

PROFESSIONAL VITAE

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and Mechanical Engineering
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A. EDUCATION AND ACADEMIC EXPERIENCE

1. Education

University of Cincinnati - 1982 to 1987
Degree: Ph.D. Aerospace Engineering & Engineering Mechanics
Area: Solid Mechanics and Materials Science

University of Cincinnati - 1976 to 1977
Degree: M.S. Applied Mechanics
Area: Solid Mechanics

University of Cincinnati - 1971 to 1976
Degree: B.S. Engineering Science
Area: Engineering Mechanics

2. RESEARCH AND PROFESSIONAL EXPERIENCE

2013 – Present Associate Dean of Graduate Studies
Francis College of Engineering
University of Massachusetts at Lowell, Lowell, MA

2002 – Present Professor of Mechanical Engineering
University of Massachusetts at Lowell, Lowell, MA

1993 – 2002 Associate Professor of Mechanical Engineering
University of Massachusetts at Lowell, Lowell, MA

1986 – 1993 Assistant Professor of Mechanical Engineering
University of New Hampshire, Durham, NH

- Summer 1989, June 1990, June 1991, June 1992 and July 1995
 Visiting Scientist
 Wright-Patterson AFB Materials Directorate, Dayton, OH
- Conducted on-site research developing and using computational models for investigating the mechanical behavior of advanced material systems.
- Summer 1988, Visiting Scientist
 Wright-Patterson AFB Flight Dynamics Directorate,
 Dayton, OH
- Conducted on-site research developing and using computational models for investigating pressure distributions at the tire-wheel interface.
- 1982 – 1986 Graduate Research and Teaching Assistant
 University of Cincinnati, Cincinnati, OH
- Teaching Assistant:* Independently taught undergraduate and graduate courses in Aerospace Engineering and Applied Mechanics, including dynamics, matrix structural analysis, strengths of materials, experimental stress and elasticity.
- Research Assistant:* Developed a computational model for investigating the mechanical behavior of high-temperature superalloys, which are used for aircraft engine disks and airfoils.
- 1979 – 1982 Advanced Stress Engineer
 B.F. Goodrich Aerospace, Troy, OH
- 1977 – 1979 Analytical Engineer
 Pratt and Whitney Aircraft, East Hartford, CT
- 1976 – 1977 Graduate Teaching Assistant
 University of Cincinnati, Cincinnati, OH
- Independently taught undergraduate courses in analog computers, engineering drawing and FORTRAN programming.
- 1972 – 1976 Engineering Co-op Student
 Electric Furnace Co., Salem, OH

B. PROFESSIONAL ACTIVITIES

1. Professional Association Memberships

International Sports Engineering Association (ISEA)

ESAForm (The European Scientific Association for material FORMing)

American Society for Testing and Materials (ASTM)

Member of ASTM Committee F08 on Sports Equipment and Facilities

Member of ASTM Sub-Committee F08.26 on Baseball and Softball
Equipment

Proactive member of ASTM in the formulation of test standards for sporting goods. I have played a key role in the development of test standards for bats and balls and for the enforcement of those standards.

American Society of Mechanical Engineers (ASME)

Member of ASME Joint Applied Mechanics Div.-Materials Div. Committee
on Constitutive Equations

Past Member of the ASME Northern New England Region Executive
Committee

American Society of Engineering Education (ASEE)

Sigma Xi Scientific Research Society (ΣX)

American Society of Composites (ASC)

2. Professional Registration

Registered Professional Engineer in Ohio (E-047390)

Registered Professional Engineer in New Hampshire (7929)

3. Manuscript Reviewer

Sports Engineering

Journal of Sports Sciences

Journal of Engineering Materials and Technology

Journal of Composites

International Journal of Modelling and Simulation

AIAA Journal of Aircraft

Polymer Engineering and Science

ASCE Journal of Engineering Mechanics

Journal of Porous Materials

International Journal of Forming

Journal of Sports Engineering and Technology

Journal of Composite Materials Part A

Journal of Composite Materials Part B

4. Grant Proposal Reviewer

National Science Foundation
National Institutes of Health

5. Editor-in-Chief

Journal of Sports Engineering and Technology

C. RESEARCH

Grants & Contracts

In Preparation

Project Title	Source of Support	Award Amount and Period	%	Investigators/ Partners
Fibers and Textiles NNMI	NNMI Program	\$75M (Federal) + Match 2016-2021	TBD	UMass Lowell Georgia Tech NC State

Pending

Project Title	Source of Support	Award Amount and Period	%	Investigators
Concussion Prevention and Diagnosis Workshop	National Science Foundation	\$15,100 2015-16	25%	Sherwood (PI, 25%) Wang (25%) Moore (UMass Med) (50%)
AIRTECH -- Airdrop Innovative Research and TECHNOLOGIES	US Army Natick Soldier Research Development and Engineering Center	\$3,417,7282 015-20	12.5%	Amirkhizi (12.5%) Chakrabarti (12.5%) Driscoll (12.5%) Hansen (12.5%) Nagarajan (12.5%) Niezrecki (12.5%) Sherwood (12.5%) Willis (PI, 12.5%)
Functional Fibers for Intelligent Fabrics and Advanced Composites	Mass S&T	\$150,000 2015-16	30%	Sherwood (PI, 30%) Johnston (35%) Hansen (35%)
Prevention and Diagnosis of Concussions	Mass S&T	\$140,000 2015-16	25%	Sherwood (PI, 25%) Wang (25%) Moore (UMass Med) (50%)

Ext: Study of Baseball Compliance and Specifications	Major League Baseball	\$86,436 2011-16	100%	Sherwood (PI,100%)
Ext: Study of Protective Head Gear	Major League Baseball	\$46,200 2012-15	100%	Sherwood (PI,100%)
Fabric Mechanical Characterization Study	Albany Engineered Composites	\$15,300 2015	100%	Sherwood (PI,100%)
AFP (Automatic Fiber Placement) Physics-Based Process Models	NASA + Aurora Flight Sciences	\$450,000 2015-17	100%	Sherwood (PI,100%)

Funded

Project Title	Source of Support	Award Amount and Period	%	Investigators
Design for Composite Wind Turbine Blades	NSF WindSTAR I/UCRC	\$65,208 2014-15	60%	Sherwood (PI, 60%) Frank (Iowa St. 40%)
Youth baseball bat study using new test procedure	Rawlings Sporting Goods	\$65,208 2014-15	100%	Sherwood (PI,100%)
Wood-Composite Bat Evaluation for Short Season Use	Baum Bat Co.	\$13,880 2015	100%	Sherwood (PI,100%)
Bat Reinforcement Durability Study	Progressive Tool	\$5200 2014-15	100%	Sherwood (PI,100%)
Material Characterization of Composites	XCraft	\$625 2015	100%	Sherwood (PI,100%)
Design of a Test to Quantify Fabric Resistance to Insect Bites	Natick HEROES	\$99,878 2015-16	100%	Sherwood (PI,100%)
Modeling the Forming Process Used in the Fabrication of Combat Helmets	Natick HEROES	\$212,000 2013-16	100%	Sherwood (PI,100%)
Multi-Mode Energy Absorption for Helmet Low-Velocity Impact Protection	Natick HEROES	\$241,110 2015-16	60%	Sherwood (60 %) Orbey (40 %)
Facilitating Industry By Engineering, Roadmapping and Science (FIBERS) to Advance U.S. Manufacturing of Composites	NIST	\$496,439 2014-16	20%	UMass Lowell U Delaware RPI U New Hampshire Iowa State U

Study Simulating Different Profiles in Taper Region of Bats	Major League Baseball	\$140,000 2014-15	100%	Sherwood (PI,100%)
Collaborative Research: I/UCRC for Wind Energy, Science, Technology, and Research (WindSTAR)	NSF + Company Members	\$484,649 2014-19	16%	Niezrecki (PI, 20%) Avitabile (16%) Sherwood (16%) Hansen (16%) Willis (16%)
Study of Protective Headgear	MLB	\$169,375 2012-15	100%	Sherwood (PI,100%)
NFHS Baseball Coefficient of Restitution Testing	Worldplay Sport, LLC	\$1035 2013-14	100%	Sherwood (PI,100%)
Tensile Testing of Glass Samples	UTC AEROSPACE SYSTEMS	\$300 2013	100%	Sherwood (PI,100%)
NFHS Soccer Ball Testing	St. Thomas F.C.	\$500 2013-14	100%	Sherwood (PI,100%)
Durability of European Beech Baseball Bats	Mine Bats	\$12,370 2013	100%	Sherwood (PI,100%)
Study of Fabric Bending Stiffness	MIT	\$3000 2013	100%	Sherwood (PI,100%)
Taber Abrasion Testing	UFP	\$1000 2013	100%	Sherwood (PI,100%)
Golf Ball Putting – Experimental Friction and Finite Element Simulation Analysis	ABS	\$9200 2013-14	100%	Sherwood (PI,100%)
Mechanical Characterization of a Material for its Friction and Tensile Properties	Aurora Flight Sciences	\$1930 2013	100%	Sherwood (PI,100%)
Study of the Effects of a One-Piece Bat Handle Grip for Wood Bats	Tater Grip	\$10,800 2013	100%	Sherwood (PI,100%)
SEP Collaborative: Achieving a Sustainable Energy Pathway for Wind Turbine Blade Manufacturing	National Science Foundation	\$1,510,000 + \$175,000 2012-16	14%	Niezrecki (PI, 20%) Avitabile (14%) Sherwood (14%) Reynaud (14%) Malloy (14%) Turcotte (14%) Schmidt (14%)
Collaborative Research: Planning Grant: I/UCRC for Wind Energy, Science, Technology, and Research (WindSTAR)	National Science Foundation	\$14,500 2012-13	16%	Niezrecki (PI, 20%) Avitabile (16%) Sherwood (16%) Hansen (16%) Willis (16%)

9 th Conference of the International Sports Engineering Association	ISEA	~\$200,000 2012	100%	Sherwood (PI,100%)
Performance and Construction of NFHS Baseballs	NFHS (National Federation of High Schools)	\$9,238	100%	Sherwood (PI,100%)
Inertial, Physical and BBCOR Performance Testing with Accelerated Break-In (ABI)	Under Armor	\$15,750 2012-13	100%	Sherwood (PI,100%)
Study of Baseball Compliance and Specifications	Major League Baseball	\$166,771 2011-14	100%	Sherwood (PI,100%)
Flowform Bat Project	Dynamic Flowform Corp	\$12,500 2012	100%	Sherwood (PI,100%)
Study and Compare Wood-Composite Bat Design	Rawlings Sporting Goods	\$11,000 2012	100%	Sherwood (PI,100%)
Aluminum Bat Coating Performance	U.S. Chrome Corp.	\$2,001 2012		Sherwood (PI,100%)
Mizuno Durability Study – Repeated Impacts	Mizuno USA	\$3,450 2012	100%	Sherwood (PI,100%)
Study of the Taper Durability of Bats	Marucci Sports	\$5,200 2012	100%	Sherwood (PI,100%)
Performance and Durability Study of a Laminated Baseball Bat	Rutland Plywood Corp.	\$1500 2011-12	100%	Sherwood (PI,100%)
Study to Develop a Protocol for Adopting New Wood Species for Listing in the Wooden Baseball Bat Supplier Regulations	Major League Baseball	\$141,250 2011-13	100%	Sherwood (PI,100%)
Study of Durability Improvement for Wood Baseball Bats	Major League Baseball	\$28,810 2012-13	100%	Sherwood (PI,100%)
Automotive Lightweight Composite Structures with Embedded Communications	Nat'l Center for Mfg Sciences (NCMS) / DOE	\$110,774 2010-12 + \$68,000 2012-13	100%	Sherwood (PI,100%)
2011 Wind Energy Research Workshop	National Science Foundation	\$20,000 2011-12	16%	Niezrecki (PI, 20%), Avitabile (16%), Sherwood (16%), Reynaud (16%), Willis (16%), Turcotte (16%)

Development of a Baseball Bat through Characterization of Barrel Section Properties	PlastiComp	\$104,993 2011-12	100%	Sherwood (PI,100%)
Effect of Environmental Conditions on Batted-Ball Performance	Major League Baseball	\$30,000 2011-12	100%	Sherwood (PI,100%)
An Experimental and Finite Element Study of the Relationship between a Softball and the Feel of a Softball Bat	Combat Sports	\$70,000 2011-13	100%	Sherwood (PI,100%)
NCAA Baseball Bat Research and Certification	NCAA <i>et al.</i>	\$2,022,104 2006-11	100%	Sherwood (PI,100%)
Comparison of a Composite Wood Bat to a Solid Wood Bat for use in Minor League Baseball	DeMarini (A division of Wilson Sports)	\$11,000 2011	100%	Sherwood (PI,100%)
The Brown University Batting Cage Bat Performance Study	USA Baseball	\$20,000 2011	100%	Sherwood (PI,100%)
Accelerated Break-in Study of Little League Youth Composite Bats	Little League Baseball	\$20,000 2010	100%	Sherwood (PI,100%)
Wind and Clean Energy Initiative to Build Collaboration and Cluster Competitiveness	2010 Science &Technology Initiatives Fund (MA)	\$110,000 2010-2011	20%	Niezrecki (PI,20%), Avitabile (20%), Sherwood (20%) Turcotte (20%), Willis (20%)
Studies of Baseball Bat Characterization, Modeling and Construction	PlastiComp	\$20,000 2010-11	100%	Sherwood (PI,100%)
Baseball Bat Durability	Major League Baseball	\$230,560	100%	Sherwood (PI,100%)
Effect of Manufacturing-Induced Defects on Reliability of Composite Wind Turbine Blades	Dept of Energy (DOE)	\$499,000 2009-11	25%	Niezrecki (25%), Avitabile (25%), Sherwood (25%), Willis (20%), Turcotte (20%)
Invention of Potential Durability Improvements for Chemical Treated Baseball Bat	Pioneer Industrial Corp.	\$9800 2009-11	100%	Sherwood (PI,100%)

Study of Comparative Performances and Other Properties of Solid Wood Barrel	MetalWood Bat Co.	\$8450 2009-10	100%	Sherwood (PI,100%)
Drape Analysis of SMC Structural Parts	USCAR ACC	\$42,875 2008-09	90%	Chen (PI, 10%) Sherwood (90%)
Collaborative International Research to Explore a Global Bat-Performance Standard	All Japan Baseball Bat Industry Association	\$10,000 2007	100%	Sherwood (PI,100%)
MRI: Acquisition of a 3D Scanning Laser Vibrometer	National Science Foundation	\$491,575 2007	20%	Niezrecki (PI 20%) Chen (20%) Avitabile (20%) Kurup (20%) Sherwood (20%)
Study to Investigate a Special Maple and Birch Woods for Wood Baseball Bat Design	BatCo	\$15,000 2006-07	100%	Sherwood (PI,100%)
Investigation of the Durability of Youth AI Baseball Bat Designs	PowerMetal Technologies	\$3400 2006	100%	Sherwood (PI,100%)
Experimental Characterization of Aluminum Alloy Tubes	AICan	\$13,888 2006-07	100%	Sherwood (PI,100%)
Durability Study to Investigate a new Composite Design for Softball Bats,"	Excel OYJ	\$1600 2006-07	100%	Sherwood (PI,100%)
Linking Process-Induced Properties to Thermoplastic-Matrix Woven-Fabric Composites Performance	National Science Foundation	\$360,000 plus \$18,000 REU Award 2005-09	70%	Sherwood (PI, 70%) Chen (15%) Gorbatikh (15%)
Comparison of the 2003 NCAA Baseball Bat Certification Protocol and the ASTM High-Speed Baseball Standard	NCAA	\$110,887 2005-06	100%	Sherwood (PI,100%)
Design and Testing of a Revolutionary Helmet	Xenith	\$100,000 2005-06	50%	Sherwood (PI,50%) McCarthy (50%)

Laboratory and Field Experimental Investigations of the Relationship of Bat Properties on Batted-Ball Performance	Rawlings Sporting Goods	\$25,000 2005-06	100%	Sherwood (PI,100%)
Multifunctional Composites	NASA SBIR Phase II with EIC Labs	\$136,268 2004-06	30%	Chen (PI, 30%) Avitabile (30%)
Experimental Investigation of Wood Baseball Bat Durability	Major League Baseball	\$109,017 2004-05	100%	Sherwood (PI,100%)
Comparison Testing of the Regular Season and World Series Baseballs for 2003, 2004 and 2005	Major League Baseball	\$23,964 2003-05	100%	Sherwood (PI,100%)
Honeycomb Compression and Crush Tests	KaZaK Composites	\$1160 2004	100%	Sherwood (PI,100%)
Testing of Carbons	Triton	\$4125 2004	100%	Sherwood (PI,100%)
Design of an Attachment Insert for a Balsa-Core Composite Pan	Office of Naval Research STTR with KaZaK Composites	\$120,000 2003-2004	100%	Sherwood (PI,100%)
Evaluation of the Regular Season Minor League Baseballs	Major League Baseball	\$20,601 2003	100%	Sherwood (PI,100%)
Provide Strength and Stiffness Evaluation of Laminated and Pultruded Glass-Vinyl Ester and Hybrid Glass/Graphite-Vinyl Ester Composites	KaZaK Composites	\$3500 2003	100%	Sherwood (PI,100%)
Evaluate the Structural Performance of a US Navy Equipment Mounting Adapter System	KaZaK Composites	\$1500 2003-04	100%	Sherwood (PI,100%)
Perform Tensile and 4-Point Bend Tests	KaZaK Composites	\$4200 2003-04	100%	Sherwood (PI,100%)
Carbon and Ceramic Foam Compression Test	KaZaK Composites	\$2500 2003-04	100%	Sherwood (PI,100%)
Short Beam Shear Tests on Boron Epoxy Tape	Specialty Materials	\$1625 2003	100%	Sherwood (PI,100%)
PTC Collaborative Learning and Reference Center - Lowell Campus	Parametric Technologies	\$25,000 2003-2004	100%	Vedula (PI), Sherwood (100%)
Test Program for Composite Materials	KaZaK Composites	\$15,700 2003-05	100%	Sherwood (PI,100%)

Collaborative Research: Enhancing the Understanding of the Fundamental Mechanisms of Thermostamping Woven Composites to Develop a Comprehensive Design Tool	National Science Foundation	\$158,000 plus \$12,000 REU award 2003-07	100%	Sherwood (PI,100%)
Investigation of the Relationship among Wood Bat Performance, Material Choice and Manufacturing Process	Major League Baseball	\$39,768 2002	100%	Sherwood (PI,100%)
NCAA 32-in and 33-in Baseball Bat Research	NCAA	\$25,000 2002	100%	Sherwood (PI,100%)
Continuation of the Major League Baseball Studies	Major League Baseball	\$10,707 2002	100%	Sherwood (PI,100%)
NCAA Baseball Bat Research	NCAA	\$62,384 2000-01	100%	Sherwood (PI,100%)
NCAA Baseball Bat Research	NCAA	\$16,000 2000	100%	Sherwood (PI,100%)
NCAA Baseball Bat Certification	NCAA et al.	\$1,400,000 1999-2005	100%	Sherwood (PI,100%)
NCAA Baseball Bat Research	NCAA	\$25,000 1999	100%	Sherwood (PI,100%)
NFHS Baseball Bat Research	NFHS	\$10,000 1999	100%	Sherwood (PI,100%)
NFHS Baseball Bat Research	NFHS	\$7500 1999	100%	Sherwood (PI,100%)
Composite Side Intrusion Beam	Ford Research Lab	\$27,000 1999	100%	Sherwood (PI,100%)
Modeling of Co-mingled Glass/Thermoplastic Fabrics for Low-Cost/High- Volume Composites Manufacturing	National Science Foundation GOALI (w/ Ford Motor Company)	\$257,000 1998-2001	50%	Chen (PI, 50%) Sherwood (50%)
Establishment of a Baseball Research Center	Major League Baseball and Rawlings Sporting Goods	\$400,000 1998-99	100%	Sherwood (PI,100%)

Characterization of a Composite Material Air Separation System	Innovative Membrane Systems, Norwood, MA	\$20,000 1998-99	50%	Chen (PI, 50%) Sherwood (50%)
Design and Performance of Baseball Bats: Analysis & Experiment	Major League Baseball	\$16,000 1997	100%	Sherwood (PI,100%)
Design for Crashworthiness	Solectria of Wilmington, MA	\$25,000 1997-98	50%	Chen (PI, 50%) Sherwood (50%)
Experimental Testing of Wheel Wells	Solectria of Wilmington, MA	\$25,000 1997-98	50%	Chen (PI, 50%) Sherwood (50%)
WWW Based Instruction and Survey of Finite Element Methods	UMASS PD Grant, Instructional Technology for Academic Development, Account #541063	\$4000 1997-98	100%	Sherwood (PI,100%)
Assuring the Structural Integrity and CAD Documentation of the Sunrise Vehicle	Solectria of Wilmington, MA	\$75,000 1996-97	100%	Sherwood (PI,100%)
Product Realization Curriculum Support	NSF Engineering Academy of Southern New England	\$82,000 1995-96	30%	Kyros (PI, 40%), Smith (30%) Sherwood (30%)
Design for Manufacturing and Crashworthiness	Solectria of Wilmington, MA, and Northeast Alternative Vehicle Consortium/ ARPA	\$50,000 1995-96	100%	Sherwood (PI,100%)
FMVSS (Federal Motor Vehicle Safety Standard) 201/208 Instrument Panel Program	Davidson- Textron of Dover, NH	\$100,000 1994-96	100%	Sherwood (PI,100%)
The Effects of Hull Cuts on the Circularity and Structural Integrity of a Submersible Pressure Vessel (99 Service Units)	Pittsburgh Super Computing Center	Estimated Value: \$24,750 in CPU Time 1993-94	100%	Sherwood (PI,100%)
The Effects of Hull Cuts on the Circularity and Structural Integrity of a Submersible Pressure Vessel (10 Service Units)	Pittsburgh Super Computing Center	Estimated Value: \$2500 in CPU Time 1993	100%	Sherwood (PI,100%)

Constitutive Modeling of Metal Matrix Composites	AFOSR/NASA/Ohio Aerospace Institute	\$252,200 1991-93	100%	Sherwood (PI,100%)
Aircraft Tire/Wheel Interface Load Measurement	AFOSR	\$264,287 (1991-93)	70%	Sherwood (PI,70%) (with UNH Professors Fussell, Gross and Watt)
Optimization of the Manufacturing Process of a Titanium Aluminide Metal Matrix Composite Using a Viscoplastic Constitutive Theory	Engineering Foundation (ASME) and AFOSR	\$20,000 1990-91	100%	Sherwood (PI,100%)
Aircraft Tire/Wheel Interface Load Measurement	AFOSR	\$69,000 1990-91	70%	Sherwood (PI,70%) (with UNH Professors Fussell, Gross and Watt)
The Effects of Hull Cuts on the Circularity and Structural Integrity of a Submersible Pressure Vessel (10 Service Units)	Pittsburgh Super Computing Center	Estimated Value: \$2500 in CPU Time 1990	100%	Sherwood (PI,100%)
Investigation of the Thermomechanical Response of a Titanium Aluminide/Silicon Carbide Composite Using a Unified State Variable Model and the Finite Element Method	NSF Super Computing Center at UIUC	, 50 Service Units (Estimated Value: \$12,500 in CPU Time) 1990-92	100%	Sherwood (PI,100%)
Predicting the Impact Response of Energy Absorbing Urethane Foam	Davidson- Textron of Dover, NH	\$20,000 1989-90	100%	Sherwood (PI,100%)
Investigation of the Thermomechanical Behavior of a Titanium Aluminide Metal Matrix Composite Using a Viscoplastic Constitutive Model	AFOSR	\$20,000 1989-90	100%	Sherwood (PI,100%)
Development of an Aircraft Tire/Wheel Interface Model for Flange/Beadseat Contact Loads	AFOSR	\$20,000 1988-89	100%	Sherwood (PI,100%)

Publications

Journal Articles

1. Bielmeier C., **Sherwood J.** 2015. "Review of Stab and Slash Testing Standards on Woven Fabric for the Development of Flexible Personal Protection Equipment." *Textile Research Journal*, (in preparation).
2. Bielmeier C., **Sherwood J.** 2015. "Meso- and Micro-Finite Element Model Development of Sewing Needle Penetration into E-glass Tow." *Textile Research Journal*, (in preparation).
3. Bielmeier C., **Sherwood J.** 2015. "Meso- and Micro-Finite Element Model Development of Sewing Needle Penetration into E-glass Section of Fabric." *Textile Research Journal*, (in preparation).
4. **Sherwood J.**, Cao J., Boisse P., Willems A., Akkerman R., Harrison P., Leutz D., Fetfatsidis K., Peng X.Q., Khan M., Mabrouki T., Lomov S.V., Vanclooster K., Bel S., Chen J., Lee W., Mitchell C. 2015. "Benchmark Study of Finite Element Models for Simulating the Thermoforming of Woven-Fabric Reinforced Composites." *Composites Part A: Applied Science and Manufacturing*, (in preparation).
5. Fallon L., **Sherwood J.** "Quantifying the Whip-Action of a Wood Composite Baseball Bat." *Journal of Sports Engineering and Technology*, (in preparation).
6. Mitchell C., Dangora L., Bielmeier C., **Sherwood J.** 2015. "Investigation into the Changes in Bending Stiffness of Textile Reinforced Composite as a Consequence of In-Plane Fabric Shear Resulting from Manufacturing." *Composites Part A: Applied Science and Manufacturing*, (submitted).
7. Dangora L., Mitchell C., **Sherwood J.** 2015. "Predictive Model for the Detection of Out-of-Plane Defects Formed during Textile-Composite Manufacture." *Composites Part A: Applied Science and Manufacturing*, (submitted).
8. Mitchell C., Fetfatsidis K., Gorczyca J., **Sherwood J.** 2015. "Material Characterization and Discrete Mesoscopic Modeling of Composite Materials for Wind Turbine Blades." *Journal of Composites Part A: Applied Science and Manufacturing*, (submitted).
9. Niezrecki C.; Avitabile P., Chen J., **Sherwood J.**, Lundstrom T., LeBlanc B., Hughes S., Desmond M., Beattie A., Rumsey M., Klute S.M., Pedrazzani R., Werlink R., Newman J. 2014. "Inspection and Monitoring of Wind Turbine Blade-Embedded Wave Defects During Fatigue Testing." *Structural Health Monitoring*. 13(6):629-643.
10. LeBlanc B., Niezrecki C., Avitabile P., Chen J., **Sherwood J.** 2013. "Damage Detection and Full Surface Characterization of a Wind Turbine Blade Using Three-Dimensional Digital Image Correlation." *Structural Health Monitoring*. 12(5-6):430-439. doi: 10.1177/1475921713506766
11. Fetfatsidis K.A., Jauffrès D., **Sherwood J.A.**, Chen J. 2013. "Characterization of the

- Tool/Fabric and Fabric/Fabric Friction for Woven-Fabric Composites During the Thermoforming Process.” *International Journal of Forming*. 6(2):209-221.
12. Fetfatsidis K.A., Gamache L. M., Gorczyca J. L., **Sherwood J.**, Jauffrès D., Chen J. 2013. “Design of an Apparatus for Measuring Tool/Fabric and Fabric/Fabric Friction of Woven-Fabric Composites During the Thermoforming Process.” *International Journal of Forming*. 6(1):1-11.
 13. **Sherwood J.**, Fetfatsidis K., Winchester D., Jauffrès D., Avitabile P., Chen J. 2013. “Using Modal Analysis to Investigate the Validity of Finite Element Models for Simulating the Thermoforming of Woven-Fabric Reinforced Composites.” *International Journal of Material Forming*. 3(1 Suppl):687-690.
 14. Sargent J., Chen J., **Sherwood, J.**, Cao J., Boisse P., Willem A., Vanclooster K., Lomov S.V., Khan M., Mabrouki T., Fetfatsidis K., Jauffrès D. 2010. “Benchmark Study of Finite Element Models for Simulating the Thermoforming of Woven-Fabric Reinforced Composites.” *International Journal of Material Forming*. 3(1 Suppl):683-686.
 15. Jauffrès D., Morris C.D., **Sherwood J.**, Chen J. 2009. “Simulation of the Thermoforming of Woven Composites: Determination of the Tensile and In-Plane Shearing Behaviors.” *International Journal of Material Forming*. 2(1 Suppl):173-176.
 16. Jauffrès D., **Sherwood J.A.**, Morris C. D., Chen J. 2009. “Discrete Mesoscopic Modeling for the Simulation of Woven-Fabric Reinforcement Forming.” *International Journal of Forming*. 3(2 Suppl):1205-1216.
 17. Lee, W., Padvoiskis, J., Cao, J., de Luycker, E., Boisse, P., Morestin, F., Chen, J., Sherwood, J. 2008. “Bias-Extension of Woven Composite Fabrics.” *International Journal of Material Forming*. 1(1 Suppl):895-898.
 18. Cao J., Akkerman R., Boisse P., Chen J., Cheng H.S., de Graaf E.F., Gorczyca J.L., Harrison P., Hivet G., Launay J., Lee W., Liu L., Lomov S.V., Long A., de Luycker E., Morestin F., Padvoiskis J., Peng X.Q., **Sherwood J.**, Stoilova Tz., Tao X.M., Verpoest I., Willems A., Wiggers J., Yu T.X., Zhu B. 2008. “Characterization of Mechanical Behavior of Woven Fabrics: Experimental Methods and Benchmark Results.” *Composites Part A: Applied Science and Manufacturing*, 39(6):1037-1053.
 19. Pawan P., Gorbatikh L., **Sherwood J.** 2008. “Properties of Rigid-Line Inclusions as Building Blocks of Natural Composites.” *Composites Science and Technology*. 68(10-11):2267-2272.
 20. Morris C.D., **Sherwood J.**, Chen J., Cao J. 2008. “An Experimental Investigation of the Fabric/Tool and Fabric/Fabric Friction During the Thermoforming Process.” *International Journal of Material Forming*. 1(1 Suppl):927-927.
 21. Gorczyca J., **Sherwood J.**, Chen J. 2007. “A Friction Model for Thermoforming Commingled Glass-Polypropylene Woven Fabrics.” *Composites Part A: Applied Science and Manufacturing*. 38(2):393-406.
 22. Liu L., Chen J., Li X., **Sherwood J.** 2005. “Two-Dimensional Macro-Mechanics

- Shear Models of Woven Fabrics." *Composites Part A: Applied Science and Manufacturing*. 36(1):105-114.
23. Gorczyca J., **Sherwood J.**, Chen J. 2005. "A Friction Model for use with a Commingled Fiberglass-Polypropylene Plain-Weave Fabric and the Metal Tool During Thermoforming." *European Finite Element Review*. 14(6-7):729-751.
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 98. **Sherwood J.A.**, Boyle M.J. 1990. "Investigation of the Thermomechanical Response of a Titanium-Aluminide/Silicon Carbide Composite Using a Unified State Variable Model and the Finite Element Method." *Microcracking Induced Damage in Composites*. ASME AMD- 111.
 99. **Sherwood J.A.**, Stouffer D.C. 1986. "A Constitutive Model with Damage for High-Temperature Superalloys." *NASA CP-10010, 3rd Symposium Nonlinear Constitutive Relations for High-Temperature Applications*. June 11-13, 1986. Akron, Ohio.

Books

Materials in Sports Equipment Vol. 2, 2007, Chapter 6: Design and Materials in Baseball by J. Sherwood and P. Drane, edited by A. Subic, Woodhead Publishing.

Composite reinforcements for optimum performance: fundamentals, properties and modeling, 2011, Chapter 17: Friction properties of composite reinforcements, by J.L. Gorkczyca, K.A. Fetfatsidis and J.A. Sherwood, edited by P. Boisse, Woodhead Publishing.

Manufacturing techniques for polymer matrix composites (PMC), 2012, Chapter 6: Fabric thermostamping in polymer matrix composites, by J.A. Sherwood, K.A. Fetfatsidis and J.L. Gorkczyca, University of Massachusetts Lowell, USA; L. Berger,

General Motors Research and Development Center, USA. Edited by S.G. Advani and K.T. Hsiao, Woodhead Publishing.

Recent Advances in Composite Materials for Wind Turbines Blades, 2013, by K. A. Fetfatsidis and J. A. Sherwood, Chapter 3: Process Simulations for Predicting Quality of Composite Wind Turbine Blades, Edited by Dr. Brahim Attaf, The World Academic Publishing Co., Ltd, ISBN 978-0-9889190-0-6

Research Labs

- Baseball Research Center. Director and Founder. (1999-Present)
- Advanced Composites and Textile Research Lab. Co-Director with Professors Julie Chen and Emmanuelle Reynaud. (1994-Present)

Media and other Honors

The quality of my research has been recognized nationally and internationally through invitations to speak and to serve on advisory panels, as well as the following honors:

- Invited to be a visiting scientist at Air Force Wright Research Labs in Dayton, OH.
- Invited to help organize sessions and referee conference papers for the Bi-Annual International Conference of Sports Engineering (Australia 2000; Japan 2002; United States 2004; and Germany 2006).
- Invited to serve on the Editorial Boards of the Journal of Sports Engineering and International Journal of Modeling and Simulation.
- Invited to serve on proposal review panels for the National Science Foundation and National Institute of Health.
- Invited by the NCAA and the NFHS in 1998 to be an independent scientist to assist in the understanding of the physics associated with the bat/ball collision and in the development of a scientifically defensible rule to control batted-ball speeds and maintain the safety and integrity of collegiate and high-school baseball. I continue to be a scientific consultant to these governing bodies.
- Invited to participate in a segment of PBS's "Scientific American Frontiers" hosted by Alan Alda and presented the scientific work that is performed at the UMLBRC. The March 2002 episode entitled "On the Ball" also showcased the UMass Lowell Baseball Team helping perform some tests.
- Invited to co-host an Electronic Field Trip with Baseball Hall for Famer Ozzie Smith. The Field Trip entitled "Fastballs, Flips and Physics – Science on the

Sandlot” was seen live by millions of students in grades 6 -12 in February 2004 and can be seen online at:

http://ali.apple.com/ali_sites/ali/exhibits/1001207/The_Field_Trip.html . The program was organized by the Baseball Hall of Fame.

- The UMLBRC attracted national attention when it completed the 2000 study for MLB to investigate the “juiced” baseball. As a result of these high profile topics, my research team and I appeared on national TV and several radio talk shows and in numerous newspapers across the country.
- In July 2004, September 2006 and June 2010, was invited by MLB to visit the Rawlings factory in Costa Rica as a scientific consultant to evaluate the manufacturing process for the major league baseball.
- In September 2007, was invited by MLB to visit the factory in China as a scientific consultant to evaluate the manufacturing process for the minor league baseball.
- In 2001, invited to speak at the Massachusetts Professional Engineer’s meeting about my baseball research. Dean Kamen and Robert Reich were the other two speakers at this meeting.
- Invited to speak at the national meeting of the Society for American Baseball Research held in Boston in June 27-30, 2002.
- Invited to participate in the National Geographic special the “Science of Summer” that aired in July 2007.
- Invited to participate in the PBS Wired Science program that aired in October 2007.
- Featured in ESPN Magazine for compliance testing of Major League Baseball.
- Numerous interviews with Boston Globe, Lowell Sun, Nashua Eagle-Tribune and other local newspapers for baseball research.
- Engineering Curricula: A University-Industry Workshop – Cornell University, Ithaca, NY – July 22-23, 2011. Cornell University hosted a university-industry workshop on the integration of simulation technology into engineering curricula. This workshop was targeted at engineering faculty who use or would like to use simulation technology in their courses and projects. I was an invited speaker and gave a presentation on the integration of finite element projects into 22.212 Strength of Materials and 22.311 Applied Strengths.
- Invited keynote speaker at the 6th New Hampshire Joint Engineering Societies Annual Conference – Bedford, NH – October 4, 2012.
- Invited keynote speaker at the Maine Engineers Week Expo banquet, – Portland, ME – March 1, 2013.
- NESN (New England Sports Network) Clubhouse
Participated in several three-minute videos with a crew from NESN for use in a Sunday Red Sox pre-game program for children. In each video, a baseball science

question is answered. The videos will air in summer 2014. These videos relate directly to the research being performed in UML Baseball Research Center.

D. SERVICE ACTIVITIES

College of Engineering and University

- University Innovation Research Committee (January 2015 - Present)
- University Economic Development Committee (February 2015 - Present)
- University Academic Technology Committee (May 2013 - Present)
- Transformational Education Committee (2011 - Present)
- All-Campus Telecommunications Task Force for Computing (1995-97)
- College of Engineering Committee for College Computing (1995-1999, 2004-Present) and Chair (2008-present)
- Senator (2002-2013)
- Graduate Policy and Affairs Committee (2005-2013) , Chair (2008-2013)
- NEASC (2011-13) Co-chair of Graduate Programs
- Computer Replenishment Program Committee (University) (March 2012 to present)
- Search Committee for Dean of Graduate School of Education (January-April 2012)

Department

- Graduate Chairman (1994-1999)
- Graduate Admissions Committee (1994-2005)
- Department Webmaster (1994-2001)
- Formula SAE Car Advisor (1995-1997, 2004-2008)
- Lab Committee (2004-Present)
- Solids Curriculum Committee and Chair (2005-Present)

- Pi Tau Sigma (Mechanical Eng'g Honor Society) Faculty Advisor (1999-Present)
- Page Turner for World's Largest Book (10 ft. x 14 ft.) Faculty Advisor (2007-08)
- Faculty search committees

E. Instructional Related Activity

Awards:

- Teacher of the Year for Mechanical Engineering (1996-97)
- E-Council Teacher of the Year for Mechanical Engineering (1998 and 1999)
- Teacher of the Year in the UMass Lowell College of Engineering given by the UML Francis College of Engineering Honor Societies, April 28, 2014

Have taught a range of courses in design and mechanics at both the undergraduate and graduate levels.

Department of Mechanical Engineering - Associate Professor and Full Professor
1993 to Present
University of Massachusetts at Lowell

Introduction to Engineering II
Mechanical Behavior or Materials
Mechanical Design I (Design of Linkages)
Mechanical Design II (Design of Cams and Gears)
Mechanics of Materials (Strength of Materials)
Applied Strengths
Finite Element Analysis
Applied Finite Element Analysis (an online course)
Non-Linear Finite Element Analysis
Plates and Shells
Finite Element Analysis of Composites

Department of Mechanical Engineering - Assistant Professor
1986 to 1993
University of New Hampshire

Intro to Statics and Dynamics (Service Course to Elec Eng'g)
Mechanics I (Statics)
Mechanics II (Strength of Materials)
Mechanics III (Particle and Rigid Body Dynamics)
Introduction to Microcomputers
Advanced Mechanics of Solids
Introduction to Finite Elements
Nonlinear Finite Element Techniques
Theory of Plasticity
Theory of Plates and Shells
Math Methods in Engineering Science II

Department of Aerospace Eng'g and Eng'g Mechanics - Graduate Student
1982 to 1986
University of Cincinnati

Engineering Mechanics II (Particle Dynamics)
Engineering Mechanics III (Rigid Body Dynamics)
Structures II and Laboratory
Matrix Structural Analysis
Experimental Stress Analysis & Laboratory
Theory of Elasticity

Department of Engineering Science - Graduate Student
1976 to 1977
University of Cincinnati

Introduction to FORTRAN Programming
Analog Computers
Engineering Graphics

Graduate Students

Completion Date	Name	Degree	Title
In Progress 2018 (estimated)	Patrick Drane	PhD	Improved Helmet Suspension Systems and mTBI Protection
In Progress 2018 (estimated)	Bradford Olsen	PhD	Parachute Suspension Line Braid Architecture and the Resulting Fluid-Structure Interaction
In Progress 2018 (estimated)	Matteo Polcari	PhD	Design for Composite Wind Turbine Blade Manufacturing
In Progress 2017 (estimated)	Joshua Fortin-Smith	PhD	Investigation of the Relationship among Wood Species and Bat Profile on Bat Durability in Major League Baseball
In Progress 2016 (estimated)	Christie Bielmeier	PhD	From Knives to Insects — A Study of Fabric Micromechanical Behavior Due To Impactors
In Progress 2016 (estimated)	Mohamad Eydani Asl	PhD	Methods for the Subcomponent Testing of Composite Wind Turbine Blades Co-Advising with Chris Niezrecki
In Progress 2016 (estimated)	Robert Kirkwood	PhD	Sustained CAD Integration: A Proposed Method to Resolve Deficiencies Related to Data Export/Import
In Progress 2015 (estimated)	Lisa Dangora	PhD	A Discrete Mesoscopic Finite Element Model for Investigating the Flexural Behavior of Textiles during Composite Manufacturing
In Progress 2015 (estimated)	Cynthia Mitchell	PhD	Modeling the Forming Process and Subsequent Cured Properties for a Textile-Reinforced Composite Material
In Progress 2015 (estimated – part-time student	William Giannetti	PhD	Formulation of a Viscoelastic Finite Element Model of the NCAA Baseball

In Progress 2015 (estimated – part-time student)	James Kremer	MS	Theoretical Constitutive Model for the Compaction of Woven Fabrics used for Thermostamping of Composites.
In Progress 2015 (estimated – part-time student)	Brian Munroe	MS	Development of a Robust Finite Element Model of the Major League Baseball Using a Layer-by-Layer Methodology
In Progress 2015 (estimated – part-time student)	Timothy Connelly	MS	Design and Performance Analysis of an Injection Molded Long-Fiber Reinforced Baseball Bat
2013	Alex Petrov	MS	Experimental and Finite Element Modeling of the Thermostamping of Prepreg Fabric-Reinforced Composites for Lightweight Automotive Structures
2013	Eric Ruggeiro	MS	Studies into the Modeling and Testing of Bat Performance and Durability
2013	Lawrence Fallon	PhD	Design and Demonstration of an Instrumented Baseball Bat for Isolation of Impact Location – A Training Tool for Improving Batter Mechanics
2013	Corey Morris	MS	Investigation of the Thermostamping of Woven Fabric Composites using LS-DYNA
2013	Jen Yee	MS	Experimental and Finite Element Modeling of the Performance of a Composite Softball Bat as a Function of Ball Type
2012	Konstantine Fetfatsidis	PhD	Simulation of the Manufacturing Process and Subsequent Structural Stiffness of a Composite Wind Turbine Blade with and without Defects

2010	Andrew Sutton	MS	Using Modal Analysis to Investigate Bat-Ball Performance of Baseball Bats
2010	Kari White	MS	Design, Analysis, and Experimental Investigation of a Robust Attachment System Kit for Naval Sandwich Panels
2010	Joshua Jones	MS	Experimental investigation of youth baseball bat performance and metrics
2010	Matthew Broe	MS	An Experimental Investigation of the Evolution of Composite Baseball Bat Performance Using Accelerated Break-in Procedures
2009	Konstantine Fetfatsidis	MS	Characterization of the fabric/tool and fabric/fabric friction during the thermostamping process for thermoplastic-matrix woven-fabric composites: Static and Dynamic
2008	Pawan Pingle	MS	Analytical Modeling of Hard Biocomposites
2007	Lisa Gamache	MS	Design of a Self-Contained Test Apparatus for the Characterization of Fabric Friction during the Thermostamping Process
2007	Nathan Gravelle	MS	Critical Comparison of Steel and Composite Beams in a Side Impact using Finite Element and Experimental Analysis
2006	Rebecca Shaw	MS	Laboratory and Field Experimental Investigations of the Relationship of Baseball Bat Properties on Batted-Ball Speed
2005	Xiang Li	DEng	Material characteristics of woven-fabric composites and finite element analysis of the thermostamping process
2004	Jennifer Gorczyca	DEng	A study of the frictional behavior of a plain-weave fabric during the thermostamping process

2004	Shintaro Nabeshima	MS	Comparison of the Performance of U.S. and Japanese Aluminum Bats Using U.S. and Japanese Test Protocols
2004	Gayatri Vedula	MS	Experimental and Finite Element Study of the Design Parameters of an Aluminum Baseball Bat
2003	Scott Weber	MS	Design and Evaluation of a Prototype Stop Collar Assembly
2003	Patrick Drane	MS	Characterization of the Effects of Use and Moisture Content on Baseball Bat Performance Using Experimental Methods
2003	Joseph Whitney	MS	Experimental characterization and dynamic simulation of a quadra link independent rear automotive suspension system
2003	Ching Pei Liang	MS	Constitutive Modeling of Energy Absorbing Foams Using LS-DYNA
2003	Timothy Mustone	MS	A Method to Evaluate and Predict the Performance of Baseball Bats Using Finite Elements
2001	Patricia Buso	MS	Finite Element Modeling of Co-Mingled Glass/Thermoplastic Fabrics for Low-Cost/High-Volume Composites Manufacturing
2000	Jennifer Gorczyca	MS	Use of computer-aided engineering and the finite element method for automobile door safety analysis
1997	Derek Rocca	MS	Application of state variable modeling and nonlinear finite element analysis to the impact of steel projectiles into thin polycarbonate lenses
1997	Michael Patterson	MS	T-jointing of Advanced Composite Laminates

University of New Hampshire			
1994	Wade Bartlett	MS Project	Experimental and Numerical Analysis of Elastic, Plastic, and Creep Response of a Cantilever Polymeric Retainer at Elevated Temperatures
1993	Thomas Harrigan	MS Project	Finite Element Investigations of the Structural Stability of Submarine Hulls
1993	Richard Doore	MS	A Methodology for Estimating Material Parameters for the Ramaswamy-Stouffer Constitutive Model
1993	Howard Quimby	MS	Finite Element Modeling of Metal-Matrix Composites and Interface Damage Using a Unified Constitutive Theory
1992	William Edwards	MS	An Analytical and Experimental Investigation into the Beadseat Pressure Distribution of an Aircraft Wheel
1992	Thomas Markey	MS	Effects of Hull Cuts on the Circularity and Structural Integrity of a Submersible Pressure Hull
1991	Colin Frost	MS	Constitutive Modeling and Simulation of Energy Absorbing Polyurethane Foam Under Impact Loading
1991	Marcia Boyle	MS	Investigation of the Thermomechanical Response of a Metal-Matrix Composite using a Unified Constitutive Theory and the Finite Element Method
1990	Endicott Fay	MS	Automation and Application of a Unified Constitutive Theory to Nonproportional Multiaxial Strain Deformation
1989	Christopher Holmes	MS	Investigation of the Impact Damage in Unidirectional Fiber-Reinforced Composite Plates
1988	Daren Nielsen	MS Project	Finite Element Modeling of the Thermal Strain Response of a Satellite Mirror