georgia,USA, September 19-21, (2012).

258) Trisha Sain, Bonjun Yeom, Nicholas Kotov, Ellen Arruda and Anthony M. Waas, "Integrated nanocomposites design with high stiffness and high damping properties," ASME Conference on Smart Materials, Adaptive structures and Intelligent Systems (SMASIS conference 2012), Stone Mountain, Georgia,USA, September 19-21, (2012).

259) D. Zhang, A.M. Waas, C.F. Yen, S. Ghiorse, A Multi-Scale Model for Mode- II Response of 3D Textile Glass Fiber Composites, ASME Applied Mechanics and Material Conference, Chicago, IL, May 30-June 1, 2011

260) D. Zhang, A.M. Waas, C.F. Yen, S. Ghiorse, Prediction of Kink Band Formation in 3D Textile Glass Fiber Composites Using a Multi-scale Modeling Strategy, 19th International Conference on Composites/Nano Engineering, Shanghai, China, July 24-30, 2011.

261) Stapleton, S. E., Waas, A. M. Arnold, S. M., and Bednarcyk, B. A., "Co-rotational Formulation for Bonded Joint Finite Elements" *53nd* AIAA/ASME/ASCE/AHS/ASC SDM Conference, Honolulu, HI, 2012. AIAA CP2012-1449.

262) Stapleton, S.E. and Waas, A.M., Functionally Graded Adhesives for Adhesively Bonded Composite Joints, 16th Int. Conference on Composite Structures (ICCS16), Porto, Portugal, June 2011.

263) Davidson P, Pineda EJ, Henirich C, Waas AM, A Unified Model for Predicting the Open Hole Tensile and Compressive Strengths of Composite Laminates for Aerospace Applications, 54rd AIAA Structures, Structural Dynamics, and Materials Conference, Boston, MA, Apr 2013, AIAA CP2013-1613, Control ID 1514265.

264) Pankow M, Yen CF, Justusson B, Waas, AM. "Through-the-thickness response of hybrid 2D and 3D woven composites" 54th Structures, Structural Dynamics and Materials Conference of American Institute of Aeronautics and Astronautics. Boston, MA. 8-11 April 2013. AIAA CP2013-1780.

265) P. Prabhakar and A.M. Waas, Mesh objective predictions of fiber-matrix splitting failure through a novel continuum-decohesive finite element method, Proceedings of the 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Boston, Massachusetts, USA, April 2013.

266) P. Prabhakar and A.M. Waas, Compressive strength and failure mode prediction in laminated composites with different stacking", Proceedings of the 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Boston, Massachusetts, USA, April 2013.

267) Pineda, E.J., Bednarcyk, B.A., Arnold, S.M., Waas, A.M. (2013). On multiscale modeling: Preserving energy dissipation across the scales with consistent handshaking methods. *54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference,* 8-11, April, Boston, MA.

268) P. Prabhakar and A.M. Waas, Computational modeling of curing induced effects in fiber reinforced laminates, SMART 2013, 6th ECCOMAS Conference on Smart Structures and Materials, Politecnico di Torino, Torino, Italia, 24-26 June, 2013.

269) Hansen, L.R. and Waas, A.M., Effects of Residual Stress in Damage and Failure Prediction in Ceramic Matrix Composites, 37th Annual Conference on Composites, Materials, and Structures, Cape Canaveral, FL, Jan. 2013

270) Hansen, L.R. and Waas, A.M., The influence of spatial non-homogeniety on the damage initiation and progression in ceramic matrix composites studied using a multiscale framework, 17th International Conference on Composite Structures, Porto, Portugal, June 17-21, 2013

271) Nhung Nguyen, Alan Wineman, Anthony Waas, Compression of fluid-filled polymeric capsules and inverse analysis to determine material properties. 4th Canadian Conference on Nonlinear Solid Mechanics, Montreal, Cananda, July 23-26, 2013.

272) Ghosh, S., Sundararaghavan V. and Waas A.M. "Construction of Multi-Dimensional Kernels for Nonlocal Elasticity from Phonon Dispersion Data and Valida- tion through Molecular Simulations", 12th U.S. National Congress on Computational Mechanics, Raleigh, NC, July 22-25, 2013.

273) Boyd, Stewart, Ji, Wooseok, Joseph, Ashith P.K. and Waas, Anthony M., Single Edge Notch Tension Test on Cross-Ply Laminated Composites for Intralaminar Fracture Properties , AIAA 2014-0852, 55th AIAA / ASMe / ASCE / AHS / SC Structures, Structural Dynamics, and Materials Conference, National Harbor, Maryland, January 13–17, 2014.

274) Z. T. Kier, A. M. Waas, C. Foerster, J. I. Rome, and V. K. Goyal, "Effects of Ply Stacking Sequence and Facesheet Instability in 3D Fiber Reinforced Foam Core Sandwich Structures with Defects," 55th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 13-17 January 2014, National Harbor, Maryland, AIAA 2014-0504.

275) Z. T. Kier, A. M. Waas, J. I. Rome, and V. K. Goyal, "Specimen Size and Effective Compressive Stiffness of 3D Fiber Reinforced Foam Core Sandwich Structures," American Society for Composites 28th Technical Conference, September 9-11, 2013, State College, PA.

276) Pineda, E. J., Waas, A. M. (2013). Numerical predictions of damage and failure in carbon fiber reinforced laminates using a thermodynamically-based work potential theory. *American Society for Composites 28th Technical Conference,* 9-11, September, State College, PA.

277) Z. T. Kier, and A. M. Waas, "Determining Effective Properties of 3D Fiber Reinforced Foam Core Sandwich Structures," SAMPE 2013, ID 3170, 2013. (US only)

278) Z. T. Kier, and A. M. Waas, "Determining Effective Interface Fracture Properties of 3D Fiber Reinforced Foam Core Sandwich Structures," 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, April 8-11, 2013, Boston, Massachusetts, AIAA 2013-1547.

279) R. J. D'Mello and A. M. Waas, "Deformation mechanisms and energy absorption in the crushing of cellular solids," American Society of Composites 29th Technical Conference, Sept. 8-10, San Diego, CA, 2014. (Abstract Accepted).

280) R. J. D'Mello and A. M. Waas, "High rate crushing of filled honeycombs," SAE World Congress & Exhibition, April 8-10, Detroit, MI, 2014.

281) R. J. D'Mello and A. M. Waas, "Static in-plane crushing of filled circular cell honeycombs," 2013 Conference of the ASCE Engineering Mechanics Institute, Northwestern University, Evanston, IL, Aug. 4-7, 2013.

282) Sain, T., Arruda, E. M. and Waas, A.M., Constitutive modeling of PU & PU-MTM nanocomposites to predict frequency dependent response, 12th U.S. National Congress on Computational Mechanics, Raleigh, NC, July 22-25, 2013.

283) Kosztowny, C.J.R., Justusson, B., and Waas, A. M., Buckling and post-buckling of variable stiffness fiber reinforced textile and pre-preg based composite plates, ASC Volume 2 pages 1530-1542. 28th American Society for Composites Technical Conference, State College, PA, September 9-11, 2013.

284) Kosztowny, C.J.R. and Waas, A. M., Buckling and post-buckling behavior of unitized, stiffened tri-axially braided composite textile plates, AIAA 2014-0164. SciTech2014 55th AIAA / ASME / ASCE / AHS / ASC Structures, Structural Dynamics, and Materials Conference, National Harbor, MD, January 13-17, 2014.

285) Ji, W. and Waas, A. M., Modeling of the progressive damage and failure in 3D woven textile composites under compression, 29th American Society of Composites Annual Technical Conference, San Diego, CA, September 8-10, 2014, abstract accepted.

286) Joseph A. P. K., Boyd, S., Waas, A. M. and Ji, W., Composite laminate failure under biaxial loading: experimental and numerical studies," 29th American Society of Composites Annual Technical Conference, San Diego, CA, September 8-10, 2014, abstract accepted.

287) Ji, W. and Waas, A. M., A predictive model for the compressive strength of 3D woven textile composites, AIAA CP2013-1727, 54th AIAA / ASME / ASCE / AHS / ASC Structures, Structural Dynamics, and Materials Conference, Boston, MA, April 8–11, 2013.

288) Ji, W. and Waas, A. M., Dynamic buckling-induced debonding in sandwich columns under uniaxial impact loading, ASME International Mechanical Engineering Congress and Exposition, Montreal, QC, Canada, November 14-20, 2014, abstract accepted.

289) Heinric h, C., Ji, W. and Waas, A. M., Modeling of the progressive damage and failure in textile composites, 17th International Conference on Composite Structures, Porto, Portugal, June 17-21, 2013.

290) Stapleton, S. E., Gries, T., and Waas, A. M., Functionally Graded Adhesives for Increased Strength of Adhesively Bonded Composite Joints, 2nd Int. Conference on Structural Adhesive Bonding, Porto, Portugal, July, 2013.

291) M.Pankow, A.M. Waas, and C.F. Yen. Comparison of 2d and 3d composites to confined crush loading. *American Society of Composites Conference*, 2013.

292) M. Pankow, A.M. Waas, C.F. Yen, and S. Ghiorse. Crush response of 2d and 3d hybrid woven composites. *International Conference on Composite Materials 19*, 2013.

293) Xu, Wu and Waas, A.M., A novel shell element for textile composite structural analysis, AIAA CP 2014-0162, 55th AIAA/ASME/ASCE/AHS/SC Structures, Structural Dynamics, and Materials Conference, National Harbor, MD, January 13-17, 2014.

294) D. Zhang, A.M. Waas, and C.F. Yen, "Progressive failure analysis of textile composites", *Science and Technology Forum and Exposition* (*SciTech*), National Harbor, Maryland, January 13-17, 2014. AIAA CP2014-0157

295) D. Zhang, A.M. Waas, and C.F. Yen, "Flexural response of 3D hybrid textile composites", *American Society for Composites 28th Technical Conference*, State College, Pennsylvania, September 9-11, 2013

296) D. Zhang, A.M. Waas, and C.F. Yen, "A validated computational model for the flexural response of 3D hybrid textile composites", *Society of Engineering Science*

50th Annual Technical Meeting/ASME-AMD Summer Meeting, Providence, Rhode Island, July 28-31, 2013.

297) Xie, J. and Waas, A. M., 2D Elastodynamic Solution for the Impact Response of Laminated Composites, 28th Annual Technical Conference of American Society for Composites, State College, PA, Sep. 9-11 2013

298) Xie, J. and Waas, A. M., Predictions of Delamination Growth for Quasi-Static Loading of Composite Laminates, 29th Annual Technical Conference of American Society for Composites, La Jolla, CA, Sep. 8-10 2014, Abstract accepted.

299) Xu, Wu and Waas, A.M., Crush analysis and Energy Absorption of Woven Textile Composite Tubes, 17th U.S. National Congress on Theoretical & Applied Mechanics, Michigan State University, East Lansing, Michigan, June 15-20, 2014.

300) Nhung Nguyen, Alan Wineman, Anthony Waas, Experiments and inverse analysis for nonlinear viscoelastic properties determination. 17th U.S. National Congress on Theoretical and Applied Mechanics, Michigan State University, June 15-20, 2014, Abstract accepted.

301) Z. T. Kier, D. N. Patel, V. K. Goyal, J. I. Rome, G. L. Steckel, and A. M. Waas, "Response of 3D Fiber Reinforced Foam Core Sandwich Structures at Cold Temperatures," American Society for Composites 29th Technical Conference, September 2014. (Abstract accepted)

302) Z. T. Kier, A. M. Waas, J. I. Rome, V. K. Goyal, D. N. Patel, and G. L. Steckel, "Through-thickness Failure of 3D Fiber Reinforced Foam Core Sandwich Structures," SAMPEtech 2014, June 2014. (Paper accepted).

303) Maiarù M., Carrera E., Meyer P., Waas A. M. (Paper Accepted) A Multiscale Method for the Analysis of Fiber Reinforced Composite Structures using CW Approach. In: ECCM16 – 16th EUROPEAN CONFERENCE ON COMPOSITE MATERIALS, Seville, Spain, 22-26 June 2014.

304) Maiarù M., Carrera E., Meyer P., Waas A.M. (Abstract Accepted) A Progressive Failure Analysis using the 1D-CUF in a Mesh Objective Way. In: 1st International Conference on Mechanics of Composites. Stony Brook University, Long Island, New York, USA. 8-12 June 2014.

305) Meyer, P. and Waas, A. M., Mesh-Objective Multi-Scale Finite Element Analysis of Unidirectional Fibrous Materials using Energy based Failure Mechanism, ECCM16, Seville, Spain, June 22–26, 2014.

306) Meyer, P. and Waas, A.M., Mesh-Objective Microstructural Finite Element Analysis of Unidirectional Ceramic Composites (CMC) using the Crack-Band Theory, Mechanics of Composites, Stony Brook University, Long Island, NY , June 8-12, 2014.

Chapters in Books

1) "Failure Mechanisms of Composite Plates under Planar Remote Biaxial Loads", in *Fracture*, Ed. E. Armanios, Transtech Publishers, Switzerland, 1995, pp463-485.

2) Hyer, M.W. and Waas, A.M. "Micromechanics of Linear Elastic Composites, ch. 12, vol. 1, Comprehensive Composite Materials, T.-W. Chou, volume editor, A. Kelly and C. Zweben, overall editors, Elsevier Science Publishers, 2000.

3) Waas, AM, Progressive Failure Analysis and Modeling in Laminated Composites Loaded into the Postbuckling Regime, B. Falozn Editor – "Advances in Buckling and Postbuckling of Composite Structures", 2008, invited chapter.

4) Section Editor, Encyclopedia of Aerospace Engineering, Wiley, ISBN: 9780470686652, DOI: 10.1002/9780470686652, copyright 1999-2013.

5) Failure in Composites, Fourth volume in ASC series on advances in composite materials, edited by Anthony M. Waas and Bhavani Sankar, Destech Publishers, ISBN: 978-1-60595-088-4, December 2012.

6) Damage in Composites, Fifth volume in ASC series on advances in composite materials, edited by Bhavani Sankar and Anthony M. Waas, Destech Publishers, ISBN: 978-1-60595-088-4, December 2012.

7) Deformation response, damage onset and failure in fiber reinforced composites, edited by Anthony M. Waas, special issue of the journal – Computers, Materials and Continua, 2013.

Government, University or Industrial Reports

1) C.D. Babcock and A. Waas, "Effect of Stress Concentration in Composite Structures," GALCIT SM Report 85-12, Caltech, Pasadena, California.

2) A. Waas and C.D. Babcock, "Observation of the Initiation and Progression of Damage in Compressively Loaded Composite Plates Containing a Cutout," GALCIT SM Report 86-34.

3) A. Waas, "Testing the Performance of the QS09/QS08 General Shell Finite Elements," B.Sc. Final Year Project Report, June 1982, Dept. of Aeronautics, Imperial College, London, U.K.

4) A. Waas, "Compression Failure of Fibrous Laminated Composites in the Presence of Stress Gradients: Experiment and Analysis," Ph.D. Thesis, October 1987, Caltech, Pasadena, CA, also, GALCIT SM Report 87-35.

5) A. Waas and C.D. Babcock, "Observation of the Initiation and Progression of Damage in Compressively Loaded Composite Plates Containing a Cutout," NASA progress Report for Grant NSG-1483, 1985.

Service

Major Committee Assignments at U of M

1) Member, College of Engineering Executive Committee, 2007-present
2) Member, Aerospace Department Vision Project, 2008
3) Chair of Aerospace Department Faculty Search Committee that successfully recruited 3 faculty members (Ihme, Fidkowsky and Sundararaghavan)-2006/2007.
4) Freshman Counselor, Aerospace Engineering, 2006-07.
5) College of Engineering (CoE) Rules Committee - 1995-1997.
6) Aerospace Dept. Safety and Hazard Committee - Member - 1990-1993.
7) Review Committee for Ae301 and Ae302 - Member - 1992-1993.
8) Committee to study Feasibility of Deptl. Advisory Committee - Member – 1993.
9) Secretary, Department Seminar Committee, 1993-1995.
10) Member, Committee for New Department Chair Search, 1995.
11) Chair, Search Committee for Faculty Member in Structures, 1996.
12) Departmental UM2000 Curriculum Reform Committee.
13) Aero. Dept. Representative, Program in Manufacturing, 1997.
14) Chair, CoE Rules Committee, 1997-1998.
15) Member-Graduate Task Force for Reshaping Graduate Education-1998/1999.
16) Chair, Dept. Graduate Committee – 1998-2002.
17) Member, Rackham Pre-Doctoral Fellowship Committee, 1998.
18) Department Representative to the COE Campaign for Michigan, 1999.
19) Casebook Re-appointment Committee for Karl Grosh (MEAM)-1996.
20) Casebook Re-appointment Committee for AnnMarie Sastry(MEAM)-1997.
21) Casebook Promotion and Tenure Committee for Ellen Arruda(MEAM)-1998.
22) Member, CoE Grad. Chairs Committee-1999-2002
23) Member, Graduate Overlay Implementation Committee-1999
24) Member, Executive Committee of Tauber Manufacturing Institute-1999.

25) Casebook Promotion and Tenure Committee for Kevin Collins(Civil)-1999.
26) Casebook Promotion and Tenure Committee for AnnMarie Sastry(MEAM)-2000.
27) Member, MEAM Department Chair Search Committee, 2001.
28) Casebook Promotion and Tenure Committee for Z. Ma (MEAM)-2001.
29) Member, University Board in Control of Intercollegiate Athletics, 2000-2003.
30) Member, Search Committee for Structures Faculty, 2001-2002.
31) Member, Aerospace and AOSS Department Merger Committee, 2002-03.
32) Member, CoE Honors and Awards Committee, 2003.
33) Chairman, CoE Honors and Awards Committee, 2004.
34) Casebook Promotion Committee for AnnMarie Sastry (MEAM)-2004.
35) College Strategic Planning Communications Committee – 2004.
36) International Programs Committee – CoE – Warsaw Institute of Technology, Poland, Imperial College, UK, Delft University, Holland and SUPAERO, France.
37) Casebook Promotion and Tenure Committee for Gustavo Parra (Civil)-2005.
38) Casebook Promotion and Tenure Committee for Suman Das (MEAM)-2005.
39) Casebook Promotion Committee for Wei Lu (MEAM)-2006.
40) Casebook Promotion Committee for Wei Lu (MEAM)-2011.
41) Freshman Engineering Advisor for Aerospace Engineering, 2005-2007.
42) Chair of new faculty search committee, 2011-2012.
43) Chair - Reappointment Committee of N. Goulbourne, 2011
44) Chair – Promotion and Tenure Committee of N. Goulbourne, 2012

Administrative Assignments at U of M (Ph.D Committees)

1) A. Argento (MEAM) - committee member - graduated 1989
2) X. Lu (MEAM) - committee member - graduated 1990
3) S. Barbat (MEAM) - committee member - graduated 1990
4) J. Zhang (MEAM) - committee member - graduated 1990
5) F. Yigit (MEAM) - committee member - graduated 1992
6) H. Najm (Civil) - committee member - graduated 1992
7) Mrs. Zhong (Aero) - committee member - graduated 1991
8) J. Hulway (MEAM) - committee member - graduated 1991
9) C. Cheng (MEAM) - committee member - graduated 1992
10) W. Waldron (MEAM) - committee member - graduated 1993
11) C. Hsiao (MEAM) - committee member - graduated 1995
12) R. Kolberg (MEAM) - committee member - graduated 1995
13) J. M. Chen (MEAM) - committee member - graduated 1993
14) D. K. Mishra (Civil) - committee member - graduated 1995
15) J. Park (Aero) - committee member - graduated 1993
16) M. Eldred (Aero) - committee member - graduated1993
17) K. Peters (Aero) - committee member - graduated 1996
18) J. Min (MEAM) - committee member - graduated 1995
19) D. Lee (Aero) - committee member - graduated 1996
20) M. Castanier (MEAM) - committee member - graduated 1996

21) K.J. Lee (MEAM) - committee member - graduated 1994
22) S.Laddha (Mat. Sci.) - committee member - graduated 1994
23) T. VanDyke(MEAM) - committee member - graduated 1995
24) Ian Darnell (MEAM) - committee member – graduated 2000
25) Kathleen Derwin(MEAM/Bioengineering) - graduated Dec. 1997
26) G. Yavuz(MEAM) - committee member - graduated 1995
27) G. McNay(Aero) - committee member - graduated 1996
28) J. Alwan (Civil) - committee member - graduated 1994
29) M. Schraad (Aero) - committee member - graduated 1996
30) P. Pryzbilo (MEAM) - committee member - graduated 1998
31) S.B. Lee (MEAM) - committee member - graduated 1997
32) S.B. Choi (MEAM) - committee member - graduated 1997
33) C. Scholar (MEAM) - committee member – graduated 2000
34) Pat Guererro (Civil) - committee member – graduated 1998
35) A. Mazzei (MEAM) - committee member - graduated 1998
36) Y. Tur (MEAM) - committee member - graduated 1998
37) W. Chui (MEAM) - committee member – graduated 1999
38) S. Wimmer (NAME) - committee member - graduated 1998
39) M. Lopez (Civil) - committee member – graduated 2000
40) L. Saggere(MEAM) – committee member – graduated 1999
41) C. Wu(Civil)) - committee member - graduated 2001
42) P. Kim(Civil) – committee member – graduated 1999
43) D. Winton-Hoffman(MEAM) - committee member – graduated 2000
44) J. Kadlowec(MEAM) – committee member – graduated 1999
45) B. Cannon (MEAM) - committee member - graduated 2001
46) Bing Chen(MEAM) - committee member - graduated 2000
47) Q. Yang(MEAM)- committee member - graduated 2000
48) W.Kim(MEAM) – committee member – graduated 1999
49) T. McDevitt (MEAM) - committee member – graduated 1999
50) J. Manjunathaiah (MEAM) - committee member - graduated 1999
51) M. Fox (MSE) – committee member – graduated 2001.
52) S. Kim (Civil) – committee member – graduated 2001.
53) H. Park (Civil) - – committee member – graduated 2001.
54) J. Judge (MEAM) - committee member - graduated 2002
55) C. Sujivarokul (Civil) - committee member - graduated 2002.
56) L. Berhan (MEAM) - committee member - graduated 2004.
57) W. Thanasak (Civil) – committee member – graduated 2004
58) P. Dasgupta (Civil) – committee member – graduated 2005
59) R. Palacios (AERO) – committee member – graduated 2005
60) Li Liu (AERO) – committee member – graduated 2005
61) V. Likitruangslip (Civil) – committee member – graduated 2006
62) J. Rupp (Biomed.) - committee member - graduated 2006.
63) Yaning Li (NAME) – committee member – graduated 2006.
64) E. Dede (ME) -– committee member – graduated 2006.

65) J. Parmigiani (ME) -– committee member – graduated 2006.
66) A. Raghavan (AERO) – committee member – graduated 2007.
67) B. Glaz (AERO) – committee member – graduation 2008.
68) Xiauyun (Tracy) Yan (NAME) – committee member – graduated 2008.
69) Joseph Wu (ME) – committee member – graduated 2008.
70) Dong Joo Kim (Civil) – committee member – graduated 2008.
71) Wen-Cheng Liao (CEE) – committee member – graduated 2009
72) Sara Johnson (MSE) – committee member – graduated 2010
73) K. Song (EECS) - committee member - graduated May 2010
74) A. Kaushik (ME) - committee member - graduated May 2011
75) S. GangiReddy (MSE) - committee member - graduated Dec. 2011
76) Anne Juggernauth (MSE) - committee member – graduated April 2013
77) Josh Chae (ME) – committee member – graduated October 2013.
78) Michael Aldridge (MSE)- committee member – graduating May 2014
79) Jared Hobeck (AERO) - committee member – graduated, April 2014
80) Kalyan Nadela (AERO) - committee member – graduated, March 2014

Administrative Assignments Elsewhere(MS/Ph.D Committees)

1) External Evaluator/Co-Chair for D. Hoogkamer (MS Thesis-Aerospace Engineering, Delft University, Holland, Co-Chair: J. Arbocz).

2) External Evaluator for S. Narayan (Ph.D Thesis-Mechanical Engineering and Materials, Drexel University, advisor: L. Schadler).

3) External Evaluator for R. Veldman (Ph.D Thesis-Aeronautical Engineering and Aviation, Western Michigan University, advisor: J. Ari-Gur).

4) External Evaluator for Y. Freed (Ph.D Thesis-Mechanical Engineering, Tel-Aviv University, advisor: L. Sills-Banks).

5) External Evaluator for Chaim Ishbir (Ph.D Thesis-Mechanical Engineering, Tel-Aviv University, advisor: L. Sills-Banks).

Service to Government, Professional Organizations and other University Boards

1) Technical Program Chair, 54th AIAA/ASME/ASCE/ASC Structures, Structural Dynamics and Materials Conference, April 2013, Boston, MA
2) Section Editor, Encyclopedia in Aerospace Engineering, Wiley, to appear, 2009.
3) Technical Program Chair, 49th AIAA/ASME/ASCE/ASC Structures, Structural Dynamics and Materials Conference, April 2008, Chicago, IL.
4) Academic Consultant, NASA Super Problem Resolution Team, Stennis Space Center, 2006-2007.

5) Academic Consultant, NASA Engineering Safety Center, Structures Technical Discipline, NASA Langley, 2007-present.
6) Editor – Computers, Materials and Continua, 2013 – present
7) Editorial Board, Composites Science and Technology, 2013 – present
8) Associate Editor, Composite Structures Journal, 2010-present
9) Associate Editor, Trans. ASME J. Applied Mechanics, 2007 – 2013
10) Editorial Board, International Journal of Engineering Science, 2007-present
11) Associate Editor - Composites Engineering Journal 1991-2006
12) Associate Editor, The Aeronautical Journal, RaeSoc., UK, 2004-present.
13) Editorial Board, Computer Modeling in Engineering and Sciences, 2004-present
14) Editorial Board, Journal of the Mechanical Behavior of Materials.
15) Editorial Advisory Board - AIAA J. of Aircraft, 1993-2000.
16) Associate Editor - AIAA Journal 1995-2002
17) Reviewer for proposals and papers from Army Research Office, NASA Langley Research Center, ONR, NSF, AIAA Journal, Trans. ASME - J. of Applied Mech., Trans. ASME - J. Eng. Materials and Technology, Composites Engineering, Acta Astronautica, AIAA J. of Aircraft, J. of Composite Materials, Experimental Mechanics, ASCE J. Engineering Mechanics, Q. Applied Mathematics, European Journal of Solids, Int.J.Solids and Structures, Mechanics of Composite Materials, Int.J.Nonlinear Mechanics, AIAA SDM Meeting
18) Member AIAA Technical Committee on Structures. Chair of sub-committee on Durability and Damage Tolerance.
19) ASME Aerospace Division Committee on Materials and Structures; Committee Representative to the ASME Congress 2001, Vice-chair – 2002, chair-2003-2005
20) Member ASME AMD Committee on Composites, AMD Committee for Instability in Solids and Structures.
21) Member ASME Materials Division Committee on Composites.
22) Session Organizer and Session Chair at AIAA SDM Meetings, 1993,1994, 1995,1999
23) Session Chair in Symposium on Non-linear Mechanics of Composites, SES Meeting, VA., June 1993.
24) Session Chair in Symposium organized by ASME committee on Instability of Structures, ASME Winter Ann. Meeting, Chicago, Nov. 1994.
25) NSF Panel Reviewer in Mechanics and Materials Program.
26) Organizer of Symposium on Compressive Failure - Soc. Engineering Science Meeting, 1998, Pullman, WA (with C.R. Schultheisz).
27) Symposium Organizer and Chair, ASME Win. 98 Symp. On Compressive Failure of Composites (with G. Kardomataes).
28) Organizer of Symposium on Mechanics of Composites - Soc. Engineering Science Meeting, 1999, Austin, TX (with S. Kyriakides).
29) Organizer of Symposium on Active Materials: Experimental Advances – ASME Int. Congress, Nov. 1999, Nashville, TN (with J.A.Shaw).
30) A.M. Waas ,Organizer of symposium on Failure Initiation and Prediction in Composites, with C. Soutis, ASME IMECE 2000, Atlanta.

31) A.M. Waas ,Organizer of symposium on Damage Initiation and Failure in Composites, ASME IMECE 2001, New York.
32) A.M. Waas ,Organizer of symposium on Damage and Failure Prediction in Composites, ASME IMECE 2002, New Orleans.
33) A.M. Waas and P.P Friedmann, Organizer of symposium on Materials and Structures for Hypersonic Vehicles, ASME IMECE 2003, Washington, DC.
34) Euromech Colloquium 464, International Organizing Committee. – chair: R. Ogden.
35) A.M. Waas and P.P Friedmann, Organizer of symposium on Materials and Structures for Hypersonic Vehicles, ASME IMECE 2004, Anaheim, Los Angeles, CA.
36) A.M. Waas and B. Sankar ,Organizer of symposium on Textile Composites, ASME IMECE 2004, Anaheim, Los Angeles, CA.
37) A.M. Waas and P.P Friedmann, Organizer of symposium on Materials and Structures for Hypersonic Vehicles, ASME IMECE 2005, Orlando, FL.
38) A.M. Waas and B. Sankar ,Organizer of symposium on Contemporary Issues in Mechanics of Composites, ICCES05, Chennai, India, Dec. 2005.
39) A.M. Waas and P.P Friedmann, Organizer of symposium on Materials and Structures for Hypersonic Vehicles, ASME IMECE 2006, Chicago, IL..
40) A.M. Waas and B. Sankar ,Organizer of symposium on Contemporary Issues in Mechanics of Composites, ICCES06, Miami, FL, Jan. 3-7, 2007.
41) A.M. Waas and P.P Friedmann, Organizer of symposium on Materials and Structures for Hypersonic Vehicles, ASME IMECE 2007, Seattle, WA.
42) A.M. Waas and P.P Friedmann, Organizer of symposium on Materials and Structures for Hypersonic Vehicles, ASME IMECE 2008, Boston, MA.
43) Member of the Review Team that Reviewed the Composite Structures Activities at NASA Glen, Cleveland, Sept. 2012.
44) Invited to review the Univ. of Florida, MAE Department, Fall 2011 (declined)
45) Member of the NASA NESC safety center, technical discipline in Structures
46) DARPA Workshop on Materials Logic - Organizer: June 21-22, 2012, Ann Arbor, MI
47) Member of External Advisory Board, University of Washington, Aeronautics Department

Consulting Activities

Professor Waas has consulted and/or carried out research projects for a variety of industries and government labs, including, Boeing, GE Aviation, Ford, GM, Sheffield Phramaceuticals, Chrysler, Toyota, Toledo Commutator, MKP Inc., Firehole, Collier Research, Albany composites, TEAM inc., Cometacoustics, Nextgenaero, NASA, Army Research Labs, NSF, ONR, AFOSR, ACC and DoE.

Patents

1) Microscopic Digital Imaging Strain Gage (with Frank Chen and two others from Ford Motor Company Scientific Laboratories). US Patent # 5,920,383, July 6, 1999.

2) Method of Using a Microscopic Digital Imaging Strain Gage (with Frank Chen and two others from Ford Motor Company Scientific Laboratories). US Patent # 6,189,386 B1, Feb. 20, 2001.

3) US provisional patent application: Convectively cooled sandwich panel for structural and heat exchange applications; Joseph Rakow and Anthony M. Waas, UM Ref. # 3083.

4) Peter A. Gustafson and Anthony M. Waas. Method for determining field quantities in a structural joint. US Patent Pending, 2009.

5) Re: U of M Ref. No. 3865; HDP Ref. No. 2115-003865/US/NP; Title: Ultrastrong and Stiff Layered Polymer Nanocomposites And Hierarchical Laminate Materials Thereof, with Kotov, Arruda and students, pending

6) U of M Ref. No. 3847; HDP Ref. No. 2115-003847/US; Title: Dispersion Method for Particles in Nancomposites and Method of Forming Nanocomposites, with Filisko, Knapp and Juggernauth, pending.

Invited Presentations and Seminars

1) "Stress Concentrations in Contact Problems", Ford Motor Car Company, Scientific Research Laboratories, Dearborn, Engineering Seminar Series, Jan. 90.

2) "Failure Mechanisms in Fibrous Composites", Wayne State University, Detroit, Dept. of Mechanical Engineering Seminar Series, October '90.

3) "Experimental Investigation of Failure Mechanisms in Fibrous Composites", Virginia Polytechnic and State University, Engineering Science and Mechanics Dept. Seminar Series, November '90.

4) "Fiber buckling in laminated plates", NASA Langley Research Center, invited lecture, December 1990.

5) "Failure Mechanisms in Uniply Composites", Ohio State University, Dept. of Aerospace and Astronautical Engineering, November 1991.

6) "Failure Mechanisms in Uniply Composites", Univ. of Moratuwa, Civil Eng. Dept., Colombo, Sri Lanka, January 1992.

7) "Failure of Thick Composite Rings", ONR Contractor Review, Univ. of Maryland, Summer 1992

8) "Failure Mechanisms in Composites under Biaxial Loads", US Army , CRREL Labs, New Hampshire, April 1993.

9) "Experiments to develop a constitutive model for HDPE", Ford Motor Car Company, Dearborn, guest of Dr. H. Moussawi, Plastic and Trim Products, Dec. 1993.

10) "Failure Mechanisms in Composites under Biaxial Loads", NASA Langley Res. Center, Jan. 1995.

11) "Mixed Mode Fracture in Polymer Composites", Mitsubishi Heavy Industries, Aerospace Division, Nagoya, Japan, Feb. 1994.

12) "Failure Mechanisms in Composites under Biaxial Loads", Science Univ. of Tokyo, Tokyo, Japan, Feb. 1994

13) "A Predictive Model for Failure of Composite Laminates under Biaxial Loads", NASA Langley Res. Center, Mechanics of Materials Branch, Jan. 1997.

14) "Biaxial Testing of Fiber Reinforced Composites- Implications for numerical tools in crash analysis" – ACC, US Car Headquarters, Dearborn, May 21 and June 10, 1997.

15) "Compressive Failure of Notched Composites", AFOSR Workshop, Dallas, Nov. 1997.

16) "Compressive Failure of Notched Fiber Reinforced Composites - A Predictive Model", Aerospace Engineering Department, Univ. of Stuttgart, Germany, Feb. 1998.

17) "Compressive Failure of Notched Fiber Reinforced Composites - A Predictive Model", Institut fur Mechanik, ETH, Zurich, Switzerland, March 1998.

18) "Compressive Failure of Notched Fiber Reinforced Composites - A Predictive Model", Laboratory for Reliability Analysis, ETH, Lausanne, Switzerland, March 1998.

19) "Use of Micromechanics to Predict the Compressive Failure of Notched Fiber Reinforced Laminates", Dipartmento de Ingeneria Strutturale, Polytechnico Milan, Italy, March 1998.

20) "Use of Micromechanics to Predict the Compressive Failure of Notched Fiber Reinforced Laminates", Institut fur Mechanik, TU Wien, Austria, March 1998.

21) "Experiments and Analysis of Compressive Failure in Notched Fiber Reinforced Composite Laminates", MEAM Department, Univ. of Michigan, March 1999.

22) "A Model for Failure in Multi-Directional Notched Laminates", US Navy CARDEROCK Labs, Nov. 1999.

23) "Experiments and Analysis of Compressive Failure in Notched Fiber Reinforced Composite Laminates", Aerospace Engineering Department, Univ. of Illinois, April 2000.

24) "Microstructural Instabilities in Braided Textile Composites", Aerospace Engineering Department, Univ. of Florida, October 2002.

25) "Multiaxial Failure of Braided Textile Composites", Civil Engineering Department, Washington University, S. Louis, November 2002.

26) Microstructural Instabilities in Textile Composites", Civil Engineering Department, Tokyo Inst. of Technology, Japan, March 03.

27) Multiaxial Failure of Braided Textile Composites", Aeronautics Department, University of Tokyo, Japan, March 03.

28) Multiaxial Failure of Braided Textile Composites", Aerospace Engineering Department, University of Nagoya, Japan, March 03.

29) Microstructural Instabilities in Braided Textile Composites, Aerospace Engineering Department, Univ. of Southern California, May 2003.

30) Multiaxial Failure of Braided Textile Composites, Structural Engineering Department, University of California, San Diego, April 04.

31) Failure of Braided Textile Composites under Multiaxial Loads, Mechanical and Aerospace Engineering Department, University of California, Irvine, May 04.

32) Measurement of Biaxial Stress States in Silicon Using Micro-Raman Spectroscopy, W.G. Knauss 70th Birthday Symposium, Caltech, Pasadena, Nov.15-16, 2004.

33) New Concepts for Thermal Protection Systems for Hypersonic Re-Entry Vehicles, NASA Glen Research Center, Dec. 7, 2004.

34) Evaluation of Biaxial Stress States in Silicon Using Micro-Raman Spectroscopy, Intel Corporation Seminar, February 2005.

35) Progressive Failure Modeling of Fiber Reinforced Laminates, Aerospace Engineering Department, Univ. of Southern California, May 2005.

36) Microstructural Instabilities in Braided Textile Composites, Mechanical Engineering Department, Northwestern University, February 2006.

37) New Concepts for Thermal Protection Systems for Hypersonic Re-Entry Vehicles, Mechanical and Aerospace Engineering, University of Padova, November, 2005.

38) Microstructural Instabilities in Braided Textile Composites, Civil Engineering Department, University of Padova, November 2005.

39) Progressive Failure Modeling of Fiber Reinforced Laminates, NASA Langley Research Center, December 05.

40) Progressive Failure Modeling of Fiber Reinforced Laminates, Naval Research Labs, Carderock, March 2006.

41) Microstructural Instabilities in Braided Textile Composites, Mechanical Engineering Department, Michigan Technological University, Fall 2006.

42) Microstructural Instabilities in Braided Textile Composites, Mechanical Engineering Department, University of Delaware, Spring 2007.

43) Response and Failure of Textile Composites, Aerospace Engineering Department, University of Illinois, Winter 2008.

44) Response and Failure of Textile Composites, Western Michigan University, Mechanical Engineering Department, Spring 2009.

45) Compressive Response and Damage accumulation in Textile Composites, UNLV, Spring Seminar, March 2010.

46) Compressive Response and Damage accumulation in Textile Composites, George Washington University Spring Seminar, March 2010.

47) Deformation Response and Fracture of LBL Nanocomposites, Wayne State University, Spring Seminar, April 2010.

48) Integrated Computational Engineering of Braided Textile Composites, Invited seminar, UCLA Engineering School, May 2011

49) Integrated Computational Engineering of Braided Textile Composites, Invited seminar, Aerospace and Mechanical Engineering Department, USC, June 2011

50) Deformation Response and Structural Integrity of Composite Aerostructures, Invited seminar, Structural Engineering Department, UCSD, Sept. 2011

51) Integrated Computational Engineering of Braided Textile Composites, Invited seminar, NASA Glenn, May 2011

52) New insights on Dynamic Buckling of Structures, Invited seminar, University of Rome, LaSapienza, Roma, October 2012

53) New insights on Dynamic Buckling of Structures, Invited seminar, Polytechnic University of Merche, Italy, October 2012.

54) The Mechanics of kink banding failure; Implications for predicting compressive strength of fiber reinforced composite structures, Invited seminar, Univ. of California, Berkeley, April 2013.

55) Flexural Response of Textile Composites, Invited seminar, Army Research Labs, October 2013.

56) Multi-scale model for textile composite flexural response, Aero Department Spring seminar series, Purdue University, April 2014

Plenary and Keynote Lectures, and Special Invited Lectures

1) Distinguished Plenary Lecture - The Use of Micromechanics for the Prediction of Composite Failure, International Conference on Composites Engineering/5, July 11-15, 1998.

2) Invited Distinguished Lecturer - Micromechanics based Model for the Prediction of Composite Failure, 5th International Symposium on Polymers & Composites 2001, Singapore.

3) Keynote lecture - Failure initiation in Notched Composites, ICEES03, Corfu, Greece, 2003

4) Special invited lecture - Microstructural Instabilities in Braided Textile Composites, 75th anniversary celebration of GALCIT, Caltech, Pasadena, Nov. 2003.

5) Keynote lecture - Compressive Response of Woven Textile Composites, International Conference on Computational and Experimental Engineering and Science, ICCES04, Madeira, Portugal, July 2004.

6) Keynote lecture - Progressive Failure Modeling of Composite Laminated Structures, ICCES06, Miami, FL, Jan. 3-7, 2007.

7) Plenary lecture - Progressive Failure Modeling of Composite Laminated Structures, ICCM16, Kyoto, Japan, July 8-13, 2007.

8) On the Dynamic Buckling of Monolithic and Sandwich Structures, special invited lecture, 80th anniversary celebration of GALCIT, Caltech, Pasadena, September 2008.

9) Keynote lecture – Multi-scale Computational Modeling of Failure in Fiber Composites, US National Congress of Applied Mechanics, July 2009.

10) Keynote lecture – Mixed Fracture in Laminated Fiber Reinforced Composites, DFC Conference, Cambridge, UK, April 2011.

11) Keynote Lecture – Computational Progressive Failure analysis and Virtual Testing of Composite Aerostructures, ICCS-16, Porto, Portugal, June 2011.

12) Plenary Lecture - Modeling and Failure of Textile Composites, 3rd ECCOMAS Thematic Conference on the Mechanical Response of Composites, Hannover, Germany, Sept. 21-23, 2011.

13) Keynote Lecture - Modeling progressive failure of fiber reinforced laminated composites: Mesh objective calculations, Keynote lecture, Workshop on Impact and Damage Tolerance in Composite Materials, RAeS, London, February 7, 2012.

14) Invited Lecture - ICME of Composite Structures, Materials Genome Initiative Workshop, Dec. 12, 2011, Ann Arbor, MI - Keynote speaker.

15) Invited Lecture - Modeling progressive failure of fiber reinforced laminated composites: Mesh objective calculations, Invited lecture, NASA NESC Technical Discipline Structures Annual Meeting, May 2012, Houston, TX

16) Keynote Lecture – Computational Modeling of Damage and Failure of Ceramic Matrix Composites, American Ceramic Society Meeting, Coco Beach, Florida, January 2013.

17) Keynote Lecture – Multiscale, Mesh Objective Approach to the Progressive Failure Analysis of Composite Aerostructures, ICCS-17, Porto, Portugal, June 2013.

18) Keynote Lecture – A Multi-scale model for textile composite structures subjected to flexural deformation, CanCNSM Conference, Montreal, Canada, July 2013.

19) Plenary Lecture – Virtual Testing of Composite Structures: Challenges and Progress, ICCM-19, Montreal, Canada, August 2013.

20) Keynote Lecture – Multi-scale Modeling of Ceramic Composite Deformation Response, American Ceramic Society Meeting, Coco Beach, Florida, January 2014.

21) Special Invited Lecture – The Josef Singer Memorial Inaugral Lecture, Technion, Aerospace Engineering, Israel – Dynamic Buckling of Structures, February 2014.

22) Special Invited Lecture - A multi-scale model for textile composite structures subjected to flexural deformation, Mechanical Engineering, TelAviv University, February 2014.

23) Plenary Lecture – Virtual Testing of Composites and Its Role in Certifying Composite Aerospace Structures -- The 54th Israel Annual Conference on Aerospace Sciences, February 2014.

24) Keynote Lecture – A Multi-scale model for ceramic matrix composite structures, Int. Conference on Mechanics of Composites, Stony Brook, June 2014