

Lloyd V. Smith

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School of Mechanical and Materials Engineering
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Education

University of Utah, Salt Lake City, Utah

Ph.D. in Mechanical Engineering, June 1994

Dissertation: Multiaxial characterization of two dimensionally braided composite materials

Advisor: Stephen R. Swanson

M.S. in Mechanical Engineering, December 1991

Thesis: Synergistic effects of environment and stress on coated polymeric fibers

Advisor: K. Lawrence DeVries

B.S. in Mechanical Engineering, June 1988

Minor: Math

Positions

Visiting scholar	École Polytechnique Fédérale de Lausanne, Switzerland	'13
Professor	Washington State University, Washington	'11 to present
Visiting scholar	Royal Melbourne Institute of Technology, Australia	'06
Associate professor	Washington State University, Washington	'02 to '11
Assistant professor	Washington State University, Washington	'96 to '02
Research assistant professor	Oak Ridge National Laboratory, Tennessee	'95 to '96
Post-doctoral fellow	Oak Ridge National Laboratory, Tennessee	'94 to '95
Instructor	University of Utah, Utah	'94
Research assistant	University of Utah, Utah	'91 to '94
Lab manager	University of Utah, Utah	'92 to '94
Tool design engineer	Hercules Aerospace, Utah	'88 to '90
Programmer	Burgoyne Computers, Utah	'83 to '88

Ph.D. Research Supervised

Siva Pilli	Diffusion and degradation of polymers	6/07 to 9/11
Mahdi Salavatian	Damage of un-notched composite materials	8/09 to 12/14
Preetam Mohapatra	Modelling the effect of bondline thickness	8/12 to present
Arghavan Talebanpour	Describing human injury in sport	5/14 to present

M.S. Research Supervised

Sudarshan Rangaraj	Durability of wood plastic composites	9/97 to 8/99
Vinay Chandrasekhar	Fatigue response of bonded aluminum extrusions	9/98 to 8/99
Mahesh Shenoy	Dynamic modeling of baseball bat impacts	1/99 to 8/00
John Axtell	Impact testing of baseball bat impacts	5/99 to 8/01
Doug Pooler	Durability of wood-plastic composites	9/99 to 6/01

David Darrow	Spring in of polymer matrix composites	9/99 to 1/01
Ben Campbell	Environmental effects of thermoplastic composites	9/99 to 8/01
Satishkumar Bapanapalli	Spring-in of composite materials	8/01 to 8/03
Ramachandran Mahadevan	Resorbable composite materials	8/01 to 8/03
Matt Shultz	Optimizing composite pressure vessels	1/02 to 5/05
Joseph Duris	Numerical models of softballs	1/03 to 12/04
Curtis Cruz	Numerical models of bats	8/03 to 5/05
Aaron Ison	Standardized bat test methods	8/03 to 5/05
Eric Biesen	Baseball Bat Test Methods	8/04 to 8/06
Prashanti Pothakamuri	Degradation of Adhesives	8/04 to 12/06
Daniel Stone	Stress Concentrations in Composite Structures	8/06 to 5/08
Rosanna Anderson	Performance of Hockey Sticks	8/06 to 5/08
Harsimran Singh	Response of Cricket Bats	8/06 to 8/08
Arjun Kothidar	Failure Criteria of Composites	8/06 to 12/08
Andy Bryson	Measuring Nonlinear Response of Polyurethane	8/07 to 8/09
Warren Faber	Normalizing Bat Performance to Ball Properties	8/08 to 8/10
Jeff Kensrud	Measuring and Modeling the Effect of Ball Drag	8/08 to 5/10
Brandon Bilek	Spatial Strain Measurements Under Flexure	8/09 to 8/10
Scott Burbank	Dynamic Response of Polyurethane	8/10 to 5/12
Jason Martin	Ball Speed Measurements using Doppler Radar	8/10 to 12/12
Chris Starke	Biaxial Testing of Composite Materials	8/10 to 5/14
Greg Nelson	Spatial Strain Measurements of Notched Composites	8/10 to 5/12
Brendan Kays	Performance of Ice Hockey Sticks	9/11 to 8/13
Peter Damstedt	Measuring composite damage using x-ray	5/12 to 5/14
Varun Gupta	Measuring the effect of bondline thickness	8/12 to 8/14
Harrison Scarborough	Durability of adhesive bonds	8/13 to present
Sayed Hafiz	Environmental fatigue of adhesive bonds	5/14 to present
David Lemme	Viscoelastic ratcheting in adhesive bonds	5/14 to present
Patrick Schwizer	Facemask impact modelling	2/14 to 8/14
Marc Demierre	Foam impact response	2/14 to 6/14
Bin Lyu	Friction and inertia of sport balls	8/14 to present

Fulltime Laboratory Staff

Jeff Kensrud	Lab Manager	5/10 to present
Lindsey Rivera	Technical Assistant	8/11 to 3/13
Jacob Dahl	Research Technologist III	4/11 to 7/14
Nathan Troll	Technician	9/11 to 7/12
Derek Nevins	Lab Engineer	8/12 to present
Bryant Leung	Research Technologist II	8/12 to 12/12
Mark Campbell	Research Technologist II	1/13 to 5/13
Michael McGeehan	Technician	3/13 to 9/14
Mariah Childs	Technical Assistant	3/13 to 5/14
Nathan Petersen	Research Technologist II	8/14 to present
Tahni Arndt	Technical Assistant	10/14 to presnt
Mahdi Salavatian	Postdoctoral Fellow	12/14 to presnt

Awards and Honors

Invited presentation, Harvard Engineering & Applied Science, December 15, 2004
 Amateur Softball Association Advisor, 2003 to present
 Major League Baseball Panelist, June 2002, September 2005
 NCAA Baseball Panelist, May 2007 to present
 USA Baseball Bat Advisory Committee, 2008 to present
 NFHS Baseball Advisor, 2010 to present
 Trackman Advisory Panelist, August 2012 to present
 Invited Paper, Sports Engineering, 2013
 Excellence as an Academic Advisor award, 2013

Popular Press

Moscow-Pullman Daily News, June 20, 2003
 KXLY, Spokane, WA, September 28, 2003
 Business Week, July 26, 2004
 Chronicle of Higher Education, October 1, 2004
 Coaching Management, October 2004
 Wall Street Journal, May 20, 2005
 KLEW, Lewiston, ID, March 9, 2006
 Chicago Tribune, March 29, 2006
 Spokesman Review, April 6, 2006
 Men's Health Magazine, July 2007
 KQED – Quest (San Francisco Public Television) July 3, 2007
 History Channel – Modern Marvels, July 25, 2007
 NPR – Science Friday, July 4, 2008
 LiveScience – July 15, 2008
 Moscow-Pullman Daily News, July 22, 2008
 American Institute of Physics, April 3, 2009
 Kansas City Star, April 26, 2009
 WSU Today, September 24, 2009
 Spokesman Review, April 13, 2010
 KXLY, Spokane, WA, April 23, 2010
 KHQ, Spokane, WA, April 24, 2010
 The Arizona Republic, September 8, 2010
 Motor City Bengals, September 8, 2010
 The Chronicle of Higher Education, November 1, 2010.
 Baseball America, Bat Guide 2.0, March, 2011
 Harvard Health Publications, March 31, 2011
 KLEW TV, April 3, 2011
 Smithsonian.com, June 24, 2011
 Redbull Ball Park Cranks, Longest Batted Ball Attempt, June 27, 2011
 Popular Mechanics, July 5, 2011
 ESPN, July 9, 2011
 Washington Post, April 19, 2012
 Instron Community Blog, May 23, 2012
 PAC-12 Network, March 2013

Sporttechie, September 23, 2013
 Baseball America, October 2, 2013
 NCAA Champion Magazine, April 2014

Courses Taught

Introduction to Finite Elements (U. Utah)
 Dynamics, ME 212
 Manufacturing Processes, ME 310
 Manufacturing Processes Laboratory, ME 311
 Systems Design, ME 316
 Materials Laboratory, ME 320
 Experimental Design, ME 406
 Machine Design, ME 414
 Finite Element Methods in Design, ME 472
 Continuum Mechanics, ME 501
 Mechanics of Composite Materials, ME 534
 Engineering in Sport, ME 483

Professional Service

Reviewed papers for:

Journal of Composite Materials
 Journal of Engineering Materials and Technology
 Polymer Engineering and Science
 Journal of Thermoplastic Composite Materials
 Composite Structures
 Experimental Mechanics
 Sports Engineering
 Sports Technology
 Journal of Sports Engineering and Technology
 Journal of Applied Biomechanics

Proposal Reviewer

Clean Washington Center, 97
 SIRTl, 99
 NOCSAE, 03
 NSF, 09

Secretary, SEM Composites TD, 98-99

Vice Chair, SEM Composites TD, 00-01

Chair, SEM Composite TD, 02-03

Chair, ASTM Ball task force 05-07

Chair, ASTM Committee F08.26 on Baseball and Softball Equipment, 07 to present

Editorial Board of the Int'l J of Sports Technology, 2007 to present

Co-Organizer, Asia-Pacific Congress on Sports Technology, 2009

Executive Board Member, ISEA, 2010 to 2013

Editorial Board of the Sports Engineering Journal, 2012 to 2013

Editor in Chief, Sports Engineering, 2013 to present

University Service

Member of Undergraduate Studies Committee, 99, 04-06
 Member of Laboratory Equipment Committee, 99-02
 Chair of Laboratory Equipment Committee, 03
 ME 120 Discipline Block, Fall 97
 Member of Graduate Studies Committee, 96-98, 08 to present
 Undergraduate Academic Advisor, 97 to present
 Member of Experimental Design ME 406 Committee, 97
 Member of Safety Committee, 00
 SAE Student Club Advisor, 02 to 06, 08 to present
 ASME Student Club Advisor, 07 to 09
 Chair Graduate Studies Committee, 11 to present

Extramural Support

1. ONR, Engineered Wood Composites for Naval Waterfront Facilities
 L. V. Smith, M. P. Wolcott
 \$134k, 1/98 to 6/01
2. Albarrie, A Comparative Characterization of Basalt and E-glass fiber Reinforced Polymeric Composite Materials
 L. V. Smith
 \$10k, 6/98 to 12/98
3. WTC, Composite Reinforcement of Wood Baseball Bats
 D. A. Bender, L. V. Smith
 \$139k, 7/98 to 6/00
4. SIRTl, Ultralightweight Extruded Aluminum Blades for Vertical Axis Wind Turbine
 S. D. Antolovich, W. Johns, L. V. Smith
 \$86k, 10/98 to 6/00
5. Boeing, Environmental Durability of Thermoplastic Composites
 L. V. Smith
 \$79k, 10/99 to 6/02
6. Boeing, Long Term Fuel Compatibility of Thermoset Composites
 L. V. Smith
 \$700k, 7/01 to 12/07
7. Toray, Fuel Compatibility of Thermoset Composites
 L. V. Smith
 \$14k, 3/02 to 9/02
8. Cytac, Fuel Compatibility of Thermoset Composites
 L. V. Smith
 \$15k, 8/03 to 2/04
9. ASA, Softball Bat Performance Test Methods
 L. V. Smith
 \$498k, 1/03 to 12/13
10. Sports Science Laboratory
 L.V. Smith
 \$3.5M, 1/03 to present

11. FAA, Effect of Surface Treatment on the Degradation of Composites
L. V. Smith
\$104k, 9/04 to 3/07
12. 3M, Long Term Fuel Compatibility of AF555 Adhesive
L. V. Smith
\$46k, 9/04 to 6/06
13. Boeing, AF555 Hot/Wet Creep Response
L. V. Smith
\$19k, 11/04 to 6/05
14. Boeing, Tailoring Composite Ply Orientations for Circular Stress Concentrations
L. V. Smith
\$75k, 1/06 to 3/07
15. Boeing, 787 Fluid Exposure of Composite Laminates and Adhesives
L.V. Smith
\$172k, 6/06 to 8/08
16. Boeing, Lytex Jet Fuel Exposure
L. V. Smith
\$60k, 12/07 to 8/08
17. Boeing, Comparative Study of Diffusion in Composites
L. V. Smith
\$30k, 5/08 to 12/08
18. NCAA, Performance of Fast-Pitch Softball Bats
L. V. Smith
\$33k, 6/08 to 6/09
19. Boeing, Compatibility of BMS 8-327 Type I with Jet Fuel
L.V. Smith
\$67k, 11/08 to 12/09
20. Boeing, Lytex Fuel Soak Testing
L. V. Smith
\$73k, 6/10 to 6/11

Professional Memberships

ASME, SAMPE, SEM, ASTM, ISEA and SES

Patents

Lloyd V. Smith, 2001, Method and Apparatus for Molding Composite Materials, 6533985.

Presentations

1. Vail, M. A., Smith, L. V., 1992. "A Microscopic and Macroscopic Investigation of Bare and Embedded Nylon-6 Fibers Exposed to Stress and NO_x," Presented at the Utah Academy of Sciences, Arts and Letters, Salt Lake City, Utah.
2. Smith, L. V., Swanson, S. R., 1993 "Stiffness and Strength of Braided Specimens in Biaxial Compression," Presented at the Textile Mechanics Working Group Meeting, Hampton,

- Virginia.
3. Smith, L. V., Swanson, S. R., 1993. "Effect of Braid Architecture on the Strength of Braided Carbon Fiber Tubes Under Biaxial Compression," Presented at the ASME Winter Annual Meeting, New Orleans, Louisiana.
 4. Smith, L. V., 1995. "Characterization of Automotive Composites," Presented at the Annual East Tennessee Chapter SAMPE Meeting, Oak Ridge, Tennessee.
 5. Smith, L. V., Weitsman, Y. J., 1995. "The Immersed Fatigue Response of Polymer Composites," Presented at the 32nd Society of Engineering Science Meeting, New Orleans, Louisiana.
 6. Smith, L. V., Weitsman, Y. J., 1997. "Characterization of Damage in Viscoelastic Materials," Presented at the Society for Experimental Mechanics Spring Conference, Bellevue, Washington.
 7. Smith, L. V., 1998. "Examination of Factors That Influence the Strength of Textile Composites," Presented at the Society for Experimental Mechanics, Spring Conference, Houston, Texas.
 8. Smith, L. V., 1998. "The Effects of Moisture on the Fatigue Response of Polymeric Composite Materials," Presented at the 35th Annual Technical Meeting of the Society of Engineering Science, Pullman, Washington.
 9. Smith, L. V., 1999. "Durable Wood Bats," Presented at the National Collegiate Athletic Association Baseball Bat Research Panel Meeting, Indianapolis, Indiana.
 10. Rangaraj, S. V., Smith, L. V., 1999. "Durability of a Wood-Thermoplastic Composite in a Simulated Marine Environment," Presented at the Society for Experimental Mechanics, Spring Conference, Cincinnati, Ohio.
 11. Smith, L. V., Hermanson, J. C., Rangaraj, S. V., Bender, D. A., 1999. "A Dynamic Finite Element Analysis of Wood Baseball Bats," Presented at the Summer Bioengineering Conference, Big Sky, Montana.
 12. Smith, L. V., Shenoy, M., Axtell, J. T., 2000. "Simulated Composite Baseball Bat Impacts Using Numerical and Experimental Techniques," Presented at the Society for Experimental Mechanics, Spring Conference, Orlando, FL.
 13. Shenoy, M. M., Smith, L. V., Axtell, J. T., 2000. "Performance Assessment of Wood, Metal and Composite Baseball Bats," Presented at the ASME International Congress and Exposition, Orlando, FL.
 14. Campbell, B. D., Smith, L. V., Peterson, K., 2001. "Environmental Degradation of Fiber Reinforced Thermoplastic Composites," Presented at the Society for Experimental Mechanics, Spring Conference, Portland, OR.
 15. Smith, L. V., 2001. "Assessing Baseball Bat Performance," Presented at the SGMA Baseball & Softball Industry Meeting Program, Chicago, Ill.
 16. Smith, L. V., Campbell, B. D., Peterson, K., 2001. "A Comparative Study of the Environmental Durability of Thermoplastic Composites," Presented at the 33rd International SAMPE Technical Conference, Seattle, WA.
 17. Smith, L. V., Hanson, J. D., Hermanson, J. C., 2002. "A Numerical Investigation of Shear Testing of Composite Materials," Presented at the Society for Experimental Mechanics, Spring Conference, Milwaukee, WI.
 18. Bapanapalli, S. K., Smith, L. V., 2003. "The Effect of Tool-Part Interaction on the Geometry of Laminated Composites," 2003 SEM Annual Conference and Exposition of Experimental and Applied Mechanics, Charlotte, NC.

19. Smith, L. V., Broker, J., Nathan, A., 2003. "A Study of Softball Player Swing Speed," International Congress on Sports Dynamics, Melbourne, Australia.
20. Smith, L. V., Broker, J., Nathan, A., 2003. "Montgomery Field Study Results," SGMA Super Show, Las Vegas, NV.
21. Smith, L. V., 2003. "High Speed Test Results," ASA Equipment Testing & Certification Committee," Oklahoma, OK.
22. Smith, L. V., 2003. "ASTM Ball Task Force Update," SGMA Annual Meeting, Dallas Texas.
23. Shultz, Matthew, Smith, L. V., 2004, "Optimum Fiber Orientation for Fiber Reinforced Pressure Vessels," 2004 SEM Annual Conference and Exposition of Experimental and Applied Mechanics, Costa Mesa, CA.
24. Duris, J. D., Smith, L. V., 2004, "ASTM Ball Task Force Update," ASTM May Committee Meeting, Salt Lake City, UT
25. Duris, J. D., Smith, L. V., 2004, "ASTM Ball Task Force Results," SGMA Annual Meeting, Houston, TX
26. Smith, L. V., 2004. "Measuring Bat Performance," NCAA Women's Softball Rules Committee Annual Meeting, San Diego, CA.
27. Smith, L. V., 2004, "Understanding Bat Performance," Harvard University, Invited Lecture.
28. Smith, L. V., 2005. "The Effect of Surface Treatment on the Degradation of Composite Adhesives," FAA JAMS Annual Meeting, Wichita, KS.
29. Smith, L. V., 2005, "Do We Need Another Ball Test?" ASTM May Committee Meeting, Reno, NV
30. Mahadevan, R., Smith, L. V., 2005. "Describing the Degradation of Polymers," SEM Annual Conference and Exposition of Experimental and Applied Mechanics, Portland, OR
31. Smith, L. V., 2005. "Describing Polymeric Degradation through Weight Measurements," ICCE-12, Tenerife, Spain
32. Smith, L. V., Cruz, C. M., Nathan, A. M., Russell, D. A., 2005. "How Bat Modifications Can Affect Their Response," APCST 2005, Tokyo, Japan, The Impact of Technology on Sport
33. Smith, L. V., 2005. "Update of Dynamic Ball Test" September ASTM Meeting, Dallas, TX
34. Smith, L. V., Pothakamuri, Prashanti, 2005. "The Effect of Surface Treatment on The Degradation of Composite Adhesives," AMTAS Fall Meeting, Seattle, WA.
35. Smith, L. V., 2005. "Describing Polymer Degradation Using Simplified Experimental Measurements," SAMPE Fall Technical Conference, Seattle, WA
36. Smith, L. V., 2005 "Dynamic Stiffness Results," ASA Annual Meeting, Tucson, AZ, Invited Lecture.
37. Smith, L. V., 2005. "Tales from the Bat Lab," WSU ASME Student Chapter Meeting, Pullman, WA, Invited Lecture
38. Smith, L. V., Duris, J. 2006. "The Dependence of Bat Performance on Ball Properties," IMAC-XXIV, St. Louis, MO.
39. Smith, L. V., 2006. "Progress in Determining Bat Performance," University of Utah, Salt Lake City, Utah, Invited Lecture.
40. Smith, L. V., 2006. "Update of Dynamic Ball and Bat Tests," May ASTM Meeting, Toronto, Canada
41. Smith, L. V., 2006. "How Composites Make Things Faster, Stronger and Better," WSU

- Discover Recruiting, Everett, Washington, Invited Lecture
42. Smith, L. V., 2006. "Rigid Wall Effects on Softball Coefficient of Restitution Measurements," The Engineering of Sport 6, Munich, Germany
 43. Smith, L. V., 2006. "Progress in Determining Bat Performance," Royal Melbourne Institute of Technology, Melbourne, Australia, Invited Lecture.
 44. Smith, L. V., 2006. "Review of Progress in Measuring Softball Equipment Performance," ASA General Session, National Council Meeting, Colorado Springs, Colorado, Invited Lecture.
 45. Smith, L. V., 2007. "Results of Preliminary Dynamic Stiffness Round Robin Tests," May ASTM Meeting, Norfolk, VA
 46. Smith, L. V., 2007. "Progress in Measuring Bat Performance," Little League, Williamsport, PA.
 47. Smith, L. V., Pothakamuri, P. 2007. "The Effect of Surface Treatment on the Degradation of Composite Adhesives," FAA JAMS Annual Review, Atlantic City, NJ.
 48. Biesen, E., Smith, L. V., 2007. "Describing the Plastic Deformation of Aluminum Softball Bats," APCST, Singapore.
 49. Smith, L. V., 2007. "Accelerating Degradation in Composites and Their Adhesives," ASC, Seattle, WA.
 50. Smith, L. V., 2008. "Measuring the Hardness of Softballs," IMAC-XXVI, Orlando, FL.
 51. Smith, L. V., 2008. "Experimental Characterization of Ice Hockey Sticks and Pucks," Fifth International Symposium on Ice Hockey Safety, Denver, CO.
 52. Smith, L. V., 2008. "Observations of Measuring Bat Speed," May ASTM, Denver, CO.
 53. Smith, L. V., 2008. "An Examination of Cricket Bat Performance," International Sports Engineering Association, Biarritz, France.
 54. Smith, L. V., 2009. "Update on Ball Dynamic Stiffness ILS," May ASTM, Vancouver, BC.
 55. Smith, L. V., 2009. "REDUCING DAMAGE NEAR CIRCULAR HOLES IN COMPOSITE LAMINATES," 17 International Conference on Composite Materials, Edinburgh, Scotland.
 56. NATHAN, A. M. AND SMITH, L. V., 2009 "EFFECT OF BALL PROPERTIES ON THE BALL-BAT COEFFICIENT OF RESTITUTION," 4th Asia-Pacific Congress on Sports Technology, Honolulu, Hawaii.
 57. Smith, L. V., 2009. "The effect of experimental error on bat performance measurements," 4th Asia-Pacific Congress on Sports Technology, Honolulu, Hawaii.
 58. SMITH, L. V., BIGFORD, R. L. 2009. "Laboratory Measurements of Ice Hockey Stick Performance," 4th Asia-Pacific Congress on Sports Technology, Honolulu, Hawaii.
 59. Smith, L. V., 2009. "The Effect of Light Gate in Ball Speed Measurements," November ASTM, Atlanta, GA.
 60. Smith, L. V., 2010. "Effect of Normalizing on Bat Performance," May ASTM, St. Louis, MO.
 61. Smith, L. V., 2010. "Effects of Ball Properties on Bat Performance," May ASA Equipment Committee Meeting, Pullman, WA
 62. Smith, L., 2010. "Impact response of sports materials," ISEA, Vienna, Austria.
 63. Smith, L., 2011. "The effect of temperature and humidity on the performance of baseballs and softballs," The Impact of Technology on Sport, 5th Asia-Pacific Congress on Sports Technology, Melbourne, Australia.
 64. Smith, L. 2011. "Matrix damage in laminated composites under biaxial stress," 18th

- International Conference on Composite Materials, Jeju, South Korea.
65. Smith, L. V., 2011. "Effects 52/300 Ball in Play Conditions," May ASA Equipment Committee Meeting, Salem, VA
 66. Smith, L. V., 2011. "Oklahoma Field Study Results," November ASA Equipment Committee Meeting, Myrtle Beach, SC
 67. Smith, L. V., 2012. "The Physics of Baseball Bat Performance Measurements," Euromech 538, The Physics of Sport, ECOLE, Paris, France.
 68. Smith, L. V., Burbank, S., Kensrud, J., Martin J., 2012. "Field Measurements of Softball Player Swing Speed," The Engineering of Sport 9, Lowell, MA.
 69. Smith, L. V., 2012. "The Science of Baseball," EPFL, Laboratory of Polymer and Composite Technology, Lausanne Switzerland
 70. Smith, L. V., 2012. "Some Baseball Science," Centre for Sports Engineering Research, Sheffield Hallam University, Sheffield, UK
 71. Smith, L., 2013. "Matrix Damage in Carbon/Epoxy Composites," EPFL Advances in Materials, Lausanne, Switzerland.
 72. Smith, L., Salavatian, M., 2013. "The Mutual Effects of Shear and Transverse Damage in Polymeric Composites," ICCM19, Montreal Canada.
 73. Smith, L., Burbank, S., 2013. "Simulating sport ball impact through material characterization," 6th Asia-Pacific Conference on Sports Technology, The Impact of Technology on Sports, Hong Kong, 18-20 September 2013.

Journal Publications

1. Smith, L. V., DeVries, K. L., 1993. "Mechanical Properties of Polymeric Fibers Exposed to Stress in a NO_x environment," *Polymer*, 34.3:546-550.
2. Smith, L. V., Swanson, S. R., 1993. "Response of Braided Composites Under Compressive Loading," *Journal of Composites Engineering*, 3.12:1165-1184.
3. Smith, L. V., Swanson, S. R., 1994. "Failure of Braided Carbon/Epoxy Composites Under Biaxial Compression," *Journal Composite Materials*, 28.12:1158-1178.
4. Smith, L. V., Swanson, S. R., 1995. "Failure of Braided Composite Cylinders under Biaxial Tension," *Journal of Composite Materials*, 29.6:766-784.
5. Smith, L. V., Swanson, S. R., 1995, "Micro-mechanics Parameters Controlling the Strength of Braided Composites," *Composites Science and Technology*, 54.2:177-184.
6. Smith, L. V., Swanson, S. R., 1996. "Effect of Architecture on the Strength of Braided Tubes under Biaxial Tension and Compression," *ASME Journal of Engineering Materials and Technology*, 118.4:478-484.
7. Swanson, S. R., Smith, L. V., 1996, "Comparison of the Biaxial Strength Properties of Braided and Laminated Carbon Fiber Composites," *Composites*, 27B.1:71-77.
8. Smith, L. V., Swanson, S. R., 1996, "Strength Design with 2-D Triaxial Braid Textile Composites," *Composites Science and Technology*, 56:359-365.
9. Smith, L. V., and Weitsman, Y. J., 1996. "The Immersed Fatigue Response of Polymer Composites," *International Journal of Fracture*, 82:31-42.
10. Smith, L. V., Swanson, S. R., 1997. "Design of a Cylindrical Specimen for Biaxial Testing of Composite Materials," *Journal of Reinforced Plastics and Composites*, 16:550-565.
11. Smith, L. V. and Weitsman, Y. J., 1998. "Inelastic Behavior of Randomly Reinforced

- Polymeric Composites Under Cyclic Loading,” *Mechanics of Time-Dependent Materials*, 1.3:293-305.
12. Smith, L. V., and Weitsman, Y. J., 1999. “The Visco-Damage Mechanical Response of Swirl-Mat Composites,” *International Journal of Fracture*, 97:301-319.
 13. Rangaraj, S. V., and Smith, L. V., 1999. “The Non-Linear Viscoelastic Response of a Wood-Thermoplastic Composite,” *Mechanics of Time-Dependent Materials*, 3.2:125-139.
 14. Rangaraj, S. V., and Smith, L. V., 2000. “The Effects of Moisture on the Durability of a Wood-Thermoplastic Composite,” *Journal of Thermoplastic Composite Materials*, 13.2:140-161.
 15. Shenoy, M. M., Smith, L. V., Axtell, J. T., 2001. “Performance Assessment of Wood, Metal and Composite Baseball Bats,” *Composite Structures*, 52:397-404.
 16. Smith, L. V., 2001. “Evaluating Baseball Bat Performance,” *Sports Engineering*, 4:205-214.
 17. Darrow, D. A., Smith, L. V., 2002. “Isolating Components of Processing Induced Warpage in Laminated Composites,” *Journal of Composite Materials*, 36.21:2407-2419.
 18. Pooler, D. J., Smith, L. V., 2004. “Non-linear Viscoelastic Response of a Wood-Plastic Composite Including Temperature Effects,” *Journal of Thermoplastic Composites*, 17.5:427-445.
 19. Smith, L. V., Axtell, J. T., 2003. “Mechanical Testing of Baseball Bats,” *Journal of Testing and Evaluation*, 31.3:210-214.
 20. Bapanapalli, S. K., and Smith, L. V., 2005. “A Linear Finite Element Model to Predict Processing-Induced Distortion in FRP Laminates,” *Composites Part A: Applied Science and Manufacturing*, 36:1666-1674.
 21. Ramachandran, M., Smith, L. V., 2007. “A Mechanistic Model Describing the Degradation of Polymers,” *Journal of Polymers and the Environment*, 15.2:75-80.
 22. Yadama, V., Wolcott, M., Smith, L. V., 2006. “Elastic Properties of Wood-Strand Composites with Undulating Strands,” *Composites Part A: Applied Science and Manufacturing*, 37:385-392.
 23. Biesen, E., Smith, L. 2007. “Describing the Plastic Deformation of Aluminum Softball Bats,” *Sports Engineering*, 10:185-194.
 24. Smith, L. V., Duris, J. G., 2009. “Progress and Challenges in Numerically Modeling Solid Sports Balls With Application to Softballs,” *Journal of Sports Sciences*, 27.4:353-360.
 25. Smith, L. V., Cruz, C. M., 2008. “Identifying Altered Softball Bats and Their Effect on Performance,” *Sports Technology*, 1.4-5:196-201.
 26. Bigford, R. L., Smith, L. V., 2009. “Experimental Characterization of Ice Hockey Sticks and Pucks,” *ASTM STP 1516:186-197 & Journal of ASTM International*, 6.7:
 27. Smith, L. V., 2009. “Progress in Measuring the Performance of Baseball and Softball Bats,” *Sports Technology*, 1.6:291-299.
 28. Pilli, S. P., Simmons, K. L., Holbery, J. D., Shutthanandan, V., Stickler, P. B. Smith, L. V., 2009. “A Novel Accelerated Moisture Absorption Test and Characterization,” *Composites Part A*, 40.9: 1501-1505.
 29. Smith, L. V., Duris, J. G., Nathan, A. M., 2009. “A Determination of the Dynamic Response of Softballs,” *Sports Engineering*, 12.4:163-169.
 30. Smith, L., Sherwood, J. 2010. “Engineering our Favorite Pastime,” *Mechanical Engineering, the Magazine of ASME*, 132.4:44-48.
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