

Brian Frederick Tatting

Education

- B.S., Engineering Mechanics, University of Illinois at Urbana-Champaign, Champaign IL, U.S.A., 1989
- Graduate Studies, Theoretical & Applied Mechanics Department, University of Illinois at Urbana-Champaign, Champaign IL, U.S.A., 1989-1991
- Ph.D., Engineering Science & Mechanics, Virginia Polytechnic Institute & State University, Blacksburg VA, U.S.A., 1998
 - Dissertation: “Analysis and Design of Variable Stiffness Cylinders”, October 1998
 - Participant in NASA-Virginia Tech Composites Program, 1991-1998

Academic Experience

- Research Assistant Professor, University of South Carolina McNAIR Center, Department of Mechanical Engineering, Dates: January 19, 2016 – present.
 - Assisted and supervised in Boeing-funded research with Masters and Doctoral candidates concerning variable stiffness composite designs for cylinders, novel 3D optimization techniques, and physics-based modeling of tow-steering mechanisms (2016-2019).
 - Participated in NASA ACC program investigating (Task 2c18) the effect of defects on composite structures using progressive damage analysis techniques (2c18) as well as simplified fast analysis tools to assess these effects (2c20) (2017-2019).
 - Principal Investigator for NASA LaRC project “Tow-Steered Panels for Tailored Wings”, generating tow-steered designs for manufacture and testing, aiding in manufacture at NASA LARC’s ISAAC AFP facility.
- Visiting Post-Doctoral Researcher, TU Delft, Netherlands, Dates: June 4, 2004 – November 4, 2004.
 - Developed solutions for conical shell structures using various tow-steering concepts.

Non-academic Experience

- Research Scientist, ADOPTTECH Inc., Blacksburg, USA, Dates: January 2004 – June 2015.
 - Managed and performed the research for projects concerning composite structures specific to advanced fiber placement (AFP) fabrication. Main topics of interest included novel manufacturing configurations utilizing AFP (curvilinear fiber laminates and highly tailored integral stiffening), composite part design for Advanced Composite Cargo Aircraft (ACCA) project, and software implementation of structural design techniques considering manufacturing constraints. Customers included Lockheed Martin Aeronautics Company (Advanced Development Program, Marietta GA), NASA-Langley Research Center, and Ingersoll Machine Tools.
- Engineering Consultant, January 1999 – December 2003.
 - Completed research for aerospace customers (through ADOPTTECH Inc.) for advanced analysis

and design of composite structures. Projects included filament-wound pressure vessel failure analysis, analysis and design software for fiber steered laminates, and cellular automata design solutions for composite plates. Customers included Ingersoll Rand Corporation, Sikorsky, and NASA-Langley Research Center.

Patents

- Robert Koon, Stephen P. Engelstad, Brian F. Tatting, Zafer Gürdal, "Highly tailored stiffening for advanced composites", US Patent WO 2009058500 A1, filed September 30, 2008 and issued May 7, 2009

Technical Reports

- Tatting B. F.; Gürdal, Z.: "Enhancements of Tow-Steering Design Techniques: Design of Rectangular Panel Under Combined Loads," NASA CR-2005-213911, September 2005, 39 pages, National Aeronautics and Space Administration, National Technical Information Service (NTIS), Springfield, VA.
- Tatting B. F.; Gürdal, Z.: "Automated Finite Element Analysis of Elastically-Tailored Plates," NASA CR-2003-212679, December 2003, 52 pages, National Aeronautics and Space Administration, National Technical Information Service (NTIS), Springfield, VA.
- Tatting B. F.; Gürdal, Z.: "Design and Manufacture of Elastically Tailored Tow Placed Plates," NASA CR-2002-211919, August 2002, 34 pages, National Aeronautics and Space Administration, National Technical Information Service (NTIS), Springfield, VA.

Refereed Publications

- Blom A., Tatting, B.F., Hol, J.M.A.M, and Gürdal Z., "Fiber Path Definitions for Elastically Tailored Conical Shells", *Composites Part B: Engineering*, Vol. 40, No 1, January 2009, pp. 77-84.
- Gürdal Z., Tatting, B.F., and Wu, C.K., "Variable Stiffness Composite Panels: Effects of Stiffness Variation on the In-Plane and Buckling Response", *Composites Part A: Applied Science and Manufacturing*, Vol. 39, No. 5, (2008), pp. 911-922.
- Lopes C., Camanho, P., Gürdal Z., and Tatting B.F., "Progressive Failure Analysis of Tow-Placed, Variable-Stiffness Composite Panels", *Int. Journal of Solids and Structures*, Vol. 44, (2007), pp. 8493-8516.
- Slotta, D. J., Tatting, B., Watson, L. T., Gürdal, Z., and Missoum, S. "Convergence Analysis for Cellular Automata Applied to Truss Design", *Engrg. Comput.*, Vol. 19, 2002, pp. 953-969.
- Tatting, B.F., Gürdal, Z., and Vasiliev, V.V., "The Brazier Effect for Finite Length Composite Tubes under Bending," *International Journal of Solids & Structures*, Vol. 34, No. 12, 1997, pp. 1419-1440.
- Tatting, B.F., Gürdal, Z., and Vasiliev, V.V., "Nonlinear Response of Long Orthotropic Tubes Under Bending Using Classical Shell Theory Including Brazier Effect," *AIAA Journal*, Vol. 34, No. 9, September 1996, pp. 1934-1940.

Conference Proceedings

- M. Moruzzi, T. Oldani, B.F. Tatting, Z. Gürdal, and A.W. Blom, "Tailoring of Composite Layups through Tow Placement Manufacturing Techniques," Proceedings of SAMPE, Long Beach, 30 April – 4 May 2006, 10 pages.
- B. Tatting, Z. Gürdal, and K. C. Wu, "Tow- Placement Technology and Fabrication Issues for Laminated Composite Structures", AIAA-2005-2017, 46th AIAA/ASME/AHS/ASC Structures, Structural Dynamics and Material Conference, CD-ROM, Austin, TX, 18-21 April 2005, 18 pages.
- D. Jegley, B. Tatting, and Z. Gürdal, "Tow- Steered Panels with Holes Subjected to Compression or Shear Loads", AIAA-2005-2081, 46th AIAA/ASME/AHS/ASC Structures, Structural Dynamics and Material Conference, CD-ROM, Austin, TX, 18-21 April 2005, 14 pages.
- Jegley, D. C., Tatting, B. F., and Gürdal Z., "Optimization of Elastically Tailored Tow-placed Plates with Holes", AIAA-2003-1420, Presented at the 44th AIAA/ASME/ AHS/ASC Structures, Structural Dynamics and Material Conference, Norfolk VA, April 2003, CD-ROM, 14 pages.
- Tatting, B. F., and Gürdal, Z., "Analysis and Design of Tow-Steered Variable Stiffness Composite Laminates," Proceedings of the AHS Structures Specialists Meeting, October 30-November 1, 2001, Williamsburg VA. CD-ROM, 8 pages.
- Tatting, B. F., and Gürdal, Z., "Cellular Automata for Design of Two-Dimensional Continuum Structures," AIAA-2000-4832, 9th AIAA/USAF/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, 2000.
- Gürdal, Z., and Tatting B. F., "Cellular Automata for Truss Structures with Linear and Nonlinear Response," AIAA-2000-1580, 41st AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, April 3-6, 2000.
- Tatting, B. and Gürdal, Z., "Nonlinear Shell Theory Solution for the Bending Response of Orthotropic Finite Length Cylinders with the Brazier Effect," Proceedings of the AIAA/ASME/ASCE/ AHS/ASC 36th SDM Conference, April 10-13, 1995, New Orleans, LA, pp. 966-976.

Non-Principal Author Journals and Conference Proceedings

- Mansur Çelebi, Zafer Gürdal, Brian Tatting, Agnes Blom-Schieber, Mostafa Rassaian, Steven Wanthal, and Halit Süleyman Türkmen, "Bending of Composite Cylindrical Shells with Circular Cutouts: Buckling and Failure Analysis," Journal of Aircraft, 3 July 2019.
- S. Rajan, M.A. Sutton, R. Wehbe, B. Tatting, Z. Gürdal, A. Kidane, "Measured Surface Deformation and Strains in Thin Thermoplastic Prepreg Tapes Steered along Curved Paths without Adhesion Using StereoDIC," Experimental Mechanics, 59:4, April 2019, pp. 531-547.
- Sreehari Rajan, Michael A Sutton, Roudy Wehbe, Brian Tatting, Zafer Gürdal, Addis Kidane, Ramy Harik, "Experimental investigation of prepreg slit tape wrinkling during automated fiber placement process using StereoDIC," Composite Part B: Engineering, 160, 1 March 2019, pp. 546-557.
- Edgars Labans, Chiara Bisagni, Mansur Celebi, Brian Tatting, Zafer Gürdal, Agnes Blom-Schieber, Mostafa Rassaian, Steven Wanthal, "Bending of Composite Cylindrical Shells with Circular Cutouts: Experimental Validation," Journal of Aircraft, March 2019.

- Rafal Anay, Paul Ziehl, Addis Tessema, Roudy Y Wehbe, Lateef Assi, Addis Kidane, Ramy Harik, Brian F Tatting, Zafer Gürdal, "An Experimental Investigation Concerning the Effects of AFP Defects on Progressive Failure of Tensile Coupons," AIAA Scitech 2019 Forum.
- Mazen A Albazzan, Ramy Harik, Brian F Tatting, Zafer Gürdal, "Efficient design optimization of nonconventional laminated composites using lamination parameters: a state of the art," Composite Structures, 30 October 2018.
- Luis G Bahamonde, Brian Tatting, Ramy Harik, Zafer Gurdal, Adriana Blom-Schieber, Mostafa Rassaian, Steven P Wanthal, "An analysis framework for topology optimization of 3D printed reinforced composites," 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference.
- Mazen Albazzan, Ramy Harik, Brian Tatting, Zafer Gurdal, Adriana Blom-Schieber, Mostafa Rassaian, Steven P Wanthal, "Optimization of Cylinders with Holes under Bending using Nonconventional Laminates," 2018 AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference.
- Mansur Celebi, Zafer Gürdal, Brian Tatting, Agnes Blom-Schieber, Mostafa Rassaian, Steven P Wanthal, "Effects of Size and Location of a Circular Cutout on Buckling and Failure of a Cylindrical Shell in Bending," 58th AIAA/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 2017.
- Faria Lopes, C.S., Camanho, P.P., Gürdal, Z., and Tatting, B.F., "Progressive Damage Analysis of Tow-steered Composite Panels in Postbuckling". Proceedings of the 16th International Conference on Composite Materials, 8–13 July, 2007, Kyoto, Japan, CD-ROM 10 pages.
- Faria Lopes, C.S., Gürdal, Z., Camanho, P.P., and Tatting, B.F., "Progressive Failure Analysis of Tow-placed, Variable-stiffness Composite Panels". AIAA-2007-2010. Proceedings of the 48th AIAA/ASME/ASCE/AHS/ ASC Structures, Structural Dynamics and Materials Conference, Honolulu, Hawaii, 23-26 April, 2007, CD-ROM 14 pages.
- A.W. Blom, B.F. Tatting, J.M.A.M. Hol, and Z. Gürdal, "Path Definitions for Elastically Tailored Conical Shells," AIAA-2006-1940, Proceedings of the 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Newport, Rhode Island, 1-4 May 2006, CD-ROM, 14 pages.