

## CURRICULUM VITA

2-22-07

**Lloyd Smith****PERSONAL DATA**

Home Address: 1947 Crestview, Moscow, ID 83843

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Citizenship: USA

**EDUCATION**Ph.D. ME, University of Utah, 1994M.S. ME, University of Utah, 1991B.S. ME, University of Utah, 1988

Areas of Interest:

Composite materials, Sports Science

**PROFESSIONAL EXPERIENCE**

Associate professor	Pullman, Washington	'02 to present
Assistant professor	Pullman, Washington	'96 to '02
Research assistant professor	Knoxville & Oak Ridge, Tennessee	'95 to '96
Post doctoral fellow	Knoxville & Oak Ridge, Tennessee	'94 to '95
Instructor	Salt Lake City, Utah	'94
Research assistant	Salt Lake City, Utah	'91 to '94
Lab manager	Salt Lake City, Utah	'92 to '94
Tool design engineer	Clearfield, Utah	'88 to '90
Programmer	Salt Lake City, Utah	'83 to '88

**COURSES TAUGHT**Graduate Level

ME 501, 534

Undergraduate Level

ME 212, 220, 310, 311, 316, 406, 414, 472

**PhD RESEARCH SUPERVISED**StudentThesis TitleDate PhD Awarded**MS RESEARCH SUPERVISED**StudentThesis/Project TitleDate MS Awarded/expected

Sudarshan Rangaraj

Durability of wood plastic  
composites

9/97 to 8/99

Mahesh Shenoy

Dynamic modeling of baseball bat

1/99 to 8/00

	impacts	
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	Processing induced 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	Describing degradation of polymeric 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	The effect of bat alterations	8/03 to 5/05
Aaron Ison	The effect of impact surface compliance on ball properties	8/03 to 12/05
Eric Biesen	Predicting bat durability	8/04 to 5/06
Prashanti Pothakamuri	Accelerating adhesive degradation	8/04 to 12/06
Rosanna Anderson	Hockey stick performance	8/06 to present
Daniel Stone	Measuring stress concentrations in composites	8/06 to present
Arjun Kothidar	Predicting the effect of stress concentrations in composites	8/06 to present
Harsimran Singh	Cricket bat performance	8/06 to present

## UNIVERSITY SERVICE

Member of Undergraduate Studies Committee, 99  
 Member of Laboratory Equipment Committee, 99 to 03  
 Chair of Laboratory Equipment Committee, 03  
 ME 120 Discipline Block, Fall 97  
 Member of Graduate Studies Committee, 96-98  
 Undergraduate Academic Advisor, 97 to present  
 Member of Experimental Design ME 406 Committee, 97 to present  
 Member of Safety Committee, 00  
 Member of Undergraduate Studies Committee, 04 to present  
 SAE Advisor, 2000 to present

## PROFESSIONAL ACTIVITIES, AWARDS AND HONORS

### Committees/Conferences:

Secretary, SEM Composites TD, 98-99  
 Vice Chair, SEM Composites TD, 00-01  
 Chair, SEM Composite TD, 02 to 03

Session Chair, 98 SES Meeting  
Session Organizer, SEM Meeting, 98-03  
Chair, ASTM Ball task force

External Examinership:

Clean Washington Center, 97  
SIRTI, 99  
NOCSAE, 03

Consulting:

Albarrie, Single Filament Testing of Basalt Fibers  
12/97 to 2/98  
HAC, Coupon Testing of Tail Rotor Materials  
3/98 to 4/98  
TriDiamond Sports Inc., Bat Stiffness Tester  
10/98 to 11/98  
Easton Sports, Baseball Bat Testing  
7/99 to 8/99  
Rawlings, Modeling bat performance  
9/02 to 2/04  
Swartz Campbell LLC, Bat expert witness  
9/03  
McKinney & Stringer, Bat expert witness  
8/04 to 10/04  
Jensen Maritime Consultants, Inc., Marine Composite Survey  
4/05 to 7/05  
Major League Baseball, Review Panel  
2000, 2005  
Quane Smith, LLP, Bat expert testimony  
2005  
Sowell, Gray, Stepp & Laffitte, LLC, Bat expert testimony  
2006, 2007

Awards/Prizes

Reviewership:

Journal of Composite Materials  
Journal of Engineering Materials and Technology  
Polymer Engineering and Science  
Journal of Thermoplastic Composite Materials  
Composite Structures  
Experimental Mechanics  
Fatigue and Fracture of Engineering Materials and Structures  
Aerospace Science and Technology

Invited Lectures/Seminars

Nathan, A., Russell, D., Smith, L. V., 2003, "Bat-Ball 101," Washington State University  
Nathan, A., Russell, D., Smith, L. V., 2004, "Bat-Ball 102," Washington State University  
Nathan, A., Russell, D., Smith, L. V., 2005, "Bat-Ball 103," Washington State University  
Smith, L. V., 2004, "Understanding Bat Performance," Harvard University.  
Smith, L. V., 2005 "Dynamic Stiffness Results," ASA Annual Meeting, Tucson, AZ.  
Smith, L. V., 2006 "Understanding Bat Performance," University of Utah, Salt Lake City, UT.  
Smith, L. V., 2006 "Understanding Bat Performance," ASA Annual Meeting, Colorado Springs, CO.  
Smith, L. V., 2006 "Understanding Bat Performance," Royal Melbourne Institute of Technology, Melbourne, Australia.

### **DEVELOPMENT OF RESEARCH FACILITIES**

Composite Materials Processing Laboratory  
Environmental Exposure Facility  
Sports Science Laboratory

### **RESEARCH GRANTS/CONTRACTS**

ONR, Engineered Wood Composites for Naval Waterfront Facilities

L. V. Smith, M. P. Wolcott

\$134k, 1/98 to 6/01

Albarrie, A Comparative Characterization of Basalt and E-glass fiber Reinforced Polymeric Composite Materials

L. V. Smith

\$10k, 6/98 to 12/98

WTC, Composite Reinforcement of Wood Baseball Bats

D. A. Bender, L. V. Smith

\$139k, 7/98 to 6/00

SIRTI, Ultralightweight Extruded Aluminum Blades for Vertical Axis Wind Turbine

S. D. Antolovich, W. Johns, L. V. Smith

\$86k, 10/98 to 6/00

Boeing, Environmental Durability of Thermoplastic Composites

L. V. Smith

\$79k, 10/99 to 6/02

Boeing, Long Term Fuel Compatibility of Thermoset Composites

L. V. Smith

\$910k, 7/01 to 12/04

Toray, Fuel Compatibility of Thermoset Composites

L. V. Smith

\$14k, 3/02 to 9/02

Cytec, Fuel Compatibility of Thermoset Composites

L. V. Smith

\$15k, 8/03 to 2/04

ASA, Softball Bat Performance Test Methods

L. V. Smith

\$176k, 1/03 to 12/07

FAA, Effect of Surface Treatment on the Degradation of Composites

L. V. Smith

\$104k, 8/04 to 1/07

3M, Long Term Fuel Compatibility of AF555 Adhesive

\$49k, 9/04 to 6/06

Boeing, AF555 Hot/West Creep Response

\$19k, 11/04 to 6/05

Boeing, 787 Fluid Exposure

\$62k, 5/06 to 5/07

Boeing, Tailored ply orientations

\$73k, 12/05 to 12/06

Boeing, Lytex Fuel Compatibility

\$52k, 9/06 to 12/07

## **PUBLICATIONS**

### **Journal Articles**

Smith, L. V., DeVries, K. L., 1993. "Mechanical Properties of Polymeric Fibers Exposed to Stress in a NO<sub>x</sub> environment," *Polymer*, 34.3:546-550.

Smith, L. V., Swanson, S. R., 1993. "Response of Braided Composites Under Compressive Loading," *Journal of Composites Engineering*, 3.12:1165-1184.

Smith, L. V., Swanson, S. R., 1994. "Failure of Braided Carbon/Epoxy Composites Under Biaxial Compression," *Journal Composite Materials*, 28.12:1158-1178.

Smith, L. V., Swanson, S. R., 1995. "Failure of Braided Composite Cylinders under Biaxial Tension," *Journal of Composite Materials*, 29.6:766-784.

Smith, L. V., Swanson, S. R., 1995, "Micro-mechanics Parameters Controlling the Strength of Braided Composites," *Composites Science and Technology*, 54.2:177-184.

- 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.
- 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.
- Smith, L. V., Swanson, S. R., 1996, "Strength Design with 2-D Triaxial Braid Textile Composites," *Composites Science and Technology*, 56:359-365.
- Smith, L. V., and Weitsman, Y. J., 1996. "The Immersed Fatigue Response of Polymer Composites," *International Journal of Fracture*, 82:31-42.
- 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.
- 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.
- Smith, L. V., and Weitsman, Y. J., 1999. "The Visco-Damage Mechanical Response of Swirl-Mat Composites," *International Journal of Fracture*, 97:301-319.
- 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.
- 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.
- Shenoy, M. M., Smith, L. V., Axtell, J. T., 2001. "Performance Assessment of Wood, Metal and Composite Baseball Bats," *Composite Structures*, 52:397-404.
- Smith, L. V., 2001. "Evaluating Baseball Bat Performance," *Sports Engineering*, 4:205-214.
- Darrow, D. A., Smith, L. V., 2002. "Isolating Components of Processing Induced Warpage in Laminated Composites," *Journal of Composite Materials*, 36.21:2407-2419.
- 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.
- Smith, L. V., Axtell, J. T., 2003. "Mechanical Testing of Baseball Bats," *Journal of Testing and Evaluation*, 31.3:210-214.
- Gillespie BW, Martinez SA, Smith LV, Treece BR., 2005. "Comparison of the tensile strength between two intradermal suture patterns: buried-knot and "pulley knot-free" techniques," *Vet Surg*, to appear.

- Bapanapalli, S. K., and Smith, L. V., 2003. "A Linear Finite Element Model to Predict Processing-Induced Distortion in FRP Laminates," *Composites Part A: Applied Science and Manufacturing*, 36:1666-1674.
- Ramachandran, M., Smith, L. V., 2004. "A Mechanistic Model Describing the Degradation of Polymers," *Journal of Polymers and the Environment*, to appear.
- 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.

#### Technical Conference Papers

- Smith, L. V., DeVries, K. L., 1992. "Mechanical Properties of Polymeric Fibers Exposed to Stress in an NO<sub>x</sub> Environment," *Bulletin of The American Physical Society*, Vol. 37, No. 1, p. 676, Indianapolis, Indiana.
- Smith, L. V., Swanson, S. R., 1993. "Effect of Architecture on the Strength of Braided Tubes Under Biaxial Compression," *ASME WAM, Composite Materials and Structures*, AD-Vol.37/AMD-Vol. 179, pp. 285-296, New Orleans, Louisiana.
- Smith, L. V., Swanson, S. R., 1994. "Strength Design with 2-d Braid Textile Composites," *Proc. of the American Society for Composites, Ninth Technical Conference*, pp. 727-734, Newark, Delaware.
- Swanson, S. R., Smith, L. V., 1994. "Comparison of the Biaxial Strength Properties of Braided and Laminated Carbon Fiber Composites," *Proc. of International Conference on Composites Engineering, ICCE/1*, Ed. D. Hui, pp. 511-512, New Orleans, Louisiana.
- Smith, L. V., Swanson, S. R., 1994. "Selection of Carbon Fiber 2D Braid Preform Parameters for Biaxial Loading," *Composites: Design and Manufacture for Cost Effectiveness, MD-Vol 48, Proc. ASME WAM*, pp. 33-44, Chicago, Illinois.
- Smith, L. V., Weitsman, Y. J., 1995. "Seawater Effects on Fatigue Response of Polymeric Composites," *Proc. International Conference DURACOSYS 95*, 16-21 July, pp. 217-223, Belgium.
- Swanson, S. R., Smith, L. V., 1995. "Multiaxial Stiffness and Strength Characterization of 2-D Braid Carbon/Epoxy Fiber Composites," *Mechanics of Textile Composites Conference, NASA Conf. Pub. 3311, Part 1*, pp. 175-249, Hampton, Virginia.
- Smith, L. V., Weitsman, Y. J., 1995. "Damage-Based Deformation Modeling," *Durability of Lightweight Composite Structures for Automotive Applications: Progress Report for Period Ending September 30, 1995*, ORNL/TM-13176, pp. 6-1 - 6-14, Oak Ridge, Tennessee.
- Smith, L. V., Weitsman, Y. J., 1996. "Visco-Damage in Swirl-Mat Fiberglass Composites," *Proc. First International Conference on Composites Science and Technology, ICCST/1*, 18-20 June,

Durban, South Africa.

- Abdel-Tawab, KH., Smith, L. V., Weitsman, Y. J., 1996. "The Inelastic/Damage Response of Swirl-Mat Polymeric Composites: Experiments and Theory," Proceedings of the symposium on Inelasticity and Damage in Solids Subject to Microstructural Change in honor of the late Professor L. M. Kachanov, September 25-27, pp. 291-300, St. John's, Newfoundland, Canada.
- Smith, L. V., Weitsman, Y. J., 1996. "Damage-Based Deformation Modeling," Durability of Lightweight Composite Structures for Automotive Applications: Progress Report for Period Ending September 30, 1996, pp. 5-1 - 5-14, Oak Ridge, Tennessee.
- Weitsman, Y. J., Smith, L. V., 1997. "The Mechanical Behavior of Swirl-Mat Composites," Proceedings of the 30<sup>th</sup> International Symposium on Automotive Technology and Automation, ISATA, Florence, Italy, June 16-19, pp. 399-406.
- Smith, L. V. Weitsman, Y. J., 1997. "Characterization of Damage in Viscoelastic Materials," Abstract Proc. of the Society for Experimental Mechanics, Spring Conference, pp. 47-48, Bellevue, Washington.
- Smith, L. V., 1998. "Examination of Factors That Influence the Strength of Textile Composites," Abstract Proc. of the Society for Experimental Mechanics, Spring Conference, pp. 11-13, Houston, Texas.
- Smith, L. V., 1998. "The Effects of Moisture on the Fatigue Response of Polymeric Composite Materials," Proc. Of the 35<sup>th</sup> Annual Technical Meeting of the Society of Engineering Science, p. 98, Pullman, Washington.
- Rangaraj, S. V., Smith, L. V., 1999. "Durability of a Wood-Thermoplastic Composites in a Simulated Marine Environment," Abstract Proc. of the Society for Experimental Mechanics, Spring Conference, pp. 814-816, Cincinnati, Ohio.
- Smith, L. V., Hermanson, J. C., Rangaraj, S. V., Bender, D. A., 1999. "A Dynamic Finite Element Analysis of Wood Baseball Bats," Proceedings of the Summer Bioengineering Conference, pp. 629-630, Big Sky, Montana.
- Smith, L. V., Shenoy, M., Axtell, J. T., 2000. "Simulated Composite Baseball Bat Impacts Using Numerical and Experimental Techniques," Abstract Proc. of the Society for Experimental Mechanics, Spring Conference, pp. 5-8, Orlando, FL.
- Axtell, J. T., Smith, L. V., Shenoy, M., 2000. "Effect of Composite Reinforcement On The Durability of Wood Baseball Bats," Proceedings of the 32<sup>nd</sup> International SAMPE Technical Conference, pp. 687-698, Boston, MA.
- Campbell, B. D., Smith, L. V., Peterson, K., 2001. "Environmental Degradation of Fiber Reinforced Thermoplastic Composites," Proceedings of the 2001 SEM Annual Conference and Exposition of Experimental and Applied Mechanics, pp. 344-347, Portland, OR.

- Pooler, D. J., Smith, L. V., 2001. "Temperature Dependent Response of a Wood Plastic Composite," Proceedings of the 2001 SEM Annual Conference and Exposition of Experimental and Applied Mechanics, pp. 628-630, Portland, OR.
- Darrow, D. A., Smith, L. V., 2001. "Evaluating the Spring-In Phenomenon of Polymer Matrix Composites," Proceedings of the 33<sup>rd</sup> International SAMPE Technical Conference, pp. 326-337, Seattle, WA.
- Smith, L. V., Campbell, B. D., Peterson, K., 2001. "A Comparative Study of the Environmental Durability of Thermoplastic Composites," Proceedings of the 33<sup>rd</sup> International SAMPE Technical Conference, pp. 998-1008, Seattle, WA.
- Martinez, S., Karyn, Smith, L. V., Carroll, W., Felman, R., Shih, M. S., 2002. "A Comparison of the Osteogenic Effects Between Two Different Surface Interferential Stimulation Devices to Enhance Surgically Based Spinal Fusion," American College of Veterinary Surgeons Meeting, San Diego, CA.
- Smith, L. V., Hanson, J. D., Hermanson, J. C., 2002. "A Numerical Investigation of Shear Testing of Composite Materials," Proceedings of the 2002 SEM Annual Conference and Exposition of Experimental and Applied Mechanics, pp. 178-181, Milwaukee, WI.
- Bapanapalli, S. K., Smith, L. V., 2003. "The Effect of Tool-Part Interaction on the Geometry of Laminated Composites," Proceedings of the 2003 SEM Annual Conference and Exposition of Experimental and Applied Mechanics, pp. 139-146, Charlotte, NC.
- Smith, L. V., Broker, J., Nathan, A., 2003. "A Study of Softball Player Swing Speed," Sports Dynamics Discovery and Application, Subic, Trivailo, Alam, eds., pp. 12-17, Melbourne, Australia.
- Shultz, M., 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.
- Duris, J., Smith, L. V., 2004, "Evaluating Test Methods Used to Characterize Softballs," The Engineering of Sport 5<sup>th</sup> International Conference, Davis, CA
- Nathan, A. M., Russell, D. A., Smith, L., 2004, "The Physics of the Trampoline Effect in Baseball and Softball Bats," The Engineering of Sport 5<sup>th</sup> International Conference, Davis, CA.
- Mahadevan, R., Smith, L. V., 2005. "Describing the Degradation of Polymers," SEM Annual Conference and Exposition of Experimental and Applied Mechanics, Portland, OR
- Smith, L. V., 2005. "Describing Polymeric Degradation through Weight Measurements," ICCE-12, Tenerife, Spain

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, (Subic & Ujihashi, Eds) pp. 33-38.

Smith, L. V., 2005. "Describing Polymer Degradation Using Simplified Experimental Measurements," SAMPE Fall Technical Conference, Seattle, WA

Smith, L. V., Ison, A. 2006. "Rigid Wall Effects on Softball Coefficient of Restitution Measurements," The Engineering of Sport 6, Volume 1, Developments for Sports, (Moritz & Haake, eds) Munich, Germany, pp. 29-34.

### Technical Presentations

Vail, M. A., Smith, L. V., 1992. "A Microscopic and Macroscopic Investigation of Bare and Embedded Nylon-6 Fibers Exposed to Stress and NO<sub>x</sub>," Presented at the Utah Academy of Sciences, Arts and Letters, Salt Lake City, Utah.

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.

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.

Smith, L. V., 1995. "Characterization of Automotive Composites," Presented at the Annual East Tennessee Chapter SAMPE Meeting, Oak Ridge, Tennessee.

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.

Smith, L. V., Weitsman, Y. J., 1997. "Characterization of Damage in Viscoelastic Materials," Presented at the Society for Experimental Mechanics Spring Conference, Bellevue, Washington.

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.

Smith, L. V., 1998. "The Effects of Moisture on the Fatigue Response of Polymeric Composite Materials," Presented at the 35<sup>th</sup> Annual Technical Meeting of the Society of Engineering Science, Pullman, Washington.

Smith, L. V., 1999. "Durable Wood Bats," Presented at the National Collegiate Athletic Association Baseball Bat Research Panel Meeting, Indianapolis, Indiana.

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.

- 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.
- 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.
- 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.
- 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.
- Smith, L. V., 2001. "Assessing Baseball Bat Performance," Presented at the SGMA Baseball & Softball Industry Meeting Program, Chicago, Ill.
- Smith, L. V., Campbell, B. D., Peterson, K., 2001. "A Comparative Study of the Environmental Durability of Thermoplastic Composites," Presented at the 33<sup>rd</sup> International SAMPE Technical Conference, Seattle, WA.
- 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.
- 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.
- Smith, L. V., Broker, J., Nathan, A., 2003. "A Study of Softball Player Swing Speed," International Congress on Sports Dynamics, Melbourne, Australia.
- Smith, L. V., Broker, J., Nathan, A., 2003. "Montgomery Field Study Results," SGMA Super Show, Las Vegas, NV.
- Smith, L. V., 2003. "High Speed Test Results," ASA Equipment Testing & Certification Committee, Oklahoma, OK.
- Smith, L. V., 2003. ASTM Ball Task Force Update," SGMA Annual Meeting, Dallas Texas.
- 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.

- Duris, J. D., Smith, L. V., 2004, "ASTM Ball Task Force Update," ASTM May Committee Meeting, Salt Lake City, UT
- Duris, J. D., Smith, L. V., 2004, "ASTM Ball Task Force Results," SGMA Annual Meeting, Houston, TX
- Smith, L. V., 2004. "Measuring Bat Performance," NCAA Women's Softball Rules Committee Annual Meeting, San Diego, CA.
- Smith, L. V., 2004, "Understanding Bat Performance," Harvard University, Invited Lecture.
- Smith, L. V., 2005. "The Effect of Surface Treatment on the Degradation of Composite Adhesives," FAA JAMS Annual Meeting, Wichita, KS.
- Smith, L. V., 2005, "Do We Need Another Ball Test?" ASTM May Committee Meeting, Reno, NV
- Mahadevan, R., Smith, L. V., 2005. "Describing the Degradation of Polymers," SEM Annual Conference and Exposition of Experimental and Applied Mechanics, Portland, OR
- Smith, L. V., 2005. "Describing Polymeric Degradation through Weight Measurements," ICCE-12, Tenerife, Spain
- 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
- Smith, L. V., 2005. "Update of Dynamic Ball Test" September ASTM Meeting, Dallas, TX
- Smith, L. V., Pothakamuri, Prashanti, 2005. "The Effect of Surface Treatment on The Degradation of Composite Adhesives," AMTAS Fall Meeting, Seattle, WA.
- Smith, L. V., 2005. "Describing Polymer Degradation Using Simplified Experimental Measurements," SAMPE Fall Technical Conference, Seattle, WA
- Smith, L. V., 2005 "Dynamic Stiffness Results," ASA Annual Meeting, Tucson, AZ, Invited Lecture.
- Smith, L. V., 2005. "Tales from the Bat Lab," WSU ASME Student Chapter Meeting, Pullman, WA, Invited Lecture
- Smith, L. V., 2006. "Progress in Determining Bat Performance," University of Utah, Salt Lake City, Utah, Invited Lecture.
- Smith, L. V., 2006. "Update of Dynamic Ball and Bat Tests," May ASTM Meeting, Toronto, Canada

Smith, L. V., 2006. "How Composites Make Things Faster, Stronger and Better," WSU Discover Recruiting, Everett, Washington, Invited Lecture

Smith, L. V., 2006. "Rigid Wall Effects on Softball Coefficient of Restitution Measurements," The Engineering of Sport 6, Munich, Germany

Smith, L. V., 2006. "Progress in Determining Bat Performance," Royal Melbourne Institute of Technology, Melbourne, Australia, Invited Lecture.

Smith, L. V., 2006. "Review of Progress in Measuring Softball Equipment Performance," ASA General Session, National Council Meeting, Colorado Springs, Colorado, Invited Lecture.

#### Other Technical Reports

Smith, L. V., 2006. "Bat and Ball Test Methods and Performance Characteristics," A white paper submitted to the Amateur Softball Association.