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Sports Science Laboratory

-Research and Service Center-

Established in 2003

http://www.ssl.wsu.edu/

Director - Lloyd V. Smith

201 Sloan Spokane St., Pullman, WA 99164
Professor
School of Mechanical and Materials Engineering
Washington State University
Tel (509) 335 3221
Fax (509) 335 4662

Manager - Jeff R. Kensrud

201 Sloan Spokane St., Pullman, WA 99164
M.S. Mechanical Engineering
Washington State University
509-335-4784

Mission Statement

The mission of the Sports Science Lab (SSL) is to provide service and research for the sports science industry. The SSL provides the most reliable and accurate measures of sports equipment performance and specializes in the dynamics of bat and ball collisions. The results of this work help regulating agencies better understand equipment performance through experimental testing and numeric models.

Impact on the industry and community

-Service-

The lab is certified with the Amateur Softball Association (ASA), providing research and consulting regarding bat and ball equipment issues. The SSL has maintained a positive relationship with ASA for over 10 years and has received grant funding from them in excess of $500,000.

Nearly three years ago the NCAA Baseball Committee certified the SSL as their exclusive baseball bat testing and research facility. This created a testing volume twice the size of ASA. The SSL has improved its infrastructure to handle this volume and has provided uninterrupted service to the NCAA.

The SSL conducts standardized testing on over 1000 pieces of baseball/softball sports equipment annually. The SSL serves over 40 different sports companies and manufacturers. Manufactures have the option of sending bats to test at the lab's convenience, or they can witness live testing. On average the lab will perform live testing for manufactures once a month.

-Research-

The Research Center component of the SSL exists to increase the accessibility of cutting edge science to sports regulatory agencies and equipment manufacturers, and facilitate the growth of knowledge in this arena. The SSL is well known in the industry as one of the leading research laboratories conducting novel and credible research related to baseball and softball science.

Testing revenues are also used to expand the research work undertaken for clients and internal purposes. The SSL supports four full time employees, two undergraduate technicians and four graduate students. The SSL has enabled 15 publications and 18 conference proceedings. The Director, Lloyd Smith, as well as other lab employees and graduate students participate in writing research papers.

Increased interest in player protection and injury, combined with new tools and techniques available to the laboratory, have created the potential for new research projects beyond the present scope of SSL operations. The lab is currently collaborating with colleagues in the School of Chemical Engineering and Bioengineering, Department of Educational Leadership & Counseling Psychology, and College of Veterinary Medicine on the WSU Pullman campus conducting research related to concussions.

-Community-

The SSL continuously gives short tours and informational sessions educating prospective students, current students, faculty at WSU, as well as the surrounding community on sports equipment performance. On occasion the director of the lab will speak at local schools and at other university seminars on topics related to sports equipment performance.

The director chairs the bat and ball equipment committee for ASTM. He has participated in producing and editing over eight standards. The director has guided the ASA in producing their bat testing protocols for over 10 years and recently led the NCAA Baseball Research Panel's revision to the NCAA BBCOR protocol.

-The Future-

In the last three years the SSL has seen substantial growth. The lab has nearly tripled its total testing volume and doubled its facilities and research capacity. In the last two years the SSL has successfully established a presence in the player protection and safety market and will continue to focus on research in this area. The SSL recognizes the industry's concern and interest in player safety, mainly related to concussions, and has effectively taken measures to capitalize on potential research and grant opportunities with NIH, NOCSAE, NFL, MLB as well as SBIR and STTRs.

The lab is also assisting USA Baseball and Little League Associations in developing a new standardized bat testing method. The SSL will likely begin certification testing for these associations in the fall of 2014.

Organizational Structure

The SSL is affiliated with the WSU Mechanical and Materials department in the College of Engineering and Architecture. Our administrative officer is Gayle Landeen, Administrative Manager for the MME department.

The Lab's leadership and employment structure is explained below.

Director-

Dr. Lloyd Smith heads the SSL as the director. He formed the Sports Science Lab when ASA requested him to be a certification center ten years ago. He has used this lab to support his research in Sports Science. He will remain director. See Appendix A for his current vita.

Manager –

Jeff Kensrud is the manager of the SSL. He manages both the service and research center operations, supervises employees/graduate students, and acquires new projects in the areas of sports equipment testing. He also conducts research projects related to sports science. See Appendix A for his current vita.

Project Engineers -

The SSL has one project engineer who focuses primarily on bio mechanical related topics. He also manages and conducts research projects related to sports science.

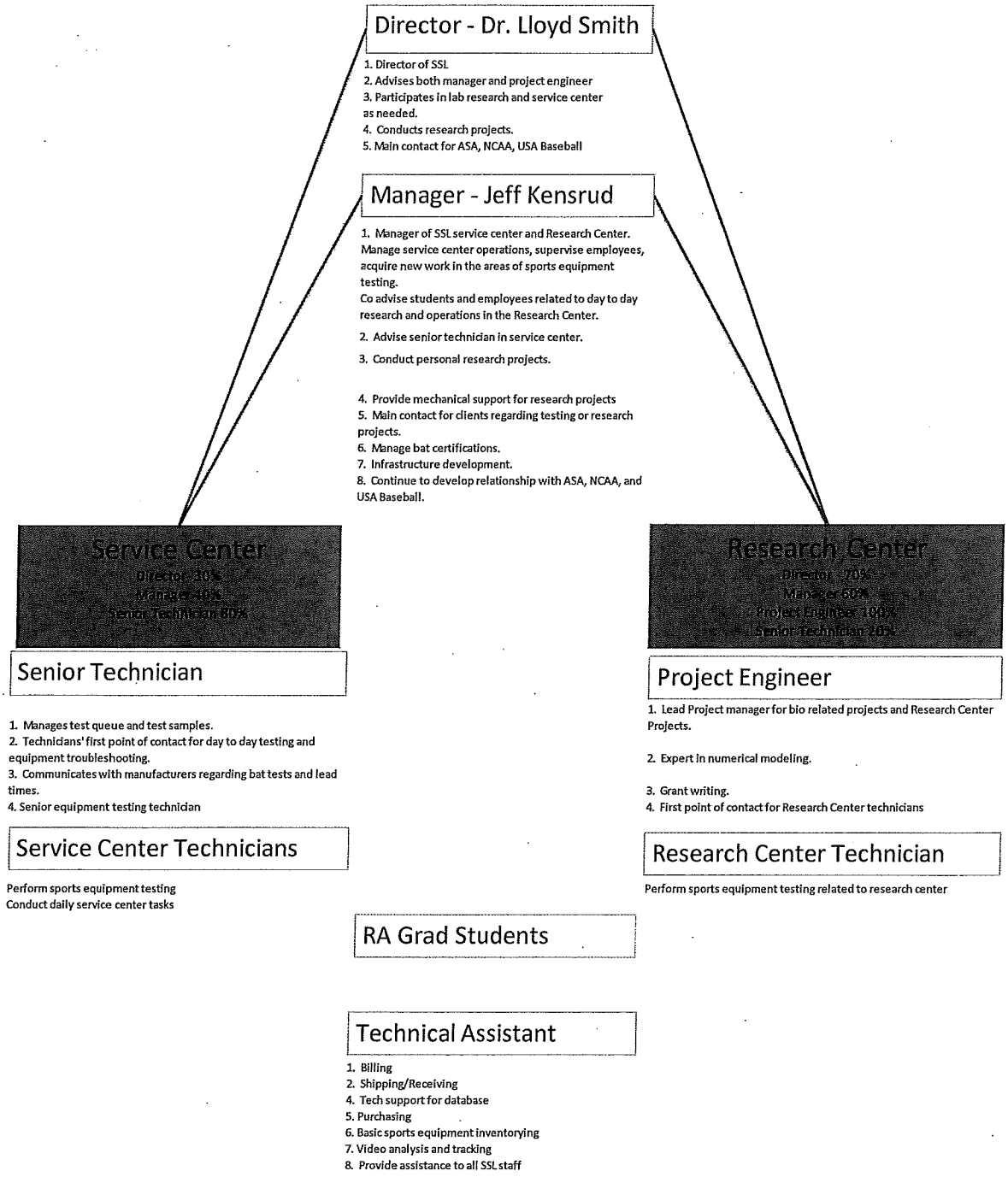
Technicians and office assistance-

The SSL standardized testing and daily maintenance tasks are conducted by six technicians. SSL technicians include two full time senior technicians, three undergraduate part time student technicians, and one full time technical office assistant.

Graduate Students –

The SSL has numerous opportunities for graduate student projects. The lab currently funds one master's student, but has provided masters theses to 12 other graduated students in the past. Most projects available in the SSL are suitable for master's theses.

Organizational Flow Chart



Organizational Resources

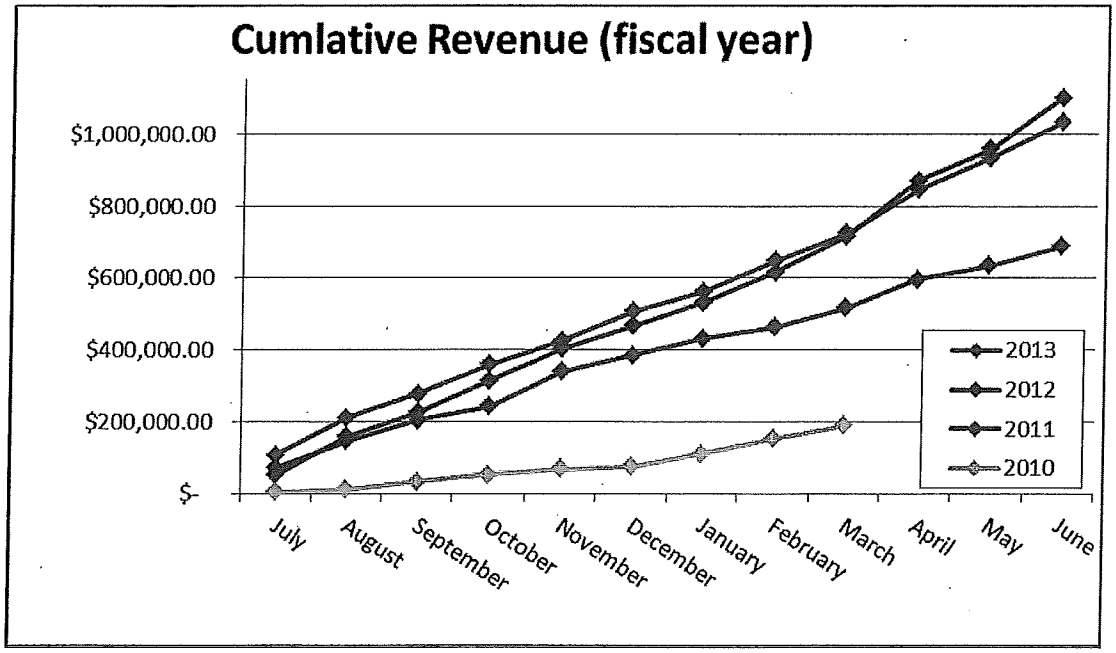
University – Salaries are not funded by the university. The university provides research and office space.

The SSL does not receive funding from Washington State.

External awards – The SSL has been receiving grants from ASA for the last 10 years. In the last three fiscal years, the ASA grant has contributed $150,000 to the lab.

The primary source of funding for the SSL is generated from the testing services we provide to the sports industry. Each piece of sports equipment we test has a test fee associated with it. The testing revenue generated has consistently supported all research projects, staff salaries, and testing equipment needs for the SSL.

In the last three fiscal years the SSL has increased in receivables from $200,000 to over one million dollars in annual revenue. The large increase in testing revenue in 2012 and 2013 was due to a new bat testing protocol that the NCAA Baseball Rules Committee implemented causing all bat manufacturers to submit new baseball bat designs. Testing receivables decreased in 2013 to $700,000. We expect future years to resemble fiscal year 2013 as most manufacturers are not designing new bats, but maintaining designs currently certified.



Organization's Services:

Services are provided to the following companies and sports manufactures:

List of businesses/manufactures affiliated with sports equipment testing				
Worth	Phoenix Bats	MacDougall	ENI JR286	Blackbat
War Club Bats	Pearson Bats	M^Powered	Easton	Baum
Viper Bats	Old Hickory Bat	Louisville Slugger	Dream Bat Co	Bass
Sargent Sports	Nike	Lon Wood Co	DeMarini	Baden
Rock Bats	Mizuno	KR3 Inc.	D-BAT Sports	
Rip-It	MINESPORT USA	Kelley Athletic Co.	Akadema	
Reebok	Metalstorm	Hoosier	Anderson	
Rawlings	Metal Wood Bat	Haag	Combat	
5 for 5 bats	Mattingly	Go Pro Bat	Carrera Sports	
ProNine Sports	Marucci	Escamilla Bats	Brett Brothers	

Services are provided to the following associations

Amateur Softball Association of America
2801 NE 50th Street
Oklahoma City, OK 73111
(405) 424-5266

NCAA – Ty Halpin
P.O. Box 6222
Indianapolis, Indiana 46206
317-917-6222

American Society of Testing Methods

USA Baseball

Lloyd V. Smith

Washington State University
School of Mechanical and Materials Engineering
Pullman, Washington 99164-2920

e-mail lvsmith@wsu.edu
tel. (509) 335-3221
fax (509) 335-4662

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 present
Preetam Mohapatra	Modelling the effect of bondline thickness	8/12 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 present
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 present
Varun Gupta	Measuring the effect of bondline thickness	8/12 to present
Harrison Scarborough	Durability of adhesive bonds	8/13 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 present
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	3/13 to present
Michael McGeehan	Technician	3/13 to present

Awards and Honors

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

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

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
- SIRTI, 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

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. SIRTI, 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. Cytec, 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
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62. Nelson, G., Smith, L., Salavatian, M. 2012. "APLICATION OF IMPROVED FREE EDGE DIGITAL IMAGE CORRELATION," SAMPE Tech 2012 Conference and Exhibition, Charleston, SC.
63. Alam, F., Ho, H., Smith, F., Subic, A., Chowdhury, H., Kumar, A. 2012. "A study of baseball and softball aerodynamics" ISEA Sports Engineering Conference 9, Procedia Engineering, Volume 34, pp. 86-91.
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66. Smith, L., Salavatian, M., 2013. "The Mutual Effects of Shear and Transverse Damage in Polymeric Composites," ICCM19, Montreal Canada.
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*	1995	*NCB Specialist: Department of Biological Structures, Functions and Technology, Faculty of Veterinary, University "Federico II", Naples, Italy (Neuroscience)
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Postdoc	1999, 2001, 2003	United States Department of Agriculture, Animal Physiology Research Unit, Athens, Georgia, USA (Trans-synaptic tracing)
Postdoc	2004-2007	Department of Veterinary and Comparative Anatomy, Pharmacology and Physiology (VCAPP), Washington State University (WSU), Pullman, WA, USA (Feeding behavior)

Professional Experience:

1992-1993	Technician: Academy of Agriculture and Technology, Olsztyn, Poland. (Research Associate: 100%)
1993-1997	Research Assistant/Ph.D. Student: Academy of Agriculture and Technology, Olsztyn, Poland. (Research: 60%; Teaching: 40%- Gross Anatomy, Comparative Animal Anatomy, And Clinical Anatomy)
1995-2001	Member: Warmia and Mazury Veterinary Chamber
1997-1998	Postdoc Fellow: Academy of Agriculture and Technology, Olsztyn, Poland. (Research: 50%; Teaching: 50%- Gross Anatomy, Comparative Animal Anatomy, and Clinical Anatomy)
1998-2004	Adjunct Professor: University of Warmia and Mazury, Olsztyn, Poland. (Research: 50%; Teaching: 50%- Gross Anatomy, Comparative Animal Anatomy, and Clinical Anatomy)

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2004-2007	Research Assistant Professor: VCAPP Department, WSU, Pullman, WA, USA. (Research: 100%)
2007-2008	Clinical Assistant Professor: VCAPP Department, WSU, Pullman, WA, USA. (Research: 50%; Teaching: 50%- Gross Anatomy)
2008-2014	Assistant Professor: VCAPP Department, WSU, Pullman, WA, USA. (Research: 45%; Teaching: 45%- Gross Anatomy; Service: 10%)
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Scientific and Professional Organizations:

American Association of Veterinary Anatomists
Association for the Advancement of Automotive Medicine (AAAM)
European Association of Veterinary Anatomists
Federation of European Neurosciences
Peripheral Nerve Society
Polish Anatomical Society
Polish Society of Veterinary Sciences
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Honors and Awards:

1993	Outstanding Veterinary Medicine Graduate Student, University of Warmia and Mazury Olsztyn, Poland
1998	Outstanding PhD Thesis, Prime Minister of Poland
1999	Award of Olsztyn Science Forum, President of City of Olsztyn, Poland
1999	USDA Award for Polish-American Science Promotion, Athens, GA, USA
2000	Presidential Award, University of Warmia and Mazury Olsztyn, Poland
2009	Awarded the WSU Honors College Faculty Thesis Advisor of the Year 2009
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2012	Award of Excellence for Outstanding Performance and Lasting Contributions as a Faculty Advisor, GPSA, WSU (Fall 2011)

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    - UH 450: (Honors Thesis or Project)..... (2009 - 2012)
    - VM 512: (Veterinary Anatomy II)..... (2008 - 2014; 24%; 150 contact h/sem.)
    - Neuro 138: (Seminar for Freshmen)..... (2009 - 2013)

Student Mentoring, Advising and Recruiting:

- **University of Warmia and Mazury** (Olsztyn, Poland)
  - *Graduate Students*

    Wojtarowicz, Aleksandra D.V.M. (major: Veterinary Medicine)
- **Washington State University** (Pullman, WA, USA)
  - Undergraduate Students

    Jassal, Jatinder (Special Problems 499; 2007, 2008, 2009)
    Matsen, Miles (Special Problems 499; 2007)
    Philes, Crystal (Special Problems 499; 2007)
    Tulloss, Danielle (Special Problems 499; 2007)
    Rachel Wanty (Senior Project 490; 2009)
    Carmichael Hilary (Senior Project 490; 2010, 2011)
    Cyr Lee Sung (Senior Project 490; 2010, 2011)
    Dahmen Jessamyn (Special Problems 499; 2010)
    Ho Phillip (Special Problems 499; 2010)
    Heath Marie (Special Problems 495; 2010, 2011)
    Lee Tin-Yan (Special Problems 495; 2010)
    Wanty Rachel (Honors Thesis UH 450, 2010, 2011, 2012)
    Lindsey Ballsmider (Special Problems 499, 2012)
    Casey Callahan (Special Problems 499, 2011, 2012)
    Miguel Toscano (Special Problems 499, 2011, 2012)
    Michelle Raji David (Honors Thesis UH 450, 2012)
    Alexandra Christine Vaughn (Special Problems 499, 2013, 2014)
    Zach Alexander Lawrence (Special Problems 499, 2013, 2014)
    Cherry Fletcher (Special Problems 499, 2014)
    Christina Lisa Sagrelius (Special Problems 499, 2013, 2014)
    Kaytlin Rose Borel (Special Problems 499, 2014)

- Master's Students

  Jassal, Jatinder (Major Advisor; 2007-2009)

  Lindsey Ballsmider (Major Advisor; 2014 – present)

- Ph.D. Students

  Anderson, Zachary (Adjunct Advisor; 2007-2008)

  Benoist, Caroline (Committee Member; 2007-2009)

  Gallaher Zachary (Major Advisor; 2008- 2012)

  Larios, Rose Marie (Committee Member; 2008-2012)

  Riley, Timothy (Committee Member; 2008-2012)

  Giulia Ronchi (PhD Co-Advisor; 2009-2010)

  Tyler Bland (Ph.D. rotation; 2012)

- Postdoc Fellows

  Ryu, Vitaly (Major Advisor; 2008-2012)

- Major Advising Contributions

  Herzog, Thibaut "Bo" (Honors Thesis: *Cocaine-induced behavior and adult neurogenesis*; under my supervision)

  Jassal, Jatinder (Mentor/Supervisor: for his undergraduate neuroscience project: Capsaicin impact on sensory neurons located in the nodose ganglion of a rat.)

  WSU Emeritus Society Scholarship 2009 for Jassal, Jatinder

  Auvil Scholars Fellowships for the 2010-11 academic years. Lee Cyr, senior, neuroscience and biology and psychology; Rachel Katherine Wanty, junior, neuroscience and Spanish and the Honors College;

  Dr. Arturs Vitums scholarship in veterinary anatomy (2010) Zachary Gallaher PhD Student

  Graduate Student Awards to attend the 61st Meeting of Nobel Laureates in Lindau, Germany nomination for Zachary Gallaher PhD Student

  Auvil Scholars Fellowships for the 2011-12 academic years. Rachel Katherine Wanty, senior neuroscience and Spanish major in Honors.

  Auvil Scholars Fellowships for the 2012-13 academic years. Michelle Raji David, sophomore in Honors.

- Recruiting

  Interviewing candidates for Graduate School (4 students)

  Interviewing candidates for Graduate School (Committee Member)

Service:

- **Washington State University**
  - Honors College

    Honors Thesis Evaluator (2010, 2011, 2012)

  - College/Departmental Committees:

    Search Committee for Radiology Faculty Position (2008)
    Neuroscience Program Curriculum Committee (2011, 2012)
    Graduate Studies Committee (2011)

Animal Resources Committee (2011, 2012, 2013)

Faculty Executive Committee (2013)

Professional Activities:

- **Journal Editor**

  Neural Regeneration Research: Guest Editor (2010- PRESENT)

- **Journal Article Reviewer**

  Neuroscience (2007-PRESENT)
  Neuroscience Letters (2008- PRESENT)
  Journal of Animal Science (2010-PRESENT)
  Acta Neurobiologiae Experimentalis (2012- PRESENT)
  Brain Research Bulletin (2013- PRESENT)
  Vojnosanitetski Pregled (2013- PRESENT)

- **Grant Reviewer**

  1. Grant Review Committee, Alabama Agricultural Experiment Station, Auburn University (2007)
  2. National Science Centre, Poland (NCN panel NZ4); „Evaluation of regenerative processes in the pig model of intervertebral disc degeneration after transplantation of bone marrow-derived mesenchymal stem cells" 2012/07/B/NZ4/01427
  3. Poncin Fellowship (2013)
  4. National Science Centre, Poland (NCN panel NZ6_8); „Markers of future in the molecular investigations after allotransplantation" 2013/09/B/NZ6/02568

- **Organizer of International Meetings**

  1. Anatomische Gesellschaft - 92. Versammlung and Polish Anatomical Society, Olsztyn, 24-27 May 1997.
  2. 23rd Congress European Association of Veterinary Anatomists (EAVA), Olsztyn, 16-19 July 2000.
  3. 12th Annual Meeting of the European Neuropeptide Club, Mierki, Poland, May 2002.

- **Professional Development**

  WSU, Responsible Conduct of Research Education (2008, 2009)

  WSU, FET SPECIAL SESSION: Human Subjects (2008, 2009)

  WSU, Office of Grant and Research Development (OGRD) GrantWriters Workshops (2007, 2008, 2009)

  WSU, OGRD Animal Contact Program (2008, 2009)

  WSU, OGRD Career Days: NIH Morning Session/NSF Afternoon Session (2008, 2009)

- **Other**

  - Litigation support, University of Georgia, Athens, GA (2008)
  - PONCIN 2012 Fellowship Review.
  - Hosting Dr. Martin Sadowski, Assistant Professor (New York University School of Medicine) *Targeting pathological protein conformation in Alzheimer's and prion diseases.* (March, 2009)
  - Hosting Dr. Richard Nowakowski, Professor and Department Chair (College of Veterinary Medicine, Department of Biomedical Sciences, College of Medicine, Florida State University) *Phenomics of Hippocampus* (November, 2009)

- Hosting Dr. Michele Fornaro, Associate Professor (Department of Clinical and Biological Sciences, University of Turnin, Italy) *Is adulthood too late for DRG cell population to be dynamic?* (November, 2010)
- Hosting Dr. Magdalena Klimczuk and Dr. Amelia Franke-Radowiecka, postdoctoral fellows from College of Veterinary Medicine at Warmia and Mazury University (UWM) in Olsztyn, Poland. The goal of the visit was strengthening of the teaching potential through investment in skills development and knowledge of teaching staff involved in the process of education at UWM. The experience gained will help them to increase the skills of academic staff in developing an innovative curriculum. The program was funded by European Union. (April-May 2012).
- Editing and modifying "Large Animal Gross Anatomy" Dissection Guide for Veterinary Anatomy Students

Invited Speaker

"Replacement of nodose ganglion neurons following capsaicin treatment of adult rats: a new model system for adult neurogenesis" College of Veterinary Medicine, University of Georgia, 2008, June 12.

"Dr. Jekyll and Mr. Hyde: Two faces of capsaicin impact on viscerosensory neurons"; Department of Clinical and Biological Sciences, University Of Turin, Italy. May 31st 2010.

"Creative Destruction In The Peripheral Nervous System: Are Exogenous Stem Cells Really Necessary?" College of Veterinary Medicine, Department of Biomedical Sciences, College of Medicine, Florida State University, USA. 2011

Research Support:

- **Funded/Active**
  - Marvel Shields Autzen Fund [WSU Intramural Research Project FY 2013-14]: Hindbrain plasticity following bariatric surgery. 07/02/13-06/02/14; Role: PI
  - NFL Charities Medical Grant: *Can the Endogenous Neural Stem Cells Repair An Injured Nervous System?* 08/08/12-02/08/14; ROLE: PI
  - USDA AFRI [2010-03243]: *Rfamide Peptides Integrate The Effect Of Nutrition On The Gonadotropic Axis Of The Gilt*; 07/01/2010-06/30/2014; Role: Co-Investigator,
  - NIH/NIDDK [10709309]: *Asynchronous glutamate release in vagal afferent to NTS neurotransmission*; 07/01/2011-06/30/2016; Role: collaborator,
- **Submitted/Pending**
  - NIH/NIDCD [1R01DC013904-01]: Vagal Influence on Brainstem Plasticity and Neural Coding of Taste. 07/01/2014- 06/30/2019, Role: PD/PI
  - Celgene Cellular Therapeutics: Neuroprotective Effect of PDA-001 on Vagal Sensory Neuron Injury Using Aggregates Alpha Synuclein. Role: PI
- **Funded/Completed**

  KBN, Poland [6P06K01220]: *Neuropeptides in the inflammation of the intestines in the pig*; 09/01/01-08/31/03; ROLE: Co-Investigator

  NATO [NATO SF2002]: *Distribution of hypothalamic neurons containing leptin receptor, innervating adipose tissue in the pig*; 05/01/03-12/31/03; ROLE: Principle-Investigator

  Bank of America Poncin Scholarship Fund [NA]: *Cell death and proliferation in the viscerosensory ganglion of the vagus nerve: a new model system for adult neurogenesis, and a*

potential source of therapeutic neuron-progenitor cells; 07/01/06-06/30/07; ROLE: Principle-Investigator

WSU New Faculty Seed Grant Program [110252]: *Injury-induced neuronal plasticity and repair*; 05/01/08-08/30/09; ROLE: Principal Investigator

George W. Bagby Research Gift Fund FY 2010-11 Intramural Research project titled "Injury induced plasticity of the viscerosensory innervation" 2010-2011; Role: PI,

Michael J Fox Foundation: Development of Small Molecule Hepatocyte Grown Factor Mimetics for the Treatment of Parkinson's Disease. 10/1/2011-9/30/2012; Role: Co-PI

NIH/NIDDKD [R01 DK052849]: The role of glutamate in the control of food intake; 05/01/12-06/30/13; ROLE: Co-Investigator

Publications:

- **Invited Papers**

1. **Czaja K.** 2012. The neural butterfly effect: The injury to peripheral nerves changes the brain. Neural Regeneration Research 7(14):1045-6.
2. **Czaja K**, Czaja WE, Giacobini-Robecchi M, Geuna S, Fornaro M (2011) Injury-induced DNA replication and neural proliferation in the adult mammalian nervous system. Book title: DNA Replication ISBN: 978-953-307-1365-2
3. Geuna, S., Raimondo, S., Ronchi, G., Di, S. F., Tos, P., **Czaja, K.**, & Fornaro, M. (2009). Chapter 3 histology of the peripheral nerve and changes occurring during nerve regeneration. Int. Rev. Neurobiol. 87, 27-46
4. **Czaja K** (2005) Trans-synaptic connections between the hypothalamus and adipose tissue: relationship to reproduction. In: Control of Pig Reproduction VII, Reproduction Supplement **62.** Eds. CJ Ashworth and RR Kraeling. Nottingham University Press, Nottingham, U.K.

- **Peer-Reviewed**

1. Peters JH, Gallaher ZR, Ryu V, **Czaja K.** 2013. Withdrawal and restoration of central vagal afferents within the dorsal vagal complex following subdiaphragmatic vagotomy. J Comp Neurol 521(15):3584-99.
2. Campos CA, Wright JS, **Czaja K**, Ritter RC. 2012. CCK-Induced Reduction of Food Intake and Hindbrain MAPK Signaling Are Mediated by NMDA Receptor Activation. Endocrinology 153(6):2633-46.
3. Gallaher ZR, Ryu V, Herzog T, Ritter RC, **Czaja K**. 2012. Changes in microglial activation within the hindbrain, nodose ganglia, and the spinal cord following subdiaphragmatic vagotomy. Neurosci Lett 513(1):31-6.
4. Johnston S, Gallaher Z, **Czaja K**. 2012. Exogenous reference gene normalization for real-time reverse transcription-polymerase chain reaction analysis under dynamic endogenous transcription. Neural Regeneration Research 7(14):1064-72.
5. **Czaja K**, Fornaro M, Geuna S. 2012. Neurogenesis in the adult peripheral nervous system. Neural Regeneration Research 7(14):1047-54.
6. Ronchi G, Ryu V, Fornaro M, **Czaja K**. 2012. Hippocampal plasticity after a vagus nerve injury in the rat. Neural Regeneration Research 7(14):1055-63.
7. Winters BD, Kruger JM, Huang X, Gallaher ZR, Ishikawa M, **Czaja K**, Krueger JM, Huang YH, Schluter OM, Dong Y. 2012. Cannabinoid receptor 1-expressing neurons in the nucleus accumbens. Proc Natl Acad Sci USA 109(40):2717-25.J.
8. Wright, C.A.Campos, T.Herzog, M.Covasa, **K.Czaja**, R.C.Ritter, Reduction of food intake by cholecystokinin requires activation of hindbrain NMDA-type glutamate receptors, Am. J Physiol Regul. Integr. Comp Physiol 301 (2011) 448-455.

9. Z.R.Gallaher, V.Ryu, R.M.Larios, L.K.Sprunger, **K.Czaja**, Neural proliferation and restoration of neurochemical phenotypes and compromised functions following capsaicin-induced neuronal damage in the nodose ganglion of the adult rat, Front Neurosci 5 (2011) 12.
10. Z.R.Gallaher, R.M.Larios, V.Ryu, L.K.Sprunger, **K.Czaja**, Recovery of viscerosensory innervation from the dorsal root ganglia of the adult rat following capsaicin-induced injury, J Comp Neurol. 518 (2010) 3529-3540.
11. V.Ryu, Z.Gallaher, **K.Czaja**, Plasticity of nodose ganglion neurons after capsaicin- and vagotomy-induced nerve damage in adult rats, Neuroscience 167 (2010) 1227-1238.
12. T.E.Brown, B.R.Lee, V.Ryu, T.Herzog, **K.Czaja**, Y.Dong, Reducing Hippocampal Cell Proliferation in the Adult Rat Does Not Prevent the Acquisition of Cocaine-induced Conditioned Place Preference, Neurosci Lett. 481 (2010) 41-46.
13. **K.Czaja**, G.A.Burns, R.C.Ritter, Capsaicin-induced neuronal death and proliferation of the primary sensory neurons located in the nodose ganglia of adult rats, Neuroscience 154 (2008) 621-630.
14. **K.Czaja**, C.R.Barb, R.R.Kraeling, Hypothalamic neurons innervating fat tissue in the pig express leptin receptor immunoreactivity, Neurosci. Lett. 425 (2007) 6-11.
15. **K.Czaja**, R.C.Ritter, G.A.Burns, N-methyl-D-aspartate receptor subunit phenotypes of vagal afferent neurons in nodose ganglia of the rat, J. Comp Neurol. 496 (2006) 877-885.
16. **K.Czaja**, R.C.Ritter, G.A.Burns, Vagal afferent neurons projecting to the stomach and small intestine exhibit multiple N-methyl-D-aspartate receptor subunit phenotypes, Brain Res 1119 (2006) 86-93.
17. C.R.Barb, G.J.Hausman, **K.Czaja**, Leptin: A metabolic signal affecting central regulation of reproduction in the pig, Domest. Anim Endocrinol. 29 (2005) 186-192.
18. **K.Czaja**, J.Kaleczyc, W.Sienkiewicz, M.Lakomy, The influence of experimental ileitis on the neuropeptide coding of enteric neurons in the pig, Pol. J. Vet. Sci. 8 (2005) 155-163.
19. M.Klimczuk, J.Kaleczyc, A.Franke-Radowiecka, **K.Czaja**, P.Podlasz, M.Lakomy, Immunohistochemical characterisation of cholinergic nerve fibres supplying accessory genital glands in the pig, Veterinarni Medicina 50 (2005) 119-130.
20. W.Sienkiewicz, J.Kaleczyc, **K.Czaja**, M.Lakomy, Adrenergic, nitrergic and peptidergic innervation of the urethral muscle in the boar, Folia Histochem. Cytobiol. 42 (2004) 89-94.
21. **K.Czaja**, R.R.Kraeling, C.R.Barb, Are hypothalamic neurons transsynaptically connected to porcine adipose tissue?, Biochem. Biophys. Res. Commun. 311 (2003) 482-485.
22. J.Kaleczyc, K.Wasowicz, M.Klimczuk, **K.Czaja**, M.Lakomy, Immunohistochemical characterisation of cholinergic neurons in the anterior pelvic ganglion of the male pig, Folia Histochem. Cytobiol. 41 (2003) 65-72.
23. J.Kaleczyc, W.Sienkiewicz, M.Klimczuk, **K.Czaja**, M.Lakomy, Differences in the chemical coding of nerve fibres supplying major populations of neurons between the caudal mesenteric ganglion and anterior pelvic ganglion in the male pig, Folia Histochem. Cytobiol. 41 (2003) 201-211.
24. Z.Pidsudko, K.Wasowicz, W.Sienkiewicz, J.Kaleczyc, **K.Czaja**, M.Lakomy, The influence of inflammation on the expression of neuropeptides in the ileum-projecting primary sensory neurones in the pig, Folia Morphol. (Warsz.) 62 (2003) 235-237.
25. A.Wojtarowicz, P.Podlasz, **K.Czaja**, Adrenergic and cholinergic innervation of pulmonary tissue in the pig, Folia Morphol. (Warsz.) 62 (2003) 215-218.
26. **K.Czaja**, M.Lakomy, J.Kaleczyc, C.R.Barb, G.B.Rampacek, R.R.Kraeling, Leptin receptors, NPY, and tyrosine hydroxylase in autonomic neurons supplying fat depots in a pig, Biochem. Biophys. Res. Commun. 293 (2002) 1138-1144.
27. **K.Czaja**, Immunohistochemical characterization of efferent neurons innervating the oviduct in the pig located in the sympathetic chain ganglia, Veterinarni Medicina 47 (2002) 85-91.
28. **K.Czaja**, R.Kraeling, M.Klimczuk, A.Franke-Radowiecka, W.Sienkiewicz, M.Lakomy, Distribution of ganglionic sympathetic neurons supplying the subcutaneous, perirenal and mesentery fat tissue depots in the pig, Acta Neurobiol. Exp. 62 (2002) 227-234.
29. **K.Czaja**, M.Lakomy, W.Sienkiewicz, J.Kaleczyc, Z.Pidsudko, C.R.Barb, G.B.Rampacek, R.R.Kraeling, Distribution of neurons containing leptin receptors in the hypothalamus of the pig, Biochem. Biophys. Res. Commun. 298 (2002) 333-337.

30. M.Lakomy, J.Kaleczyc, K.Wasowicz, **K.Czaja**, Immunohistochemical study of the otic ganglion in the pig, Pol. J. Vet. Sci. 5 (2002) 257-262.
31. K.Wasowicz, P.Podlasz, **K.Czaja**, M.Lakomy, Uterus-innervating neurones of paracervical ganglion in the pig: immunohistochemical characteristics, Folia Morphol. (Warsz.) 61 (2002) 15-20.
32. **K.Czaja**, J.Kaleczyc, Z.Pidsudko, A.Franke-Radowiecka, M.Lakomy, Distribution of efferent neurones innervating the oviduct in the pig, Folia Morphol. (Warsz.) 60 (2001) 243-248.
33. **K.Czaja**, K.Wasowicz, M.Klimczuk, P.Podlasz, M.Lakomy, Distribution and immunohistochemical characterisation of paracervical neurons innervating the oviduct in the pig, Folia Morphol. (Warsz.) 60 (2001) 205-211.
34. M.Majewski, J.Kaleczyc, W.Sienkiewicz, W.Wasowicz, Z.Pidsudko, **K.Czaja**, M.Lakomy, Immunocastration-induced changes in the pattern of the porcine seminal vesicle innervation, Polish J Vet Sci 4 (2001) 205-216.
35. J.Sowinska, H.Brzostowski, Z.Tanski, **K.Czaja**, The weaning stress response in lambs of different age, Czech Journal of Animal Science 46 (2001) 465-468.
36. K.Wasowicz, J.Kaleczyc, W.Sienkiewicz, **K.Czaja**, A.Ziecik, M.Lakomy, Influence of active immunization against GnRH on VIP- and NPY-positive innervation of the porcine testis, Folia Histochem. Cytobiol. 39 (2001) 269-274.
37. **K.Czaja**, W.Sienkiewicz, J.Kaleczyc, K.Wasowicz, M.Majewski, M.Lakomy, Innervation of the prostate gland in the pig after hormonal castration, Polish Journal of Veterinary Sciences 3 (2000) 161-170.
38. **K.Czaja**, Distribution of primary afferent neurons innervating the porcine oviduct and their immunohistochemical characterization, Cells Tissues. Organs 166 (2000) 275-282.
39. **K.Czaja**, J.Kaleczyc, W.Sienkiewicz, M.Majewski, M.Lakomy, Peptidergic innervation of the porcine oviduct studied by double-labelling immunohistochemistry, Folia Histochem. Cytobiol. 34 (1996) 141-150.
40. **K.Czaja**, W.Sienkiewicz, A.Vittoria, A.Costagliola, A.Cecio, Neuroendocrine cells in the female urogenital tract of the pig, and their immunohistochemical characterization, Acta Anat. 157 (1996) 11-19.
41. M.Majewski, W.Sienkiewicz, J.Kaleczyc, B.Mayer, **K.Czaja**, M.Lakomy, The distribution and co-localization of immunoreactivity to nitric oxide synthase, vasoactive intestinal polypeptide and substance P within nerve fibres supplying bovine and porcine female genital organs, Cell Tissue Res. 281 (1995) 445-464.
42. **K.Czaja**, M.Majewski, B.Klinkosz, J.Kaleczyc, Adrenergic and acetylcholinesterase-positive innervation of the bovine oviduct, Folia Morphol. (Warsz.) 52 (1993) 151-159.

- **Accepted for publication:**

1. .Gallaher Z, Johnston S, **Czaja K**. (2014) Neural proliferation in the dorsal root ganglia of the adult rat following capsaicin-induced neuronal death. J Comp Neurol

Abstracts (total 79)**:**

1. Łakomy M, Kaleczyc J, Majewski M, Wąsowicz K, **Czaja K**: Immunohistochemiczna charakterystyka neuronów włączonych w procesy regulacyjne funkcji samiczych i samczych narządów rozrodczych świni. Konferencja: Postęp badań w biologii rozrodu. Olsztyn, Poland, 1994.
2. Sienkiewicz W, **Czaja K**, Kaleczyc J, Majewski M, Wąsowicz K, Łakomy M: Immunohistochemical study on the development of vasoactive intestinal polypeptide (VIP) -and galanin (GAL)-immunoreactive nerve structures in the porcine nucleus arcuatus-median eminence complex. 89.Versammlung, Marburg, Germany, 1994.
3. **Czaja K**, Sienkiewicz W, Kaleczyc J, Majewski M, Łakomy M: Peptidergic innervation of the porcine Fallopian tube studied by double-labelling immunohistochemistry. 89.Versammlung, Marburg, Germany, 1994.

4. Łakomy M, Kaleczyc J, Majewski M, Wąsowicz K, **Czaja K**: Immunohistochemical characterization of neurons supplying male and female reproductive organs in the pig. The 6th Zavrnik Memorial Meeting, Abstracts, Lipica, Slovenia ,1995.
5. **Czaja K**, Sienkiewicz W, Vittoria A, Cecio A: Paraneurony w żeńskim układzie moczowo-płciowym u świni i ich immunohistochemiczna charakterystyka. 30th Konferencja PTHC, Wrocław, Poland, 1995.
6. Pidsudko Z, Majewski M, Kaleczyc J, **Czaja K**, Łakomy M: Substancja P, peptyd kodowany genem kalcytoniny i galanina w neuronach lędźwiowych zwojów rdzeniowych świni. 30th Konferencja PTHC, Wrocław, Poland, 1995.
7. **Czaja K**, Majewski M, Pidsudko Z, Łakomy M: Distribution of sensory neurons innervating the porcine oviduct and their immunohistochemical characterization. Anatomische Gesellschaft - 91.Versammlung, Jena, Germany, 1996.
8. Majewski M, Kaleczyc J, **Czaja K**, Heym C, Łakomy M: Do porcine inferior mesenteric ganglion (IMG) "Ovarian" and "ovarian artery" neurons differently respond to axotomy? 17th Zjazd PTA, Gdańsk, Poland, 1996.
9. Kaleczyc J, Majewski M, Łakomy M, **Czaja K**, Mayer B: Immunohistochemical characterization of nitric oxide synthase-containing neurons in the pelvic ganglia of the male pig. 17th Zjazd PTA, Gdańsk, Poland, 1996.
10. **Czaja K**, Kaleczyc J, Majewski M, Pidsudko Z, Łakomy M: Prevertebral neurons projecting to the porcine oviduct: distribution and chemical coding. 17th Zjazd PTA, Gdańsk, Poland, 1996.
11. Pidsudko Z, Majewski M, Kaleczyc J, **Czaja K**, Łakomy M: Chemical neuroanatomy of the porcine lumbar dorsal root ganglia (DRGs). 17th Zjazd PTA, Gdańsk, Poland, 1996.
12. Kaleczyc J, Majewski M, Łakomy M, **Czaja K**, Mayer B: Badania immunohistochemiczne neuronów zawierających syntetazę tlenku azotu w zwojach splotu miednicznego samca świni. X Kongres PTNW, Wrocław, Poland, 1996.
13. **Czaja K**, Kaleczyc J, Majewski M, Pidsudko Z, Łakomy M: Prevertebral neurons projecting to the porcine oviduct: distribution and chemical coding. X Kongres PTNW, Wrocław, Poland, 1996.
14. Pidsudko Z, Majewski M, Kaleczyc J, **Czaja K**, Łakomy M: Chemical neuroanatomy of the porcine lumbar dorsal root ganglia (DRGs). X Kongres PTNW, Wrocław, Poland, 1996.
15. Majewski M, Kaleczyc J, **Czaja K**, Heym C, Łakomy M: Do porcine inferior mesenteric ganglion (IMG) "Ovarian" and "ovarian artery" neurons differently respond to axotomy? Konferencja, Interakcje komórkowe *in vitro*", Poznań, Poland ,1996.
16. **Czaja K**: Immunohistochemical characterization of paravertebral neurons innervating the porcine oviduct. Anatomische Gesellschaft - 92. Versammlung and Polish Anatomical Society, Olsztyn, Poland, 1997.
17. Łakomy M, **Czaja K**: Lokalizacja i immunohistochemiczna charakterystyka neuronów unerwiających jajowód u świni. Materiały Sesji Naukowej PIWET, Puławy, Poland, 1998.
18. Majewski M, Łakomy M, Kaleczyc J, Wąsowicz K, Sienkiewicz W, Pidsudko Z, **Czaja K**: Plastyczność i ekspresja genowa w neuronach zaopatrujących jajnik świni w warunkach eksperymentalnych. Materiały Sesji Naukowej PIWET, Puławy, Poland, 1998.
19. Majewski M, Kaleczyc J, Łakomy M, Wąsowicz K, **Czaja K**, Pidsudko Z: Plasticity of inferior mesenteric ganglion (IMG) neurons after uni- and bilateral ovariectomy. 9th Meeting of the European Neuropeptide Club, Ferrara, Italy, 1999.
20. **Czaja K**, Kaleczyc J, Sienkiewicz W, Łakomy M: Dystrybucja i immunohistochemiczna charakterystyka neuronów zwoju przyszyjkowego zaopatrujących jajowód świni. I Zjazd Towarzystwa Biologii Rozrodu, Mierki, Poland ,1999.

21. Majewski M, Kaleczyc J, Łakomy M, Wąsowicz K, **Czaja K**, Pidsudko Z: Plasticity of inferior mesenteric ganglion (IMG) neurons after uni- and bilateral ovariectomy. 18th Zjazd PTA oraz 34th Sympozjum PTHiC, Łódź, Poland, 1999.
22. Sienkiewicz W, **Czaja K**, Kaleczyc J, Majewski M, Łakomy M: Paraneurons in the porcine male uretra. Have castration and active immunisation againist GnRH any effect on urethral paraneurons? XVIII Zjazd PTA oraz XXXIV Sympozjum PTHiC, Łódź, Poland, 1999.
23. **Czaja K**, Majewski M, Pidsudko Z, Kaleczyc J, Łakomy M: Axotomy-induced peptide-plasticity of ovary-projecting neurons in the pig: dorsal root ganglia. 18th Zjazd PTA oraz 34th Sympozjum PTHiC, Łódź, Poland, 1999.
24. Sienkiewicz W, Majewski M, **Czaja K**., Kaleczyc J, Łakomy M: Neural activity in testis under ohyziological and experimental conditions in the pig. 4th International Congress of the Polish Neuroscience Society, Gdańsk, Poland, 1999.
25. **Czaja K**, Kaleczyc J, Sienkiewicz W, Łakomy M: Distribution and immunohistochemical characterization of paracervical neurons innervating the oviduct in the pig. 4th International Congress of the Polish Neuroscience Society, Gdańsk, Poland, 1999.
26. Sienkiewicz W, Kaleczyc J, Wąsowicz K, **Czaja K**, Pidsudko Z, Łakomy M: Catecholaminergic and peptidergic systems in male porcine hypothalamus after active immunization against GNRH. 10th Annual Meeting of the European Neuropeptide Club, Innsbruck, Austria, 2000.
27. **Czaja K**, Kraeling RR, Klimczuk M, Franke A, Łakomy M: Distribution of neurons supplying the mesentery fat in the pig. ASGBI/AG/NAV Tripartite Meeting St John's College Cambridge, UK, 2000.
28. Kaleczyc J, Sienkiewicz W, Wąsowicz K, **Czaja K**, Pidsudko Z, Łakomy M: Adrenergic and peptidergic innervation of the porcine vas deferens after active immunisation against GnRH. Quantitative and morphological studies. 23rd Congress EAVA, Olsztyn, Poland, 2000.
29. Sienkiewicz W, Kaleczyc J, Wąsowicz K, **Czaja K**, Pidsudko Z, Łakomy M: Changes in catecholamine content and distribution in porcine testis under ageing and hormonal manipulations. Quantitative and morphological studies. 23rd Congress EAVA, Olsztyn, Poland, 2000.
30. **Czaja K**, Sienkiewicz W, Kaleczyc J, Wąsowicz K, Majewski M, Pidsudko Z, Łakomy M: Innervation of the prostate gland in the pig after a hormonal castration. 23rd Congress EAVA, Olsztyn, Poland, 2000.
31. Pidsudko Z, Kaleczyc J, **Czaja K**, Sienkiewicz W, Łakomy M, Majewski M: The distribution and chemical coding of neurons in the dorsal root ganglia projecting to the urinary bladder neck in the pig. 23rd Congress EAVA, Olsztyn, Poland, 2000.
32. Klimczuk M, **Czaja K**, Franke-Radowiecka A, Łakomy M, Kraeling RR: Distribution of neurons supplying the perirenal fat in the pig. 23rd Congress EAVA, Olsztyn, Poland, 2000.
33. Franke-Radowiecka A, **Czaja K**, Klimczuk M, Kraeling RR, Łakomy M: Distribution of neurons supplying the subcutaneous fat in the pig. 23rd Congress EAVA, Olsztyn, Poland, 2000.
34. Kaleczyc J, Sienkiewicz W, Wąsowicz K, **Czaja K**, Pidsudko Z, Łakomy M: Wpływ aktywnej immunizacji przeciwko GnRH na stan adrenergicznego i peptydergicznego unerwienia nasieniowodu świni. XI Kongres PTNW, Lublin, Poland, 2000.
35. Sienkiewicz W, Kula K, Kaleczyc J, **Czaja K**, Pidsudko Z, Wąsowicz K, Łakomy M: Aktywna immunizacja przeciwko GN-RH na przykładzie samców świni domowej – nowa metoda sterylizacji zwierząt domowych. 11th Kongres PTNW, Lublin, Poland, 2000.
36. **Czaja K**, Sienkiewicz W, Kaleczyc J, Wąsowicz K, Majewski M, Pidsudko Z, Łakomy M: Unerwienie prostaty u świni po kastracji hormonalnej. 11th Kongres PTNW, Lublin, Poland, 2000.
37. Pidsudko Z, Kaleczyc J, **Czaja K**, Sienkiewicz W, Łakomy M, Majewski M: Rozmieszczenie i kodowanie chemiczne neuronów zwojów rdzeniowych projektujących do szyjki pęcherza moczowego świni. 11th Kongres PTNW, Lublin, Poland, 2000.

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39. Franke-Radowiecka A, **Czaja K**, Klimczuk M, Kraeling RR, Łakomy M: Dystrybucja neuronów zaopatrujących podskórną tkankę tłuszczową u świni. 11th Kongres PTNW, Lublin, Poland,2000.
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41. Pidsudko Z, Kaleczyc J, Łakomy M, **Czaja K**, Majewski M: Axotomy induced changes in the chemical cooding of neurons in the porcine inferior mesenteric ganglion projecting to the urinary bladder trigon. 96. Versammlung der Anatomischen Gesellschaft, Műnster, Germany, 2001
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43. Sienkiewicz W, **Czaja K**, Kraeling RR, Łakomy M: Localisation of leptin receptor (OB-R) in porcine hypothalamus. 19th Congress of the Polish Anatomical Society, 35th Symposium of the Polish Society of Cytochemistry and Histochemistry, Wrocław, Poland, 2001.
44. **Czaja K**, Kraeling RR, Klimczuk M, Pidsudko Z, Łakomy M: Leptin receptors in neurons of the sympathetic chain ganglia innervating fat tissue in the pig. 19th Congress of the Polish Anatomical Society, 35th Symposium of the Polish Society of Cytochemistry and Histochemistry, Wrocław, Poland, 2001.
45. Pidsudko Z, Kaleczyc J, **Czaja K**, Sienkiewicz W, Łakomy M, Majewski M: Distribution and chemical coding of neurons in the itramural ganglia of the urinary bladder trigone in the pig. 19th Congress of the Polish Anatomical Society, 35th Symposium of the Polish Society of Cytochemistry and Histochemistry, Wrocław, Poland, 2001.
46. Klimczuk M, **Czaja K**, Franke-Radowiecka A, Kraeling RR, Łakomy M: Leptin receptors (Ob-R) in neurons of the sympathetic chain (SChG) and prevertebral ganglia (PVG) innervating perirenal fat tissue in the pig. 19th Congress of the Polish Anatomical Society, 35th Symposium of the Polish Society of Cytochemistry and Histochemistry, Wrocław, Poland, 2001.
47. **Czaja K**, Pidsudko Z, Kraeling RR, Łakomy M: Immunohistochemical characteristics of leptin-receptor-containing neurons supplying the subcutaneous adipose tissue in the pig. 5th International Congress of the Polish Neuroscience Society, Toruń, Poland, 2001.
48. Pidsudko Z, Kaleczyc J, **Czaja K**, Łakomy M, Majewski M: Distribution and chemical coding of neurons in the prevertebral ganglia supplying the urinary bladder trigone in the pig. 5th International Congress of the Polish Neuroscience Society, Toruń, Poland, 2001.
49. **Czaja K**, Pidsudko Z. Sienkiewicz W, Łakomy M: Zastosowanie tracerów transsynaptycznych do badania unerwienia tkanki tłuszczowej. Konferencja, Genetyczne, molekularne i komórkowe podstawy patologii i terapii ośrodkowego układu nerwowego", Warszawa, Poland, 2001.
50. Pidsudko Z, **Czaja K**, Majewski M, Kaleczyc J, Sienkiewicz W, Łakomy M: Zastosowanie metod wstecznego znakowania neuronalnego do oceny funkcji zwoju trzewnego i krezkowego przedniego u zwierząt. Konferencja, Genetyczne, molekularne i komórkowe podstawy patologii i terapii ośrodkowego układu nerwowego", Warszawa, Poland, 2001.
51. **Czaja K**, Kraeling RR, Kaleczyc J, Pidsudko Z, Całka J, Łakomy M: Leptin receptor immunoreactivity in neurons of the hypothalamus identified after injection of pseudorabies virus into the porcine adipose tissue. 97. Versammlung Anatomische Gesellschaft, Halle, Germany, 2002.
52. Pidsudko Z, Kaleczyc J, **Czaja K**, Łakomy M, Scheuermann DW, Timmermans J-P, Majewski M: Chemically induced inflammation of the bowel affects the synaptic input to the inferior mesenteric ganglion (IMG) neurons projecting to the small and large intestine. 97. Versammlung Anatomische Gesellschaft, Halle, Germany, 2002.

53. **Czaja K**, Kraeling RR, Kaleczyc J, Pidsudko Z, Łakomy M: Leptin receptor- and neuropeptide Y-immunoreactivity in the arcuate nucleus neurons supplying the porcine adipose tissue. 12th Annual Meeting of the European Neuropeptide Club, Mierki k/Olsztyna, Poland, 2002.
54. Pidsudko Z, Kaleczyc J, **Czaja K**, Sienkiewicz W, Łakomy M, Majewski M: Distribution and chemical coding of neurons in pelvic ganglia supplying the porcine urinary bladder. 12th Annual Meeting of the European Neuropeptide Club, Mierki k/Olsztyna, Poland, 2002.
55. **Czaja K**, Kraeling RR, Kaleczyc J, Pidsudko Z, Łakomy M: Leptin receptor- and neuropeptide Y-immunoreactivity in the paraventricular nucleus neurons supplying the porcine adipose tissue identified after injection of pseudorabies virus. 17th International Symposium on Morphological Sciences, Timişoara, Romenia, 2002.
56. Wojtarowicz A, **Czaja K**: Wpływieku i krzyżowania międzyrasowego na budowę makroskopową płuc u owiec. 31st Międzynarodowe Seminarium Kół Naukowych, UW-M Olsztyn, Poland, 2002.
57. Burns GA, Ritter RC, **Czaja K**. Age-related changes in NMDA receptor subunit phenotypes in vagal afferent neurons in the rat. SFN Annual Meeting, Washington, DC, 2005.
58. **Czaja K**, Ritter RC, Burns GA. N-methyl-D-aspartate (NMDA) receptor subunit composition in nodose ganglion neurons innervating the stomach and duodenum in the rat. SFN Annual Meeting, Washington, DC, 2005.
59. **Czaja K**, Burns GA, Ritter RC. Replacement of nodose ganglion neurons following capsaicin treatment of adult rats: a new model system for adult neurogenesis. SFN Annual Meeting, Atlanta, GA, 2006.
60. **Czaja K**, Burns GA, Ritter RC. Capsaicin-induced neuronal proliferation in nodose ganglion of adult rats: a new model system for damage-induced repair of sensory neurons. SFN Annual Meeting, San Diego, CA, 2007.
61. **Czaja K**, Burns GA, Ritter RC. Hindbrain glutamatergic control of meal size: Evidence for participation of specific N-methyl-D-aspartate receptor (NMDAR) phenotypes on myelinated vagal afferent neurons. SSIB Meeting, Steam Boat, CO, 2007.
62. Gallaher ZR, Larios RT, Sprunger LK, **Czaja K**. Capsaicin-induced plasticity of dorsal root ganglion neurons projecting to the peritoneum of the rat. SFN Annual Meeting, Washington, DC, 2008.
63. **Czaja K**, Ryu V, Gallaher ZR. Capsaicin-induced neuronal death triggers division of pluripotent cells within the nodose ganglia, sufficient to replace lost neurons. SFN Annual Meeting, Chicago, IL, DC, 2009.
64. Ryu V, Gallaher ZR, **Czaja K**. A restoration of viscerosensory connections following a capsaicin-induced nerve injury is due to the regeneration of damaged terminals and the neural proliferation. Chicago, IL, DC, 2009.
65. Gallaher ZR, Larios RT, Sprunger LK, **Czaja K**. Neural plasticity of primary sensory neurons following damage of C-type afferents in adult rats. ISNR Pacific Groove, CA, 2009.
66. Gallaher ZR & **Czaja K**; Injury-induced neurogenesis within the sensory ganglia of adult rats. 32nd Annual ARCS Foundation Luncheon (2010), Seattle, WA 98101.
67. Ryu V, Gallaher Z, **Czaja K**; Capsaicin-induced damage in adult nodose ganglion is followed by neural proliferation. Adult Neurogenesis: Structure and Function, May 27-30, 2010, Frauenchiemsee, Germany
68. Gallaher ZR, Larios RM, Ryu V, Sprunger LK, **Czaja K**; NEURAL PLASTICITY OF PRIMARY SENSORY NEURONS FOLLOWING DAMAGE OF C-TYPE AFFERENTS IN ADULT RATS. 2010 WSU Academic Showcase,
69. V. C. AKIN, P. DUFFY, N. HUSTON, **K. CZAJA**, M. COVASA, R. C. RITTER; CCK-induced activation of glutamatergic myenteric ganglion neurons: A potential source of glutamate for control of food intake by abdominal vagal NMDA-receptors. SFN 2010, 91.8/GGG13,

70. J. S. WRIGHT, T. HERZOG, M. COVASA, **K. CZAJA**, R. C. RITTER; Selective antagonism of hindbrain NMDA-type glutamate receptors reverses reduction of food intake by cholecystokinin. SFN 2010, 191.24/EEE8,
71. V. RYU, Z. R. GALLAHER, **K. CZAJA**; Newborn neurons contribute to the restoration of vagal viscerosensory innervation following capsaicin-induced neuronal damage in the adult rat. SFN 2010, 435.15/B5,
72. **K. CZAJA**, T. HERZOG, Z. R. GALLAHER, V. RYU, N. HUSTON, R. C. RITTER; Subdiaphragmatic vagotomy induces long-lasting changes in hindbrain, spinal and ganglionic microglia activation. SFN 2010, 795.7/EEE2,
73. L. Cyr, V. Ryu and **K. Czaja**; Generation of peripheral vagal afferents and disparities in cell morphology of the nodose ganglia following axotomy and capsaicin treatment in adult rats. 2010 WSU/CVM Student Research Symposium,
74. Gallaher ZR, Ryu V, Larios RM, Sprunger LK, **Czaja K**, Neural proliferation and restoration of neurochemical phenotypes and compromised functions following capsaicin-induced neuronal damage in the nodose ganglion of the adult rat. 2010 WSU/CVM Student Research Symposium.
75. Wanty R, Ritter R, **Czaja K**, Aging of vagal afferent glutamatergic neurons in the rat. SSIB Annual Meeting 2011, Clearwater, Florida
76. Z. R. GALLAHER, S. T. JOHNSTON, **K. CZAJA**; Proliferation of endogenous neural progenitor cells in adult dorsal root ganglia following exposure to capsaicin. SFN 2011, 130.19/A52,
77. V. RYU, J. H. PETERS, G. RONCHI, **K. CZAJA**; Primary afferent retraction and reinnervation at vagal central terminals in the nucleus of the solitary tract following subdiaphragmatic vagotomy. SFN 2011, 870.16/D48,
78. C. A. CAMPOS, **K. CZAJA**, M. COVASA, R. C. RITTER; Hindbrain NMDA receptor activation mediates CCK-induced increase in hindbrain ERK 1/2 phosphorylation and reduction of food intake. SFN 2011, 395.20/WW40,
79. K. CZAJA, R. C. RITTER, C. K. CALLAHAN, M. TOSCANO, S. T. JOHNSTON; Capsaicin acts via the central nervous system to prevent diet-induced body fat accumulation. SFN 2012, 798.12/AAA15
80. **K. CZAJA**, P. DI LORENZO, L. BALLSMIDER, C. CALLAHAN; Vertical gastric sleeve surgery does not reduce body fat accumulation or body weight gain in lean Sprague Dawley male rats. SFN 2013, 476.14/III36

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Education

2005	Ph.D.	Education	Kansas State University
2001	M.S.	Kinesiology	Kansas State University
1998	B.A.	Sports Medicine	Whitworth College

Certifications

2014-present	Training Center Faculty, American Heart Association
2012-present	Mental Health First Aid Certification
2012-present	K1/K2 Kinesiotaping Certification
2011-present	Instructor for CPR/AED/First Aid for the Professional Rescuer, Red Cross
2011-present	Green Dot By-stander Trainer Certification
2008-present	Washington State Licensed Athletic Trainer (AT/L)
2005-2006	Kansas Licensed Athletic Trainer (ATC-L)
1998-2004	Registered Kansas Athletic Trainer (ATC-R)
1999-present	BOC certification
1996-present	CPR/AED for the Healthcare Provider, American Red Cross

Professional Experience

Washington State University- Associate Professor

Athletic Training Program Director (June 2007-present)

- Lead, manage, and maintain CAATE accreditation (site-visit Fall 2009 – Full accreditation awarded until 2020)
- Communicate with Athletic Training clinical staff and community clinical sites
- Responsible for developing and planning all academic related items for the athletic training major
- Responsible for maintaining and implementing all assessment related items for the major and program

Assistant Professor (August 2006-2013)

- Responsible for all aspects of the course development including syllabus, selection of textbooks, construction of exams, instruction, course development and evaluation, etc.
- Communicate with members of the faculty, administrative and support staff
- Involved in the development of program development for the Kinesiology programs and related outcomes

Principal-Investigator, Neck Strength and Concussion relationship (Fall 2010-present)

- Procurement of BTE Multi-cervical unit equipment for research project ($40,000)
- Development of study design
- Monitor study progress, data collection and coordination of student research assistants

Principal-Investigator, Impacts in youth soccer and relationship to concussion and neck strength (Spring 2012-present)

- Procurement of X2 Impact equipment for research project ($6,000)
- Development of study design
- Monitor study progress, data collection and coordination of student research assistants

Co-Principal Investigator, Concussion Education Effectiveness (Summer 2012-present)

- Development of study design
- Monitor study progress, data collection and coordination of student research assistants

Associate Director, National Aquatic and Sports Medicine Institute (May 2008- August 2011)

- Responsible for all communication between institute staff and participants
- Coordinate all research projects at the institute
- Responsible for all Institutional Review Board applications and modifications
- Responsible for publications/information on current research projects

Co-Principal Investigator, Biophysiologic Effects of Water Immersion (2007-2011)

- Development of study design
- Submittal of Institutional Review Board proposal and renewals
- Data collection, analysis and supervision of staff

Principal-Investigator, Asthma and Exercise Study (August 2008-September 2010)

- Development of study design
- Submitted proposal to full-board of Institutional Review Board
- Monitor study progress, data collection, coordination of staff

Bethany College

Assistant Professor (August 2004-August 2006)

- Responsible for all aspects of the course development including syllabus, selection of textbooks, construction of exams, instruction, course development and evaluation, etc.
- Responsible for attending all department, division and faculty wide meetings
- Communicate with members of the faculty, administrative and support staff

Program Consultant for Athletic Training (May 2006-September 2006)

- Responsible for the application process for candidacy and initial accreditation from CAAHEP.
- Responsible for developing and planning all academic related items for the athletic training major
- Responsible for the transition between program directors

Program Director of Athletic Training (August 2004-May 2006)

- Responsible for the application process for candidacy and initial accreditation from CAAHEP.
- Responsible for developing and planning all academic related items for the athletic training major
- Responsible for maintaining and implementing all assessment related items for the major and program

Kansas State University

Graduate Research Assistant, Graduate School (August 2001-May 04)

- Performed various duties for the Associate and Assistant Dean of the Graduate School
- Entered, compiled and ran reports for several university and outside surveys
- Planned and implemented a university wide new graduate student orientation
- Develop and maintained recruitment material, including brochures and posters

Intramural ATC (August 1998-May 04)

- Provided on site first aid, preliminary diagnosis and immediate treatment of injuries
- Monitored all intramural activities and apply preventative taping
- Communicated with all recreation complex participants and administration
- Communicated and assist emergency medical personnel when called on site

Lab Assistant, Vascular Control Lab (May 2000-August 01)

- Perform rat training, treatment and dissection of test subject rats
- Conduct chemical assays and various lab preparations
- Maintain ethical standards and ideal lab conditions

Research

Publications (Refereed Journal)

Hildenbrand, K. and Vasavada, A. Collegiate and high school athlete neck strength in neutral and rotated postures, *Journal of Strength and Conditioning Research, (in press).*

Hildenbrand, K., Barbosa-Leiker, C., & Melchior, D. (2012). Different immersion temperatures' impact upon blood pressure of individuals with varied sex and age. *International Journal of Aquatic Research and Education,* 6(4):303-314.

Hildenbrand, K., & Schultz, J., (2012). Assessment for learning: Development of a rubric to improve Critical Thinking. *Journal of Education in Athletic Training*, 7(3):86-94.

Hildenbrand, K., Freson, T., Barbosa-Leiker, C., Nordio, S., Becker, B. & Miller, A. (2011). The Impact of an Aquatic Exercise Protocol on Physiologic Measures within an Asthmatic Population. *International Journal of Aquatic Research and Education,* 5(4): 378-388.

Sanders, J., & Hildenbrand, K. (2010) Major concerns? A longitudinal analysis of student-athletes' academic majors in comparative perspective. *Journal of Intercollegiate Sport.* 3:213-233.

Hildenbrand, K., Nordio, S., Freson, T.S., & Becker, B. (2010). Development of an Aquatic Exercise Training Protocol for the Asthmatic Population, *International Journal of Aquatic Research and Education*, 4(3): 278-299.

Hildenbrand, K., Becker, B., Whitcomb, R., & Sanders, J., (2010). Age-Dependent Autonomic Changes Following Immersion in Cool, Neutral, and Warm Water Temperatures, *International Journal of Aquatic Research and Education*, 4(2): 127-146 .

Hildenbrand, K., Sanders, J., Leslie-Toogood, A., & Benton, S., (2009). Athletic Status and Academic Performance and Persistence at a NCAA Division 1 University, *Journal for the Study of Sports and Athletes in Education*. 3(1): 41-58.

Becker, B., Hildenbrand, K., Whitcomb, R., & Sanders, J., (2008). Biophysiologic Effects of Water Immersion. *International Journal of Aquatic Research and Education,* 3(1): 24-37.

Hildenbrand, K., & Noble, L. (2004). Abdominal Muscle Activity While Performing Trunk-Flexion Exercises Using the Ab Roller, ABslide, FitBall, and Conventionally Performed Trunk Curls. *Journal of Athletic Training.* 39(1):37-43.

Publications in Review (Refereed Journal)

Suderman, B.L, Hildenbrand, K., & Vasavada, A.N., Neck strength and muscle activity in sagittal plane postures for male subjects. *Spine,* (submitted November 2012)

Hildenbrand, K., Vasavada, A., & Karstetter, J. Relationship between neck strength and history of concussion, *Journal of Athletic Training*, (submitted May 2012)

Published Conference Abstracts (Refereed)

Hildenbrand, K., Nordio, S., Freson, T., & Becker, B. (June 2010). Development of an Aquatic Exercise Training Protocol for the Asthmatic Population, *Medicine and Science in Sports and Exercise*, 42:5 Supplement.

Hildenbrand, K., & Becker, B., (May 2009). Aging and the Autonomic Nervous System: Effects of Water Immersion, *Medicine and Science in Sports and Exercise*, 41:5 Supplement.

Becker, B., & Hildenbrand, K., (May 2008). Biophysiologic Effects of Water Immersion. *Medicine and Science in Sports and Exercise,* 40:5 Supplement.

Projects in Process

Hildenbrand, K., & Pietz, K., An investigation of concussion education content and effectiveness, Athletic Training and Sports Health Care. In-preparation.

Hildenbrand, K., Pietz, K., & Mitchell, S., Understanding and Application of current concussion guidelines by Emergency Department physicians, Clinical Journal of Sports Medicine. In-preparation.

Hildenbrand, K., & Schultz, J., Use of a critical thinking rubric for program wide assessment. *Journal of Education in Athletic Training*, In-preparation

Hildenbrand, K., and Dougher, M.. Measure of processing speed and working memory in concussion with gender and learning disability modifiers, *Athletic Training and Sports Health Care*. In-preparation

Scholarly Conference Presentations (Peer Reviewed)

Hildenbrand, K., Nordio, S., Freson, T., & Becker, B. (June 2010). *Development of an Aquatic Exercise Training Protocol for the Asthmatic Population.* Poster Presentation to the American College of Sports Medicine, Baltimore, MD.

Hildenbrand, K., Becker, B., & Whitcomb, R. (May, 2009). *Aging and the Autonomic Nervous System: Effects of Water Immersion*. Slide Presentation to the American College of Sports Medicine, Seattle, WA.

Hildenbrand, K., Ater-Kranov, A., & Schultz, J., (January, 2009). *Extending Beyond the Classroom to Prepare Kinesiology Students for Success in 21st Century Careers,* Presentation at Association of American Colleges and Universities Annual Conference. Seattle, Washington.

Becker, B., & Hildenbrand, K., (June, 2008). *Aquatic Immersion Temperature Effects Upon the Autonomic Nervous System.* Presentation at the 36th Annual Congress of the International Society of Medical Hydrology & Climatology. Porto, Portugal.

Becker, B., & Hildenbrand, K., (May, 2008). *Biophysiologic Effects of Water Immersion.* Poster Presentation to the American College of Sports Medicine, Indianapolis, IN.

Parmenter, B., Langill, M., Lanni, K., Hawes, S., Brueggemeier, C., Hildenbrand, K., & Drake, W., (February, 2008). *Analysis of performance on the n-back paradigm,* Poster Presentation to the Annual Meeting of the International Neuropsychological Society. Waikoloa, HI.

Hildenbrand, K., & Noble, L. (June, 2002). *Abdominal Muscle Activity While Performing Trunk-Flexion Exercises Using the Ab Roller, ABslide, FitBall, and Conventionally Performed Trunk Curls.* Poster Presentation for the National Athletic Trainers Association. Dallas, Texas

Hildenbrand, K., & Noble, L. (October, 2001). *Abdominal Muscle Activity While Performing Trunk-Flexion Exercises Using the Ab Roller, ABslide, FitBall, and Conventionally Performed Trunk Curls.* Poster Presentation to the American College of Sports Medicine Regional Conference. Kansas City, Missouri.

University Conference Presentations (Peer-reviewed)

Becker, B., Hildenbrand, K., Whitcomb, R., & Child, W., (March, 2008). *Biophysiologic Effects of Warm Water Immersion.* Poster Presentation to the WSU Academic Showcase. Pullman, WA.

Hildenbrand, K., Schultz, J., Ater-Kranov, A., & Desrosier, T., (March, 2008). *Critical Thinking in Kinesiology.* Poster Presentation to the WSU Academic Showcase. Pullman, WA.

Hildenbrand, K., & Noble, L. (April, 2002). *Abdominal Muscle Activity While Performing Trunk-Flexion Exercises Using the Ab Roller, ABslide, FitBall, and Conventionally Performed Trunk Curls.* Presentation to the Kansas State Graduate Research Forum. Manhattan, Kansas.

Invited Conference Presentations

Hildenbrand, K. (October 2010). *Aquatic Effects on Physiologic and Psychologic Parameters in an Asthmatic Population.* Presentation for the World Aquatic Health Conference. Atlanta, Georgia.

Becker, B., & Hildenbrand, K., (October, 2009). *Hot Water Immersion Affects the Nervous System: A Comparision of Older and Younger Populations*. Presentation for the World Aquatic Health Conference. Atlanta, Georgia.

Becker, B., & Hildenbrand, K., (October, 2008). *Aging and the Autonomic Nervous System: Effects of Cool, Neutral and Warm Water Immersion.* Presentation for the World Aquatic Health Conference. Colorado Springs, Colorado.

Hildenbrand, K., Oelke, B., & Parmenter, B. (March, 2008). *Concussions: A longitudinal Perspective.* Presentation for the Nationals Athletic Trainers Association District 10 meeting. Bellevue, Washington.

Becker, B., & Hildenbrand, K. (October, 2007). *Physiologic Changes in the Hot Tub.* Presentation for the World Aquatic Health Conference. Cincinnati, Ohio.

Service Presentations

Hildenbrand, K. (October 2013). Sport Related Concussions, Science on Tap, Coeur d 'alene, ID

Tingstad, E., Hildenbrand, K., Radakovich, J., Henry, S., & Smith, E., (September 2013). Concussion Update, Pullman Regional Hospital, Pullman, WA

Hildenbrand, K. (April 2013). Sport Related Concussions, Science on Tap, Moscow, ID.

Becker, B., & Hildenbrand, K. (December 2008). *Aquatic Institute Vision,* Presentation for the College of Education Foundation Event. Seattle, Washington.

Becker, B., & Hildenbrand, K. (December 2007). *Creation of an Aquatic Institute,* Presentation for the College of Education Foundation Event. Seattle, Washington.

Becker, B., & Hildenbrand, K. (October, 2007). *Biophysiologic Effects of Warm Water Immersion.* Presentation for the WSU Foundation Board of Trustee's. Spokane, WA.

Reviewer

2013-present Journal of Back Rehabilitation
2011-present Journal of Education in Athletic Training
2008-present International Journal of Aquatic Education and Research

Workshops

2012	Mental Health Awareness Training (2-day Workshop)
2011	WSU: Green Dot Facilitator Training (4-day Workshop)
2010-2011	WSU: Productive Proposal Workshop

Grants

2014	$722,000 Submitted Grant to the NFL Head Health Challenge, Co-PI
2013	$173,066 (Not Funded) Submitted Full grant to National Operating Standards Commission for Athletic Equipment for Neck Strength Analysis (after preliminary grant acceptance), Co-PI

2013 $8,248 Faculty Funding Award from WSU College of Education, Co-PI
2013 $15,000 (Not Funded) National High School Federation, Concussion Education, Co-PI
2013 $57,267 (Not Funded) NATA Research Foundation, Concussion Effectiveness, Co-PI
2012 $8,841 Faculty Funding Award from WSU College of Education, Co-PI
2011 $87,000 (Not Funded) Submitted Full grant to National Operating Standards Commission for Athletic Equipment for Concussion Education Research (after preliminary grant acceptance), PI
2011 $5,400 (Not Funded) Faculty Funding Award for Concussion Education research, PI
2009-2010 $3,600 Faculty Funding Award from WSU College of Education, PI
2008-2013 $1,000,000 (originally funded) National Swimming Pool Foundation (to support the creation of the National Aquatic and Sports Medicine Institute) Co-PI
2008-2010 $165,000 from the National Swimming Pool Foundation to support research on the thermal effects of warm water immersion, PI
2007-2008 $8,830 from WSU Teaching and Learning Improvement Grant, PI
2007-2009 $165,994 from the National Swimming Pool Foundation to support research on the thermal effects of warm water immersion, Co-PI

Gifts

2012-present $8,000 Gift in Kind from X2 Impact, PI (Equipment to examine the relationship between neurocognitive, neck strength, baseline measurements and impact magnitude on youth soccer players)
2010-present $40,000 Gift in Kind from BTE Technologies, PI (Equipment to examine the relationship of neck strength and the incidence of concussion)

Teaching

2006-present (Washington State University)

- Kines 199 Introduction to Motor Learning 3 credits
- Kines 263 Emergency Response 2 credits
- HF 496/KINES 496/Biol 220 Medical Terminology 3/2 credits on-line based course
- Ath T 469 Organization and Administration of Athletic Training 3 credits
- Ath T 271 Upper Extremity Evaluation of Athletic Training Injuries 3 credits
- HF 496 Medical Terminology 2 credits
- Ath T 266 Care and Prevention of Athletic Injuries, 3 credits
- MVST 262 Human Anatomy 4 credits
- MVST 262 Human Anatomy (3) Lab sections

2004- 2006 (Bethany College)

- PE 390 Nutrition
- PE 250 Prevention, Treatment and Care of Athletic Injuries
- PE 342 Exercise Physiology
- AT 101 Functional Anatomy for the Athletic Trainer
- AT 200 Introduction to Clinical Experience
- AT 301 Clinical Experience I
- AT 302 Clinical Experience II
- AT 403 Clinical Experience III
- AT 404 Clinical Experience IV
- AT 435 Administration of Athletic Training

Advising

Academic

Advisor for Certified Athletic Training Majors

2007-present Advise 56 students at various stages of progress in the Athletic Training Major

Research

Honors Thesis Advisor

2012- present Bayley DePaul,

2012-2013 Thomas Hammett, An analysis of the efficacy of current methods of scoliosis surgery for treating adolescent idiopathic scoliosis

2010-2013 Reed Odmal, Relationship of head impacts to neurocognitive performance and neck strength in youth athletes

2010-2012 Nicole Vaux, The long term effects and prevention of CTE in athletes

2010-2012 Jared Karstetter, Do Neck Strength Deficits Correlate to the Incidence of Concussion? Thesis of Distiction Honors

2008-2010 Maggie Dougher, Gender Differences on Neuropsychological Testing and Concussions Thesis of Distinction Honors

2006-2007 James Trevor Rockney, Functional Electrical Stimulation and its Effects on Cerebrovascular Accident Patients

Advisor for Auvil Scholarship Student

2008 Omar Fercha, Research involving concussions

2007 Whitney Child, Research involving water immersion

Master's in Teaching

2012-present Bud Bannon, Chair

2011-present Corinne Gaddis, Chair

2011- present Josh Emery, Chair

2012-2013 Shelby Witschen, Chair

2010-2011 Simon Waite, Chair

2009-2010 Maren Delaney, Chair

Committee Member, Masters Thesis

2009-2012 Liz Hirst, Biomechanical relationship of neck strength to shoulder pain in rowers.

2006-2007 Patti Davenport, Moral and social reasoning of certified and student athletic trainers concerning performance drug use in sport.

Service

Professional Service

National Athletic Training Association's District 10 Secretary

2012-present Secretary for District 10 (Washington, Alaska, Idaho, Oregon and Montana) One of 32 elected officials for the NATA

National Professional Development Committee, National Athletic Trainers Association

2010-present Chair of the committee, lead 7 sub-committees on various projects

National Executive Committee on Education, National Athletic Trainers Association

2013-present Committee member, educational directives of the National Association

Vice President of Washington State Athletic Trainer's Association

2007-2012 Involved in legislative effort and working with the board of directors to move issues related to athletic training throughout the state

District 10 Local Education Program Chair

2009-2010 Chair of the committee for developing the education program for the annual district 10 meeting for the Northwest Athletic Trainers Association

University

Provost Leadership Training Academy

2014-present Nominated by the Dean of the College of Education

Academic Affairs, Faculty Senate

2013-present College of Education representative

Admissions Sub-committee

2013- present Academic Affairs committee representative

College

Search Committee Chair/Member

2013-2014 Chair, 2 Tenure-Track Assistant Professors in Exercise Physiology and Biomechanics

2012 Committee Member, Tenure Associate Professor in Kinesiology Program

Undergraduate Retention and Student Success Committee

2011-present Committee member

Scholarship Committee for College of Education

2007-present Serves as a representative for the process and awarding of scholarships for undergraduate students at WSU

Cougar Pride Committee

2007-2009 PEB/Smith Building Coordinator

Department

Athletic Training Program Director

2007-present Director of accredited athletic training education program (45 students)

Athletic Training Club Advisor

2007-present Attend meetings, advise club events and promote community service and research aims

Committee Search Member for Athletic Trainers

2008-11 Served as education member for the hiring of 2 new athletic trainers in the athletic department

Area Program Coordinator for Kinesiology

2010-present Served as the program coordinator for Kinesiology to the Department Chair

2007-2008 Served as the program coordinator for Kinesiology to the Department Chair

Chair Search Committee for Clinical Coordinator

2007 Chaired the committee to hire a clinical coordinator/instructor, responsible for all paperwork, committee organization and recruitment of candidates

Kansas State University

Planning Committee, Department of Counseling and Educational Psychology,

2001- 02 Assisted with the development of the intercollegiate specialization within the College Student and Personnel Services master's program

Student Advisory Board,

2001- 02 Formed and organized a student advisory board at the request of faculty in the Counseling and Educational Psychology Department, this involved recruitment of other students to participate on the board, arranged meeting times and locations

Student Affairs Graduate Association (SAGA) Co-President,

2002- 03 Represented SAGA at all faculty meetings, and Graduate Student Council meetings. Presided over all activities and provided leadership within the graduate association.

Awards/Recognition

2012 Selected by the National Athletic Trainer's Research Foundation mentorship program (1 of 9 individuals selected): Assigned to be mentored by Kevin Guskiewicz PhD, ATC (leading concussion researcher in the United States)

2009 College of Education Legacy Leaf, Students in Athletic Training

2008 Excellence in External Funding, Department of Educational Leadership and Counseling Psychology

2008 Campus Day Award, Cougar Pride Day

Research Cited in Contemporary News Organizations and Magazines and Websites

October 2008 Cougs hit the hot tubs to show benefits of water training, Spokesman Review http://www.spokesmanreview.com/breaking/story.asp?ID=17060

October 2008 Therapy benefits athletes, WSU Today http://wsutoday.wsu.edu/pages/Publications.asp?Action=Detail&PublicationID=12928

October 2008 WSU Athletes hit hot tubs for training, Forecast Earth http://climate.weather.com/articles/hottubs102001.html

March 2008 Exploring the 'Aaah' ... $1 Million Grant Advances Aquatic Health Research, Reuters http://www.reuters.com/article/pressRelease/idUS146592+19-Mar-2008+PRN20080319

February 2008 Researchers plan aquatic health research center, The Daily Evergreen http://www.dailyevergreen.com/story/24625

January 2008 National Swimming Pool Foundation Press Release apsp.org/APSPWeeklye-ad/Jan30-08/pr-nasmi.pdf

January 2008 What is the most complete Ab workout? forum.bodybuilding.com/attachment.php?attachmentid=368171&d=1168748988

August 2005 Whitworth Athletic Training Spot Light

December 2002 Kansas State University Publicity Release on Abdominal Research

December 2002 Study: Strong abs don't require exercise machines. *The Ottawa Herald. 107*, 5. Ottawa Daily News, Ottawa Kansas
www.forum.bodybuilding.com
www.soleexercise.com/abexerciseequipment/index.html
www.exercisenetwork.info/Exercise3193198.aspx

Acknowledgements of Contributions to Research Articles

McAllister, R., Albarracin, I., Jasperse,J., & Price, M. (2004). Thyroid Status and Endothelium-dependent Vasodilation in Skeletal Muscle, *American Journal of Physiology, Regulatory Integrative Comp Physiology,* R-00061-2003R3.

McAllister, R., Albarracin, I., Price E., Smith, T., Turk, J., & Wyatt, K. (2005). Thyroid status and nitric oxide in rat arterial vessels, *Journal of Endocrinology,* 185: 111-119.

Zbreski, M., Helwigh, B., Mitchell, K., Musch, T., Weiss, M., & McAllister, R. (2006). Effects of Cyclosporine-A on Rat Soleus Muscle Fiber Size and Phenotype, *Medicine & Science in Sports & Exercise,* 38(5):833-839.

Professional Memberships

2007-present	American College of Sports Medicine
2006-present	Northwest Athletic Trainer's Association, District 10
2006-present	Washington State Athletic Trainer's Association
1998-present	National Athletic Trainer's Association
1998-2006	Mid-America Athletic Trainers' Association, District 5

CURRICULUM VITA FOR ANITA VASAVADA

EDUCATION

Ph.D.	Northwestern University, Biomedical Engineering	1999
	Thesis title: Biomechanics and neural control of human neck muscles	
M. S.	Stanford University, Mechanical Engineering	1991
B. S.	Columbia University, Mechanical Engineering	1990
B. A.	Whitman College, Mathematics/Physics	1990

PROFESSIONAL EXPERIENCE

Washington State University, Pullman, WA.
Associate Professor

Voiland School of Chemical Engineering and Bioengineering 2008-present
Department of Integrative Physiology and Neuroscience 2008-present
(formerly Veterinary and Comparative Anatomy, Pharmacology and Physiology)

Assistant Professor

School of Chemical Engineering and Bioengineering 2004-2008
Department of Veterinary and Comparative Anatomy, Pharmacology and Physiology 2001-2008
Department of Biological Systems Engineering 2001-2004

Affiliate faculty: School of Mechanical and Materials Engineering 2002-present

Visiting Scientist 2009-2010
Department of Bioengineering, Stanford University

Post-doctoral Fellow 1999-2000
Department of Neurology, Emory University, Atlanta, GA.

Graduate Research Assistant 1993-1999
Department of Biomedical Engineering, Northwestern University, and
Sensory Motor Performance Program, Rehabilitation Inst. of Chicago, Chicago, IL.

Research Support Specialist 1991-1993
Biomechanics Laboratory, Yale University, New Haven, CT.

Biomedical Engineer 1991
Veterans Administration, Rehabilitation R&D, Palo Alto, CA.

HONORS AND AWARDS

Outstanding Researcher, National Center for Simulation in Research	2012
National Science Foundation CAREER Award	2008
Outstanding Teacher in Bioengineering, Washington State University	2005
International Society of Biomechanics Student Congress Travel Grant	1999
National Science Foundation Graduate Fellowship	1994-1997
Walter P. Murphy Fellowship, Northwestern University Graduate School	1993-1994
Graduate Fellowship, Stanford University, Mechanical Engineering Department	1990-1991

Academic Honors with Distinction, Columbia University	1990
Magna cum Laude, Whitman College	1990
Tau Beta Pi, Columbia University	1989
Phi Beta Kappa, Whitman College	1986

TEACHING

Bioelectric Phenomena and Devices — Spring 2014
- Co-developed and co-taught course.

Cardiovascular and Neural Engineering — Spring 2012
- Co-developed and co-taught course.

Biomedical Engineering Principles (BE 481/ChE 476; 3 credits (lecture only)) — Spring 2011
- Co-developed and co-taught course.

Systems Bioengineering (BE 541; 3 credits (lecture only)) — Spring 2011
- Co-developed and co-taught course.

Unified Systems Bioengineering I (BE 340; 4 credits (3 lecture, 1 lab)) — Spring 2008-2009
- Sole instructor.

Mechanics of Biological Materials (BE 321; 3 credits (lecture only)) — Fall 2010-2013

Mechanics of Biological Materials (BE 320[M]; 4 credits (3 lecture, 1 lab)) — Fall 2007-08
- Substantially modified existing course and sole instructor.

Biomechanics (BE 425/525; 3 credits (lecture only)) — Spring 2005-2006, 2009, 2011, 2013
- Co-developed and co-taught course.

Bioengineering Analysis (BE 210; 2 credits (1 lecture, 1 lab)) — Spring 2004-2007, 2012-2014
- Developed course and sole instructor.

Professional Preparation and Ethics (BE 205; 1 credit) — Fall 2003-2004, 2006, 2011-2013
- Developed course and sole instructor.

Functional Neuroscience (Neuro 520) — Fall 2003-2005, 2011-2013
- Team-taught course.
- 3-hour lecture and 2-hour discussion per week for 2-3 weeks (4 credits).

Biological Systems Analysis and Design (BSysE 210; 3 credits (2 lecture, 1 lab)) Fall 2001-2002
- Substantially modified course and sole instructor.

STUDENTS MENTORED

Graduate Students as major advisor (5):

Kaitlyn Roberts (M.S., Chemical Engineering)	2010 - present
Derek Nevins (M.S., Engineering)	2010 – 2012
Beth Suderman (Ph.D., Mechanical Engineering)	2008 – 2012
Liying Zheng (Ph.D., Mechanical Engineering)	2004 – 2011
Gerald Lucas (M.S., Mechanical Engineering)	2004 – 2006

Graduate Thesis Committees (11):

Ryan Kelley (Ph.D., Mechanical Engineering)	2013 - present
Chrystal Quisenberry (Ph.D., Engineering Science)	2012 - present
Sahar Vahabzadeh (Ph.D., Mechanical Engineering)	2012 - present
Nathan Darnall (Ph.D., Mechanical Engineering)	2011 - present
Vladimir Borisov (Ph.D., Engineering Science)	2010 - present
Gary Fielding (Ph.D., Engineering Science)	2011 - 2013
Anish Shivaram (M.S., Mechanical Engineering)	2013
Sampath Gollapudi (Ph.D., Mechanical Engineering)	2003 - 2010
Scott Rewinkel (M.S., Mechanical Engineering)	2008 - 2009
Danny Godbout (M.S., Mechanical Engineering)	2006 - 2008
Matthew Albright (M.S., Exercise Science)	2001 - 2002

Undergraduate and Professional (20):

Ellis Hughes (Bioengineering)	2013 - present
Victor Small (Bioengineering)	2013 - present
Thu Ly (Bioengineering)	2013
Steven Monda (Bioengineering)	2012 - present
Kyle Blum (Bioengineering)	2011 - 2012
Katrina Hansen (Bioengineering)	2010
Derek Nevins (Bioeng.; Undergraduates in Biology and Math (UBM) Program)	2009 - 2010
Ben Ware (Bioengineering)	2008 - 2009
Justin Tanner (Bioengineering)	2008
Darrin Trask (Bioengineering; UBM Program)	2007 - 2009
Konstantin Stakhovich (Mathematics; UBM Program)	2007 - 2008
Jessica Jahn (Biological Systems Eng./Bioengineering; McNair Achievement Scholar)	2006
Linda Rico (Biology)	2006 - 2007
Ahmad Bayomy (Bioengineering)	2005
Richard Lasher (Bioengineering)	2003 - 2006
Travis Meyer (Bioengineering)	2003 - 2006
Christopher Robinson (Veterinary Student)	2002
Andrew Hsu (Neuroscience)	2002 - 2003
Jess Anderson (Veterinary Student)	2001 - 2003
Amanda Scannell (Biological Systems Engineering)	2001 - 2002

Non-WSU Thesis Committee membership (3)

Missy Thompson (Ph.D., Neuroscience, University of Idaho)	2011 - present
Anna Carlson (Ph.D., Applied Mechanics, Chalmers Inst. of Technology, Sweden)	2011 – 2012
Maurice Curtin (Ph.D., Electrical Engineering, University College, Dublin, Ireland)	2014

Other Research Mentoring (2):

Gulsum Oygizit, DVM from Turkey	2008 - 2009
Anne-Margreet Knotterus, M.D. from the Netherlands	2006 - 2007

High School (3):

Ashok Manoranjan (Pullman High School; shadow)	2013
Anna Flury (Rogers High School, Puyallup; job shadow)	2011
Sarah Slinker (Pullman High School; senior project mentor)	2008 – 2009

PUBLICATIONS

Refereed Journal Articles:

1. **Vasavada, AN**, Nevins, DD, Monda, SM, Hughes, E, Lin, DC. Gravitational Demand on the Neck Musculature during Tablet Computer Use. *Ergonomics*, submitted, 2013.

2. Nevins DD, Zheng, L, **Vasavada, AN**. Inter-individual Variation in Vertebral Kinematics Affects Predictions of Neck Musculoskeletal Models. *Journal of Biomechanics*, submitted, 2013.

3. Lin, D., Godbout, D., **Vasavada, AN**. Assessing the perception of human-like mechanical impedance for robotic systems. *IEEE Transactions on Human-Machine Systems,* 43(5), 479-486, 2013.

4. Hildenbrand, K, **Vasavada, AN**. Collegiate and high school athlete neck strength in neutral and rotated postures. *Journal of Strength and Conditioning Research,* 27(11):3173-82, 2013.

5. Zheng, L, Siegmund, GP, Ozyigit, G, **Vasavada, AN**. Sex-specific prediction of neck muscle volumes. Journal of Biomechanics, 46:899-904, 2013.

6. Zheng L, Jahn J, **Vasavada, AN**. Sagittal plane kinematics of the adult hyoid bone. *Journal of Biomechanics*, 45:531-536, 2012.

7. Suderman, BL, **Vasavada, AN**. Moving muscle points provide accurate curved muscle paths in a model of the cervical spine. *Journal of Biomechanics*, 45:400-404, 2012.

8. Suderman, BL, Krishnamoorthy, B, **Vasavada, AN**. Neck muscle paths and moment arms are significantly affected by wrapping surface parameters. *Computer Methods in Biomechanics and Biomedical Engineering,* 15:7:735-744, 2012.

9. Jahn J, McMulkin ML, **Vasavada, AN**. Calf muscle-tendon lengths before and after Tendo-Achilles lengthenings and gastrocnemius lengthenings for equinus in cerebral palsy and idiopathic toe-walking. *Gait and Posture*, 29(4):612-617, 2009.

10. Hicks, DH, Pitts, MJ, Bagley, RS, **Vasavada, A**, Simon, J, Chen, AV, Wininger, FA. *In vitro* biomechanical evaluation of a novel internal fixation implant and a traditional pin with polymethylmethacrylate internal fixation implant used to stablize the C4 – 5 vertebral motion unit in canine cervical spines. *American Journal of Veterinary Research*, 70(6)719-26, 2009.

11. **Vasavada, AN**, Lasher, RA, Meyer, TE, Lin, DC. Defining and evaluating MRI-derived wrapping surfaces for spinal muscles. *Journal of Biomechanics*, 41:1450-1457, 2008.

12. **Vasavada, AN**, Danaraj, J, Siegmund, GP. Head and neck anthropometry, vertebral geometry and neck strength in height-matched men and women. *Journal of Biomechanics*, 41:114-121, 2008.

13. **Vasavada, AN**, Brault, JR, Siegmund, GP. Musculotendon and fascicle strains in anterior and posterior neck muscles during whiplash injury. *Spine*, 32(7):756-765, 2007.

14. Anderson, J, Hsu, A, **Vasavada, AN**. Morphology, architecture and biomechanics of the human cervical multifidus. *Spine*, 30:4:E86-E91, 2005.

15. **Vasavada, AN**, Peterson, BW, Delp, SL. Three-dimensional spatial tuning of neck muscle activations in humans. *Experimental Brain Research*, 147:4:437-448, 2002.

16. Panjabi, MM, Crisco, JJ, **Vasavada, A**, Oda, T, Cholewicki, J, Nibu, K, Shin, E. Mechanical properties of the human cervical spine as shown by three-dimensional load-displacement curves. *Spine*, 26(24):2692-2700, 2001.

17. **Vasavada, AN**, Li, S, Delp, SL. Three-dimensional isometric strength of neck muscles in humans. *Spine*, 26(17):1904-1909, 2001.

18. **Vasavada, AN,** Li, S, Delp SL. Influence of muscle morphometry and moment arms on the moment-generating capacity of human neck muscles. *Spine,* 23(4):412-422, 1998.

19. Kifune, M, Panjabi, MM, Liu, W, Arand, M, **Vasavada, A**, Oxland, T. Functional morphology of the spinal canal after endplate, wedge, and burst fractures. *Journal of Spinal Disorders.* 10(6):457-66, 1997.

20. Panjabi, MM, Kifune, M, Wen, L, Arand, M, Oxland, TR, Lin, RM, Yoon, WS, **Vasavada, A**. Dynamic canal encroachment during thoracolumbar burst fractures. *Journal of Spinal Disorders.* 8(1):39-48, 1995.

21. Panjabi, MM, Lydon, C, **Vasavada, A**, Grob, D, Crisco, JJ, Dvorak, J. On the understanding of clinical instability. *Spine*, 19(23):2642-50, 1994.

22. Grob, D, Panjabi, MM, Dvorak, J, Humke, T, Lydon, C, **Vasavada, A,** Crisco, JJ. Die instabile Wirbelsaule--eine "In-vitro-" und "In-vivo-Studie" zum besseren Verstandnis der klinischen Instabilitat. [The unstable spinal column--an "in vitro" and "in vivo study" on better understanding of clinical instability]. *Orthopade*, 23(4):291-298, 1994.

23. Chen, I-H, **Vasavada, AN**, Panjabi, MM. Kinematics of the cervical spinal canal: Changes with sagittal plane loads. *Journal of Spinal Disorders*, 7(2):93-101, 1994.

24. Mimura, M, Panjabi, MM, Oxland, TR, Yamamoto, I, Crisco, JJ, **Vasavada, A**. Disc degeneration affects the multidirectional flexibility of the lumbar spine. *Spine*, 19(12):1371-1380, 1994.

25. Ahlgren, BD, **Vasavada, AN**, Brower, RS, Lydon, C, Herkowitz, HN, Panjabi, MM. Effect of annular incision technique on the strength and multidirectional flexibility of the healing intervertebral disc. *Spine*, 19(8):948-954, 1994.

26. **Vasavada, AN**, Delp, SL, Maloney, WJ, Schurman, DJ, Zajac, FE. Compensating for changes in muscle length in total hip arthroplasty: Effects on the moment-generating capacity of the muscles. *Clinical Orthopaedics and Related Research*, 302:121-133, 1994.

Invited Reviews:

1. Siegmund, GP, Winkelstein, BA, Ivancic, PC, Svensson, MY, **Vasavada, AN**. The anatomy and biomechanics of acute and chronic whiplash injury. *Traffic Injury Prevention*, 10(2):101-112, 2009.

Book Chapters:

1. **Vasavada, AN**, Delp, SL, Lieber, R. Architectural Design and Function of Human Back Muscles, in *Rothman-Simeone, the Spine*, 5th ed. W.B. Saunders Co., Philadelphia, 2006.

2. Panjabi, MM, **Vasavada, AN**, White, AA. Cervical Spine Biomechanics, in *Seminars in Spine Surgery*, Vol. 5, No. 1, pp. 10-16. W. B. Saunders Co., Philadelphia, 1993.

3. Panjabi, MM, **Vasavada, AN**, White, AA. Biomechanical Principles of Spinal Fusion, in *Spine: State of the Art Reviews*, Vol 6, No. 3, pp. 435-443. Hanley and Belfus, Inc., Philadelphia, 1992.

Conference Proceedings (Peer-reviewed):

1. Cox, CA, Dibb, AT, Cutcliffe, HC, Nightingale, RW, Myers, BS, **Vasavada, AN**, Suderman, B, Bass, CR. The influence of modeling methods and paths on head and neck response. World Congress on Computational Mechanics, Barcelona, Spain, July 20 – 25, 2014.

2. Cohen, RG, Smith, B, Sanders, N, Johnson, KN, **Vasavada, AN**, Schmitter-Edgecombe, M. Forward Head Posture in Older Subjects is Associated with Cognitive Deficits. International Society for Posture and Gait Research, Vancouver, BC, Canada, June 29 – July 3, 2014.

3. **Vasavada, AN**, Nevins, DD, Monda, S, Lin, DC. Neck muscle mechanical demand during tablet PC use. Biomedical Engineering Society, Seattle, WA, Sept. 25-28, 2013.

4. Nevins, DD, Zheng, L, **Vasavada, AN**. Sensitivity of neck musculoskeletal model predictions to variation in intervertebral kinematics. Podium presentation at ASME Summer Bioengineering Conference, Sunriver, OR, June 26-29, 2013.

5. Suderman, BL, **Vasavada, AN**. Effect of curvature on sagittal plane moment arms of human neck muscles. Podium presentation at ASME Summer Bioengineering Conference, Sunriver, OR, June 26-29, 2013.

6. Suderman, B, **Vasavada, AN**. MRI-derived moment arms of neck muscles during sagittal plane motion. Podium presentation at Canadian Society of Biomechanics, Vancouver, BC, June 6-9, 2012.

7. Siegmund, GP, **Vasavada, AN**, Blouin, JS. The human splenius capitis muscle is primarily a head-neck rotator. Podium presentation at American Society of Biomechanics, Long Beach, CA, Aug. 10-13, 2011.

8. Suderman, BL, **Vasavada, AN**. Moving muscle points provide accurate curved paths in a model of the cervical spine. Poster presentation at American Society of Biomechanics, Long Beach, CA, Aug. 10-13, 2011.

9. Zheng, L, Siegmund, GP, Vasavada, AN. Accurate prediction of neck muscle volumes using a two-step process. Poster presentation at American Society of Biomechanics, Long Beach, CA, Aug. 10-13, 2011.

10. **Vasavada, AN**, Trask, D, Knottnerus, A, Lin, DC. Effects of head position and impact direction on neck muscle response to perturbations. Podium presentation at American Society of Biomechanics, State College, PA, August 26-29, 2009.

11. Zheng, L, Jahn, J, **Vasavada, A**. Sex differences in posture and kinematics of the human head and neck. Poster presentation at American Society of Biomechanics, State College, PA, August 26-29, 2009.

12. Hicks, DH, Pitts, MJ, Bagley, RS, **Vasavada, A**, Simon, J, Chen, AV, Wininger, FA. Biomechanical evaluation of two internal fixation implants used for canine cervical spine arthrodesis. American College of Veterinary Internal Medicine, San Antonio TX, 2008.

13. **Vasavada, AN**, Danaraj, J, Siegmund, GP. Gender differences in neck geometry and strength in height-matched subjects. Podium presentation at World Congress on Neck Pain, Los Angeles, CA, January 20-22, 2008.

14. Zheng, L, Rico, L, Lasher, R, **Vasavada, AN**. Biomechanical neck model based on the Visible Human Female. Podium presentation at American Society of Biomechanics, Stanford, CA, August 23-25, 2007.

15. **Vasavada, AN**, Danaraj, J, Siegmund, GP. Female necks are not uniformly scaled versions of male necks. Podium presentation at American Society of Biomechanics, Stanford, CA, August 23-25, 2007.

16. **Vasavada, AN**, Lasher, RA, Meyer, TE. Criteria for wrapping surfaces for spinal muscles. Poster presentation at American Society of Biomechanics, Stanford, CA, August 23-25, 2007.

17. Jahn, J, McMulkin, M and **Vasavada, AN.** Calf muscle lengths increase after tendo-Achilles lengthenings but not Vulpius procedure surgeries for equinus. Poster presentation at Gait and Clinical Movement Analysis Society, Springfield, MA, April 11-14, 2007.

18. **Vasavada, AN**, Brault, JR and Siegmund, GP. Potentially injurious lengthening contractions of the neck muscles during whiplash. Podium presentation at International Whiplash Trauma Congress, Portland, OR, June 2-3, 2006.

19. Anderson, J, Hsu, A, **Vasavada, A**. Morphology, architecture and biomechanics of human cervical multifidus muscles. Poster presentation at American Society of Biomechanics, Portland, OR, September 8-11, 2004.

20. Krithivasan P and **Vasavada A**. Angular acceleration of the head/neck system induced by sternocleidomastoid. Poster presentation at American Society of Biomechanics, Portland, OR, September 8-11, 2004.

21. Lasher R, Meyer T, Kraemer K, Gavin P, **Vasavada A**. MRI-based geometry of neck muscles for biomechanical models. Poster presentation at American Society of Biomechanics, Portland, OR, September 8-11, 2004.

22. **Vasavada, AN,** Brault, JR, Siegmund, GP. Neck muscle strains in whiplash injury. Podium presentation at Biomedical Engineering Society, Nashville, TN, October 1-4, 2003.

23. **Vasavada, AN,** Brault, JR, Siegmund, GP. Neck muscle strains in whiplash injury. Poster at World Congress of Biomechanics, Calgary, Canada, August 4 – 9, 2002.

24. **Vasavada, AN**, Li, S and Delp, SL. Three-dimensional spatial tuning of neck muscle activations. Poster at International Society of Biomechanics in Calgary, Canada, August 8-13, 1999. *Recipient of International Society of Biomechanics Student Congress Travel Grant.*

25. Li, S, **Vasavada, AN**, Delp, SL. Isometric strength and electromyographic activities of neck muscles. Presented at Orthopaedic Research Society, Anaheim, CA, February 1-4, 1999.

26. Li, S, **Vasavada, AN**, Delp, SL. Effect of cervical spine position on moment-generating potentials of neck muscles. Presented at American Society of Mechanical Engineers: Advances in Bioengineering, Dallas, TX, November 16-21, 1997.

27. Li, S, **Vasavada, AN**, Delp, SL. Quantification of moment arms and isometric strength of neck muscles in neutral head position. Presented at American Society of Mechanical Engineers: Advances in Bioengineering, Atlanta, GA, November 17-22, 1996.

28. **Vasavada, AN,** Li, S, Delp, SL. Variations in neck muscle fascicle lengths with head position. Presented at American Society of Biomechanics, Atlanta, GA, October 17-19, 1996.

29. **Vasavada, A**, Lydon, C, Grob, D, Dvorak, J. Diagnostic external fixation in the lower cervical spine: A biomechanical evaluation. Podium presentation at Orthopaedic Research Society, San Francisco, Feb. 15-18, 1993.

30. Lydon, C, **Vasavada, A**. The effect of loading rate and skeletal maturity on the biomechanical and histological properties of the rabbit anterior cruciate ligament. Poster at Orthopaedic Research Society, San Francisco, Feb. 15-18, 1993.

31. **Vasavada, A**, Chen, I-H. Disc and ligamentum flavum bulge in the lower cervical spine. Poster at Orthopaedic Research Society, San Francisco, Feb. 15-18, 1993.

Conference Proceedings (Non peer-reviewed):

1. Nevins, D, Monda, S, Lin, DC and **Vasavada, AN**. Mechanical demand of forward head postures associated with tablet PC use. Podium presentation at Northwest Biomechanics Symposium, Moscow, ID, May 31-June 1, 2013.

2. Monda, S, Nevins, D, Lin, DC and **Vasavada, AN**. Head and neck postures during tablet PC use. Poster presentation at Northwest Biomechanics Symposium, Moscow, ID, May 31-June 1, 2013.

3. Nevins, D and **Vasavada, AN**. Model Neck Strength Sensitivity to Normal Variation in Vertebral Kinematic Parameters. Poster presentation at Northwest Biomechanics Symposium, Eugene, OR, May 18-19, 2012.

4. Roberts, K and **Vasavada, AN**. Effect of Neck Muscle Fatigue on Head Sway and Muscle Activity in Seated Posture. Poster presentation at Northwest Biomechanics Symposium, Eugene, OR, May 18-19, 2012.

5. Blum, K, Siegmund GP, **Vasavada, AN**. Neck Musculotendon Strains in Males and Females During Whiplash. Podium presentation at Northwest Biomechanics Symposium, Eugene, OR, May 18-19, 2012.

6. Suderman, B, **Vasavada, AN**. MRI-derived moment arms of neck muscles during sagittal plane motion. Podium presentation at Northwest Biomechanics Symposium, Eugene, OR, May 18-19, 2012.

7. Suderman, BL, **Vasavada, AN**. Moving muscle points provide accurate models of neck muscle paths. Podium presentation at Northwest Biomechanics Symposium, Vancouver, BC, June 3-4, 2011.

8. Nevins, D, **Vasavada, AN**. Quantifying variability in head center of rotation. Podium presentation at Northwest Biomechanics Symposium, Vancouver, BC, June 3-4, 2011.

9. **Vasavada, AN**, Blouin, J-S, Newell, R, Siegmund, GP. Functional compartments in the human splenius capitis muscle are revealed by constrained isometric tasks. Poster presentation at Society for Neuroscience Annual Meeting, San Diego, CA, Nov. 13-18, 2010.

10. Suderman, BL, Krishnamoorthy, B, **Vasavada AN**. Comparison of moment arm methods for curved muscle paths in a cervical spine model. Podium presentation at Northwest Biomechanics Symposium, Seattle, WA, May 21-22, 2010.

11. Zheng, L, Ozyigit, O, Jahn, J, **Vasavada A**. Can we predict human neck muscle volumes from anthropometric data? Podium presentation at Northwest Biomechanics Symposium, Pullman, WA, June 5-6, 2009.

12. Trask, DJ, Knottnerus, A, Lin, DC, **Vasavada, AN**. Effects of head position and impact direction on neck muscle response to perturbations. Podium presentation at Northwest Biomechanics Symposium, Pullman, WA, June 5-6, 2009.

13. Suderman, BL, **Vasavada AN**, Krishnamoorthy, B. Effect of curved muscle paths on neck biomechanics. Podium presentation at Northwest Biomechanics Symposium, Pullman, WA, June 5-6, 2009.

14. Trask, D, Knottnerus, A, Lucas, G, Lin, D, **Vasavada, A**. Effect of posture and impact direction on neck muscle reflex responses. Podium presentation at Northwest Biomechanics Symposium, Boise, ID, May 9-10, 2008.

15. Zheng, L, **Vasavada, A**. The sex effects of skeletal and muscle size on neck strength. Podium presentation at Northwest Biomechanics Symposium, Boise, ID, May 9-10, 2008.

16. Stakhovich, K, Krishnamoorthy, B, **Vasavada, A**. Improving the representation of trapezius in a neck model by incorporating multiple wrapping surfaces. Podium presentation at Northwest Biomechanics Symposium, Boise, ID, May 9-10, 2008.

17. Jahn, J, McMulkin, M, **Vasavada, A**. Differences in calf muscle-tendon lengths before and after tendo-Achilles lengthenings and gastrocnemius lengthenings. Poster presentation at Northwest Biomechanics Symposium, Boise, ID, May 9-10, 2008.

18. Lasher, R, Meyer, T, Vasavada, A. Development and validation of curved muscle paths in a neck model. Podium presentation at Northwest Biomechanics Symposium, Vancouver, BC, Canada, May 12-13, 2006.

19. Zheng, L, Bayomy, A, Vasavada, A. Biomechanical model of the human female head and neck system. Poster presentation at Northwest Biomechanics Symposium, Vancouver, BC, Canada, May 12-13, 2006.

20. Zheng, L, Joshi, H, Meyer, T, Lasher, R, Vasavada, A. Geometric modeling of neck muscles for biomechanical models. Podium presentation at Northwest Biomechanics Symposium, Seattle, WA, May 13-14, 2005.

21. Lucas, G, Vasavada, A. An experimental design for measuring neck reflex function. Poster presentation at Northwest Biomechanics Symposium, Seattle, WA, May 13-14, 2005.

22. Li, S, **Vasavada, AN**, Delp, SL, Peterson BW. A biomechanical model of the human head and neck musculoskeletal system. Presented at 3rd International Symposium on the Head/Neck System, Vail, CO, July 2-6, 1995.

23. Panjabi, MM, Wen, L, Arand, M, **Vasavada, A**, Oxland, T. Reposition of the burst fracture fragment: the effect of loads. Second prize, poster presentation, International Society for the Study of the Lumbar Spine, Seattle, June, 1994.

24. Chen, I-H, **Vasavada, A**, Panjabi, MM. Cervical spinal canal changes due to sagittal plane loads. Presented at Cervical Spine Research Society, New York, December, 1993.

25. Panjabi, MM, Lydon, C, **Vasavada, A**, Grob, D, Crisco, JJ, Dvorak, J. On the understanding of clinical instability in whiplash patients. Poster at Cervical Spine Research Society, New York, December, 1993.

26. Ahlgren, B, Lydon, C, Brower, R, **Vasavada, A**, Herkowitz, H, Panjabi, M. Effect of technique of annular incision on the strength and multidirectional flexibility of the healing intervertebral disc. Presented at North American Spine Society, San Diego, October 14-16, 1993.

27. Mimura, M, Panjabi, MM, Oxland, TR, Yamamoto, I, Crisco, JJ, **Vasavada, A**. The relationship between multidirectional lumbar flexibility and intervertebral disc degeneration. Presented at International Society for the Study of the Lumbar Spine, Marseille, France, June 15-18, 1993.

28. Ahlgren, B, Lydon, C, Brower, R, **Vasavada, A**, Herkowitz, H, Panjabi, M. Strength of healing lumbar discs after surgical incisions. Presented at International Society for the Study of the Lumbar Spine, Marseille, France, June 15-18, 1993.

29. Panjabi, MM, Lydon, C, **Vasavada, A**, Grob, D, Crisco, JJ, Dvorak, J. Biomechanical evaluation of diagnostic external fixation. Presented at Cervical Spine Research Society meeting, Palm Desert, Dec. 3-5, 1992.

INVITED PRESENTATIONS

1. Williams, S., **Vasavada, A.**, Beneat, J., Cappuccino, G., Lin, D., Rosa, W., Reinkens, K.A., Carr, E., & Amoroso, F. (2012). IEEE Real World Engineering Projects: Discovery-Based Curriculum Modules for First-Year Students. Frontiers In Education, Seattle, WA, Oct. 6-8, 2012.

2. Svensson, MY, Siegmund, GP, Winkelstein, BA, **Vasavada, AN**, Jakobsson, L, Ivancic, PC. Reducing the risk of neck injury sequelae; injury mechanisms and prevention. Video presentation at Fifth International Whiplash Trauma Congress, Lund, Sweden, Aug. 24-28, 2011.

3. Lieber, RL, Ward, SR, Brown, SHM, **Vasavada, AN**. Design of Human Skeletal Muscles. Symposium at American College of Sports Medicine, Denver, CO, June 1-4, 2011.

4. How do we hold up the head: A role for the cervical multifidus muscle? George W. Bagby Research Symposium, Vancouver, BC, May 19-20, 2010.

5. Entangled paths can be aligned. ME 311, Women in Engineering, Stanford University, January 7, 2010.

6. Neck muscles and moment arms. Neuromuscular Biomechanics Lab. Stanford, CA, November 6, 2009.

7. Panelist: Mechanisms of whiplash injury. World Congress on Neck Pain. Los Angeles, CA, January 20-22, 2008.

8. Eccentric contractions in neck muscles during whiplash. Symposium on Quantification and Mechanisms of Impaired Motor Control. Northwestern University, Chicago, IL, June 26-27, 2007.

9. Musculoskeletal models to analyze injury, disease and treatment. WSU Center for Integrated Biotechnology Annual Retreat, Moscow, ID, September 22, 2006.

10. Gender-specific neck musculoskeletal parameters for analysis of whiplash injury. CDC National Center for Injury Prevention and Control New Investigator Workshop. Atlanta, GA, June 28-29, 2006.

11. Understanding whiplash injury. Cougar Conversations, Washington State University, November, 5, 2005.

12. An academic research career: A pain in the neck? University of Idaho Neuroscience REU Program, Summers of 2005-2009.

13. Biomechanics and neurophysiology of the neck musculoskeletal system. Biology Colloquium, University of Idaho, November, 2004.

14. Biomechanics of the head and neck musculoskeletal system. Mechanical Engineering Seminar, Washington State University, February, 2003.

RESEARCH GRANTS

Funded proposals:

Slate Computer Ergonomics: Biomechanical Analysis of Head and Neck Postures
Role: PI.
Office Ergonomics Research Committee
$25,890; 1/2012 – 12/2012 (No-cost extension to 10/2013)

Differences in Neck Muscle Morphometry and Head Posture between Patients with Whiplash Injury and Healthy Subjects
Role: PI.
National Skeletal Muscle Research Center
$6,759; 7/2009 – 6/2010

CAREER: Modulation of neck muscle stiffness as a unifying principle for head and neck postural stability.
Role: PI.
National Science Foundation.
$486,521; 5 years; 2/2008 – 1/ 2013 (No-cost extension to 1/2014)

The role of neck muscle mechanics in pediatric head and neck injury.
Role: Consultant. (P.I.: David Nuckley, University of Minnesota).
National Institutes of Health.
$155,202 total costs to Dr. Vasavada; 10/2007 – 9/2010.

Gender-specific neck musculoskeletal parameters for analysis of whiplash injury.
Role: PI. (Collaborator: Gunter Siegmund, MEA Forensic Engineers and Scientists and University of British Columbia).
Centers for Disease Control.
$99,173 total costs; 9/2005 – 8/2007.

Biomechanical analysis of the neck musculature in whiplash injury.
Role: PI. (Collaborator: Gunter Siegmund, MEA Forensic Engineers and Scientists and University of British Columbia).
Whitaker Foundation.
$237,855 total costs; 5/2003 – 4/2006.

Development of educational materials that strengthen students' problem-solving skills for a bioengineering fundamentals course.
Role: Consultant. (P.I.: Ann Saterbak, Rice University).
National Science Foundation.
$3000 to Dr. Vasavada; 7/2003 – 6/2005.

Directional tuning of neck muscle activation and head-neck stiffness due to perturbations in the horizontal plane.
Role: PI. (co-PI: David Lin, WSU)
WSU College of Veterinary Medicine Intramural Grant.
$19,180; 7/2002 – 6/2003.

Contribution of intervertebral muscles to cervical spine stability.
Role: PI.
George W. Bagby Research Fund.
$19,250; 7/2001 – 6/2002.

PROFESSIONAL SOCIETY MEMBERSHIPS

- American Society of Biomechanics
- American Society for Engineering Education
- Biomedical Engineering Society

SERVICE

Department:

Chair, Bioengineering Undergraduate Studies Committee	2011-present
Bioengineering Faculty Search Committee	2011-2012
Bioengineering Graduate Degree Committee	2005-present
Bioengineering Undergraduate Curriculum Committee	2002-2010
Bioengineering Undergraduate Academic Advising	2002-present
Bioengineering Club Advisor	2003-2009, 2010-present
Chemical and Bioengineering Director Search Committee	2003-2006
Bioengineering Faculty Search Committee	2004-2005
Neuroscience Faculty Search Committee	2001

College:

Health Sciences Library Advisory Committee	2003-2009

University:

Kinesiology Search Committee	2013-present
Faculty Senate Representative, Voiland School	2010-present
Pre-Medical/Pre-Dental Applicant Advisory Committee	2010-present
Faculty mentor, McNair Achievement Program	2006
Summer Alive! freshman advising	2003-2006
Recruiting videos, and other recruiting activities	2004-present
President's Commission on the Status of Women	2001-2003

National/International:

Chair, session on Spine Modeling, World Congress of Biomechanics	2014
Resume critique, Biomedical Engineering Society Annual Meeting	2013

Project Administrator, Head and Neck Musculoskeletal Biomechanics SimTK (the Simulation Toolkit), part of the Simbios project of the National Center for Biomedical Computing (http://simtk.org/home/neck_mechanics). Forum for sharing models, data and images, and discussion by researchers.	2007 - present
Textbook review, Prentice-Hall	2011
Reviewer, American Society of Biomechanics Annual Conference	2010 - 2011
Reviewer, International Symposium on the 3D Analysis of Human Movement	2010
Conference co-chair, Northwest Biomechanics Symposium	2009, 2013
Organizing Committee, Northwest Biomechanics Symposium	2005-present
Reviewer for ASME summer bioengineering conference Ph.D. competition	2006, 2007
Featured in the book, *Changing Our World: True Stories of Women Engineers,* Part of the Extraordinary Women Engineers Project, a national initiative to encourage girls to enter engineering	2006
Distribute neck biomechanical model to researchers worldwide	2001-present
Distribute directional statistics software to researchers worldwide	2001-present

Journal Reviewer:

American Journal of Sports Medicine	2013
Archives of Physical Medicine and Rehabilitation	2003, 2005
ASME Journal of Biomechanical Engineering	2001, 2010-2014
Biomechanics and Modeling in Mechanobiology	2010
Clinical Anatomy	2009
Clinical Biomechanics	2007, 2010
Computer Methods and Programs in Biomedicine	2011
IEEE Transactions on Biomedical Engineering	2004
IEEE Man, Systems and Cybernetics	2004
Journal of Anatomy	2010, 2012 - 2013
Journal of Applied Biomechanics	2005, 2007-2009, 2012
Journal of Biomechanics	2007 – 2010, 2012, 2014
Journal of Bone and Joint Surgery	2007
Journal of Ergonomics	2012
Journal of Neurophysiology	2010, 2012
Journal of Sports Science and Medicine	2005
Medicine and Science in Sports and Exercise	2005, 2008
Sports Medicine, Arthroscopy, Rehabilitation, Therapy & Technology	2009

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Application for WSU Faculty Senate approval of the Innovation Assessment Center

Name of Center: WSU University Center for Innovation and Value Creation

Type of Center: Service Center

Director: Dr. Michael Ebinger, 665 N. Riverpoint Blvd. Suite 201C, Spokane, WA 99210-1495; 509-358-7897; ebingerm@wsu.edu; www.business.wsu.edu/organizations/eda

Established: 2012 (continuous since 1990, but not as a recognized center at WSU).

Organizational Summary

Mission, Purpose, Goals, and Functions. The WSU University Center for Innovation and Value Creation (the University Center hereafter) is one of approximately 60 University Centers funded in the US by the Economic Development Administration and the US Department of Commerce. Each EDA University Center is located at a state-funded, public research and education institution and is funded yearly for a five-year cycle. WSU's University Center is currently in its second year of the five-year cycle, which ends June 30, 2017. The University Center has been housed at WSU since the inception of the federal program in the late 1980s. This application marks the first recognition as a CIL by the WSU Faculty Senate.

The mission of the University Center is to provide technical business assistance, applied research, and outreach to new and early-stage businesses. The purposes of the University Center's are the following:

- *Identify Talent.* Discover the wealth of talent within the WSU academic system that could be applied to new businesses and to assist those wishing to expand. This talent includes technology as well as the human resources to advise new and growing businesses.
- *Commercialize New Ideas.* Bring outside entrepreneurs into contact with WSU talent to help commercialize WSU technology and intellectual property.
- *Design Tools for Rural Development.* Provide assistance and technical expertise to rural areas of Washington to create value in smaller communities.

The goals of the University Center are the following:

- Assess new ideas for their innovative potential and marketability.
- Provide Innovation Assessment tools to individual clients and teams inside and outside the WSU campuses.
- Improve assessment tools to better manage the risks of new startups and/or improve a startup's likelihood of success.
- Help individual clients using the services decide on how to pursue their ideas.
- Assist existing businesses in their efforts to grow and access new markets.
- Create value through economic development in the university community, rural and metropolitan areas, and throughout the state.

Functions:

- Help individual clients using the Innovation Assessment services decide on how to pursue their ideas.
- Provide business planning services to individuals or teams within and from outside the WSU campuses.
- Interface with organizations such as the Small Business Development Centers to increase the chances for success of new businesses and existing businesses desiring growth.
- Provide initial and applied research about markets and competition to those seeking that information.
- Provide a training ground, through internships, for students to develop fundamental research skills and interact with real-world clients.
- Provide opportunities for interacting with other WSU programs in business and product development.
- Assist the WSU Office of Commercialization in efforts to commercialize different WSU technology and intellectual property.

- Contribute to teaching opportunities within WSU.

Summary of Effectiveness in Reaching Goals and Functions. Since the University Center began its current cycle in July 2012 the following demonstrate that multiple goals are being achieved.

Technical Assistance

- Assisted on a successful bid for an NSF SBIR Phase I grant.
- Helping five businesses to prepare for growth or to launch.
- Assisting four organizations assess their economic impacts in regions of the state and/or plan for more effective economic development throughout the state.
- Launching intercampus ties to combine early product/market research (WSU-Spokane) with business growth applications (WSU-Vancouver).
- Assisting WSU researchers and practitioners in developing commercialization pathways and/or development plans in Pharmacy, Nursing, Engineering, the Applied Science Laboratory, and within Speech and Audiology.

Applied Research (by way of Innovation Assessment Services)

- Since July 2012, 12 projects have been accepted for assessment. Five remain in process, six have been completed, and one was returned to the client and the project closed.
- Three of the assessment projects were passed to Technical Assistance for further development with the client.
- A team of paid interns from WSU, Gonzaga University, and Whitworth University have provided the research support for the Assessment Center while learning and applying new skills in business analysis.

Information Dissemination

- Participated in four area business plan competitions as judge in various categories.
- Presentations to local school and business groups about what the University Center provides for communities and the region.
- Invited panelist for business/technical interface for Spokane River Alliance and Greater Spokane, Inc. concerns.
- Continuous interaction with faculty, staff, and administration on Health Sciences expansions at WSU-Spokane campus.

Changes in Goals, Nature, and Scope of Activities. The goals for the current University Center have not changed greatly from the previous 5 years because the sponsor desired similar activity over the funding periods. The geographic nature and scope of the activities, however, is significantly different in the current cycle. The sponsor, the Economic Development Administration (EDA), wanted the WSU University Center to expand efforts to the entire area of Washington State instead of only the eastern portion. This expansion also includes collaboration with University Centers in Idaho and Oregon as appropriate.

University Center-University Community Interactions. Academic units throughout the WSU community provide opportunities for growth and commercialization when combined appropriately. Discovering the pockets of talent and technology at each campus and then bringing these together is a primary function of the University Center.

Collaboration with the Office of Commercialization is also essential to the University Center's success. Currently the University Center can provide fundamental research on markets and competition for the Office of Commercialization and in turn have the Office of Commercialization staff advise on best practices to move WSU research ahead for the most academic and financial gain.

Contribution and Impact on Instructional Programs. Contributions to instructional programs have been in two areas. First, the University Center is an outlet for talented students seeking experience as interns in business research and applications. For example, some of the interns were recruited from the Frank Institute as engineers and contributed significantly to products for outside clients that involved composite materials. Impact to instructional programs includes reinforcing the skills for research about markets, competitive landscapes, and applying these to commercializing technologies from the fundamental science and engineering levels.

The second area of contribution is within the online MBA programs offered through WSU. Practical examples of academic principles provides students and instructors alike an opportunity to expand beyond classroom learning and teaching. For example, one project under evaluation as part of applied research (Innovation Assessment Services) is now a Capstone project for an MBA student in Vancouver. The University Center expects to be involved in this type of activity throughout the funding cycle.

Contribution and Impact on University and Clients. As mentioned above, the University Center is beginning to contribute to commercialization of different technologies and ideas that are emerging from WSU research. A shared goal with the Office of Commercialization is to tangibly strengthen the commercialization of WSU talent and technology by June 2017.

Clients of the University Center are beginning to view WSU as a go-to source of information on how to assess their innovations and new ideas. The Small Business Development Centers (SBDC) and the University Center are collaborating by providing clients with more complete and fundamental information and data on their businesses as they develop ideas to products and to full-scale business efforts. Because of these collaborations WSU is developing a strong reputation for helping new businesses start and existing businesses build.

Strategic Vision. The University Center is funded through a single grant from the EDA that requires a 1:1 match in either cash or in-kind effort. Currently that match is through in-kind effort. Innovation Assessment Services are single fee-for-service charges to clients to help offset intern time and effort for each project.

The strategic vision for the University Center is two fold. First, while the in-kind support for the grant match is required and appreciated, the Center Director would like to replace that match with cash and other support from the community/region/state and likely form a public/private partnership. This would create a WSU-led, community/region/state organization that would be able to serve more clients within and outside the WSU campuses more efficiently. An expanded scope for the University Center would include becoming more effective at assisting researchers in grant proposals (e.g., SBIR Phase I and Phase II, Health Sciences and Services Authority of Spokane County (HSSA) grants, and Life Sciences Discovery Fund (LSDF) grants) and more integrated training of interns via interactions with all of the WSU campuses. In addition, the University Center could use this expansion to collaborate and include other state institutions including Eastern Washington University, Central Washington University, Western Washington University, Evergreen State College, and the talent in the many community colleges in the state.

Second, according to the desires expressed by the sponsor to all EDA University Centers, the Center should become financially independent of the EDA grant by the end of the funding cycle. Because of that requirement, the EDA funding is considered seed funding for a longer-term effort. The University Center plans to attract public and private funding to complete the 1:1 match early in the third year of operation or in the summer of 2014. Achieving this goal will mean that the current match of in-kind from different WSU departments is replaced with public and private funds and services of at least $125,000. The University Center will also be working to become self-supporting by the end of the EDA grant cycle in June 2017. Successfully

reaching this goal means that the University Center ends the June 2017 funding cycle with a new budget of at least $250,000 that does not include a new cycle of funding from EDA.

Organizational Structure

Director Selection and Criteria. The current University Center Director was approved in early 2012 after volunteering to write the proposal to fund the center for another five-year cycle. The Director's recent MBA and interest in teaching in the online MBA programs indicated his abilities, and his desire to apply those skills demonstrated his interest in advancing the University Center. His previous experience at Los Alamos National Laboratory as a research and development scientist also qualifies him for commercialization efforts.

The director's term of office is for the current grant cycle, which ends in June 2017. The term of office will be revisited if or when the Center's required grant match is met with private and public cash funding. The Director is currently formulating a succession plan for transition to a new director at an appropriate time.

Current Director's Vita. Michael Ebinger is currently the Director of the WSU University Center for Innovation and Value Creation, a recent 5-year award from the US Economic Development Administration. His current interests and efforts have been to commercialize technical research efforts using marketing research, business strategies, and operations. He has applied technical expertise and business strategy interests to intellectual property valuation and quantitative analysis (Lee & Hayes, Spokane WA), new technology evaluation (Washington State University), and through several consulting opportunities.

Ebinger graduated from the University of Arizona in 1980 (BA with Honors, Anthropology) and 1984 (MS, Soils, Water, and Engineering), and from Purdue University in 1988 (Ph. D. in Soil Chemistry and Mineralogy). He joined the research staff at Los Alamos National Laboratory in 1988 and served as staff scientist until 2003. He became Ecosystems Team Lead in 2003 then interim Group Leader and Deputy Division Leader at different times for the Earth and Environmental Sciences Division through 2005. In 2005 he was named Group Leader of the Atmosphere, Climate, and Ecosystems Dynamics Group, a position he held until 2008 when he moved into program development efforts until he left the Laboratory in 2009. In 2010 he graduated from Washington State University (MBA with Honors) after relocating to Spokane from New Mexico.

Ebinger helped to develop a novel approach to identify elements in soil chemical environments such as carbon, metals, and radionuclides using laser-induced breakdown spectroscopy. This is the same technology aboard NASA's Curiosity Mars Explorer. The soil methodology was granted a US patent in 2010 and a second in 2012. He leveraged this research into pivotal policy development that was part of the foundation for greenhouse gas verification efforts during the latter Bush and early Obama administrations. This information also formed the initial stages of key national security interests in climate change verification in denied-access territories.

These translations of basic research to more applied areas piqued his interest in wider commercialization efforts. Currently these include commercializing emerging technology in health sciences, small manufacturing, energy, and agriculture as widely as possible.

Faculty Members and Departments. Participating faculty are those assisting with the grant match. These faculty include Dr. Anson Fatland (VP for Economic Development and External Affairs), Mr. Joe Harris (College of Business and Department of Management, Information Systems and Entrepreneurship), Dr. Ken Butterfield (College of Business and Department Chair, Management, Information Systems and Entrepreneurship), and Dr. Howard Davis (Frank Institute).

Membership Criteria. There are no special criteria for membership in the University Center except for a strong commitment to the mission and demonstrated support of the strategic direction.

Graduate Students, Postdoctoral Appointments, and Visiting Scholars. To date there has been little academic involvement of graduate students, postdoctoral appointees, visiting scholars or others. Occasionally the intern pool includes an interested graduate student, but the duties the graduate student undertakes are above and beyond those assigned by the major professor or committee. It is conceivable, though, that participation in the research activities of the University Center could be an integral part of a Masters project in Business Administration, other business areas, or possibly in areas such as the Professional Science Masters Program.

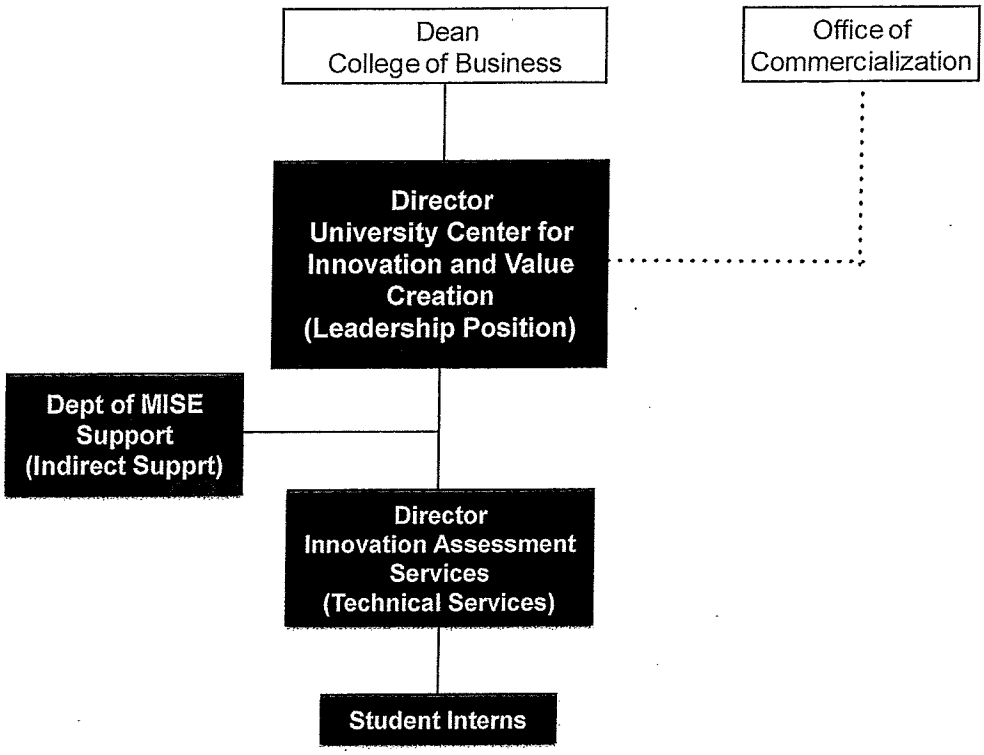
In January 2014, the University Center and the Business Growth-Mentored Activity Program (BG-MAP) began a collaboration that involves a client from outside WSU and a Vancouver MBA candidate. Developing the client's business idea to startup is the goal for the MBA student, and the initial collaboration could become a model of how the University Center leverages the expertise of WSU for other clients.

Supporting Colleges, Departments, and Programs. The main support for the University Center is from the College of Business and the Department of Management, Information Systems and Entrepreneurship. Strong support also comes from the Office of Commercialization and the Provosts of the Spokane and Vancouver campuses.

Board of Advisors. The University Center is forming a board of advisors that should begin meeting by Fall 2014.

Organizational Flow Chart

The following figure is the organizational chart at present. Blue boxes are positions supported by the University Center EDA grant and match.



Organizational Resources

a) Current and expected levels of support during the current (2013-2014) and previous (2012-2013) fiscal years are provided in Table2 1 and 2 below.

Table 1. Summary budgets for current and previous fiscal years for the University Center program. Note that the EDA requires a 1:1 match, but the match can be 100% in-kind.

	2012-2013	**2013-2014**
Federal (EDA)	$125,000	$125,000
Non-Federal (WSU Match)	$125,000	$125,000
Total:	$250,000	$250,000

Table 2. Detailed budget for current and previous fiscal years for the University Center program.

	2012-2013	**2013-2014**
External (EDA/Federal)		
Salaries	$62,000	$62,000
Wages	$14,400	$14,400
Travel	$2013	$2013
Benefits	$21,587	$21,587
Total	$100,000	$100,000
F&A	$25,000	$25,000
External (EDA) total	$125,000	$125,000
Non-Federal (WSU Match)		
Salaries	$75,007	$75,007
Wages	$1,248	$1,248
Travel	$613	$613
Benefits	$23,132	$23,132
Total	$100,000	$100,000
F&A	$25,000	$25,000
Non-Federal total	$125,000	$125,000
Grand Total:	$250,000	$250,000

Budgets for the remaining three fiscal years are expected to be similar to the first two years because the external source will not increase.

b) Current and needed levels of support:

Space requirements. Currently the University Center occupies one office of the Small Business Development Center Suites in the Innovate Washington Building on the Spokane Campus. In the three remaining fiscal years an additional office should be added to house the interns and a full-time director of Innovation Assessment Services.

Staff support. Minimal staff support is required and no budget is allocated to cover staff support beyond what is provided through F&A.

Equipment. Upgrades to computers for the University Center Director and the Director of Innovation Services are expected (and needed) in the third year.

Other external institutional support. Additional external support is desired, and there is strategy emerging to replace the in-kind support with cash from public and/or private sources. The EDA also has requested that current University Centers become independent from EDA granting by the end of the last year of the cycle. To this end, the emerging strategy will be moving to reach this goal.

WSU, Non-WSU, and Other Users of the University Center

There are several users of the University Center services from WSU, and outside WSU. WSU Departments using the University Center's services include:

- College of Pharmacy (Linda Garrelts-McClain)
- College of Nursing (Patricia Butterfield et al.)
- College of Business, Online MBA Programs (Joe Harris, Velle Kolde)
- Department of Speech and Hearing Sciences (Mark VanDam)
- Professional Science Masters Program (Pullman, Spokane)
- Chemical Engineering & Bioengineering (David Lin)
- Office of Commercialization (Sita Pappu, Pullman; Anson Fatland, Seattle)
- Senior Vice Chancellor for Academic Affairs and Research (John Roll)

Non-WSU companies, industries, associations, businesses and/or universities/colleges using the University Center's services include:

- North Central Washington Economic Development District (Jennifer Korfiatis)
- LaRone Solutions, Spokane Valley (Rod and Laloni Nelson)
- Professional Filtration Products, Spokane Valley (Lynn Siebert)

Other Users: Individuals using the University Center and/or Innovation Assessment Services:

- Cliff Keith, Tacoma, WA (Inventor)
- Johanna Hilde, Everett, WA (Inventor)
- Keith McPhun, Camus (Innovator)
- Fred Downey, Bremerton, WA (Inventor)
- Ellen Wait, Hayden Lake, ID
- Matt Owings, Colville, WA (Inventor)

Innovation Assessment Services receives 10 – 20 calls and inquiries each month about services. Of these about 10% are considered good matches for the services we offer.

Organizational evaluation and support statement from responsible dean or lead dean (2 pp).

From the dean or the lead dean and covers:

a. Providing approval of the CIL's (University Center's) goals, achievements and budget.
b. Explain if department or college resources have been provided to further the activities of the Center (there is the in-kind)
c. Other comments in support.

123841-cls-a

REQUEST FOR ESTABLISHMENT OF NEW LABORATORY
(VETERINARY CLINICAL PHARMACOLOGY LABORATORY)

Background Information: As current director of the Veterinary Clinical Pharmacology Laboratory (VCPL), I apologize for not being in compliance with University Polices regarding the establishment of a sanctioned Laboratory. I was simply not aware of the policy. The VCPL has been established as a WSU Service Center since 2004. The service center component of the VCPL offers a genetic test for dogs (MDR1 mutation). Dogs that have this mutation are extremely susceptible to drug toxicity and may experience fatal adverse drug reactions if they are treated with normal doses of certain drugs. I discovered this mutation (2001), WSU patented the technology, we established a WSU Service Center (2004), and have been providing this service to veterinarians since then. The VCPL has grown from testing 15-20 dogs per week (with one part-time employee) to testing 150-200 dogs per week (with 1 full-time and 2 part-time staff employees and 3 time-slip employees). All employees, equipment and supplies used for the service center are paid through service center revenues. The VCPL continues to perform research to identify additional genetic tests that may be useful for veterinarians.

1. **Name of Unit**: Veterinary Clinical Pharmacology Laboratory (VCPL)

2. **Nature and Scope of Activities**: The VCPL has 2 primary functions: research and service. The research undertaken by the VCPL encompasses veterinary pharmacology and pharmacogenetics. Using results from that research, the goal of the VCPL is to generate a battery of genetic tests to be used by veterinarians to prevent adverse drug reactions and enhance efficacy of drugs in veterinary patients (primarily dogs and cats). This is the service component of VCPL. The diagnostic tests will be patented by WSU and offered to the public via a service center agreement with WSU. Thus, the VCPL will be a research laboratory as well as a laboratory that provides genetic testing services for veterinarians in the WSU Veterinary Teaching Hospital, veterinarians in the state of Washington, and veterinarians from all over the world.

3. **Criteria and method of selection of director**. The Director must be a DVM that has achieved Diplomate status in the American College of Veterinary Clinical Pharmacology. The individual should also have demonstrated expertise in the field of veterinary pharmacogenetics. Currently, only one WSU faculty member meets those criteria.

4. **Department involved**: Department of Veterinary Clinical Sciences (College of Veterinary Medicine)

5. **Amount of budgetary support requested**: none needed (self supporting)

6. **Expected funding needed from university, state, external awards or gift sources**: It is expected that the VCPL Director will apply for research grants to support additional research in the area of veterinary pharmacology and pharmacogenetics. Additionally, gifts will be solicited from appreciative pet owners or veterinarians that have had positive

interactions with the Veterinary Clinical Pharmacology Laboratory. Lastly, funding from the pharmaceutical industry may also be pursued for specific research projects.

7. **Needs for space, equipment and supplies**: The Veterinary Clinical Pharmacology Laboratory is currently assigned to rooms 2053 and 2054 ADBF Building (approximately 720 square feet). This space is adequate for the needs of the VCPL.

8. **Expected contribution to and impact on instructional programs**:
The laboratory does not offer formal coursework but does offer research experience to WSU students at several levels:
Undergraduate-Approximately 1 undergraduate student per year is offered part-time employment in the VCPL to gain research experience.
Graduate-Generally one or two WSU graduate students per year earns their Master's or PhD by completing a research project in the VCPL.
Professional (DVM)-To date, 2 students in the professional DVM program have earned summer research fellowships to conduct research in the VCPL (each of these students worked in the laboratory for 2 summers). Both of these students have published their work in peer-reviewed journals.

9. **Expected contribution to university and other clients**:
University
a. The VCPL provides important genetic testing for veterinary patients at the WSU Veterinary Teaching Hospital.
b. Because WSU will hold the patents for any genetic tests that VCPL invents, royalties from patent income WSU will receive royalty income (royalty income to WSU to date exceeds $500,000).

Other clients
a. Veterinarians from all over the world use the VCPL to test dogs for the MDR1 mutation in order to prevent life-threatening adverse drug reactions. The VCPL tests approximately 150-200 dogs per week for veterinarians in the U.S., Canada, and other countries.

10. **Supporting letters from chair (Dr. William Dernell) and Dean (Dr. Bryan Slinker)—Attached.**

11. **Function of the proposed unit releative to the university community, its organization and administration, requisite financial and staff support, space requirements and other requested university resources.**
Service Center-The VCPL functions as a WSU service center as well as a research laboratory. The service center is financially self-supporting and employs 1 full time and 2 part-time staff as well as 3 time-slip employees (thus contributing to the community by enhancing the local economy). Additionally, the service center pays for 15% of the director's salary (Katrina Mealey, professor) for the time required to operate the service center and answer questions from veterinarians regarding test results and optimal drug therapy for their patients. The day-to-day functions of the VCPL are overseen by the VCPL Lab manager (currently a full-time research tech III postion). The service center

purchases equipment and supplies needed for service center activities using service center revenues. For example, a $60,000 robotic processor was recently purchased with service center revenues to increase the efficiency of DNA extraction.

Research Laboratory-The research "arm" of VCPL functions as a typical research laboratory within the Veterinary Clinical Sciences department. There are typically several graduate students and a part-time research technician that are engaged in various research projects. The research tends to focus on genetic causes of adverse drug reactions in dogs and/or cats. Sources for research funding include foundations (i.e., Morris Animal Foundation, American Kennel Club Foundation); NIH, Intramural grants, and the Ott Endowment.

123842-cils-a

WSU Extension Western Center for Risk Management Education

Faculty Senate CIL Report

5 year review period from fiscal year 2008 to 2012

April 15, 2013

Service Center - Extension

Established 2001

Shannon Neibergs
Associate Professor Extension Economist, Director WCRME
School of Economic Sciences
sneibergs@wsu.edu
509 335 6360
http://westrme.wsu.edu/

Organization Summary

a. The mission statement, purpose, goals and function of the WCRME

Washington State University Extension's Western Center for Risk Management Education (WCRME) is one of five regional Risk Management Education Centers competitively awarded by USDA NIFA from federal funds appropriated in the Federal Crop Insurance Act. The National Extension Risk Management Education (ERME) program was authorized in the 2000 Agriculture Risk Protection Act's revisions to the Federal Crop Insurance Act under the legislative title Partnerships for Risk Management Education, Section 524 (a) (3). WSU has been competitively awarded the Western Region since 2001 when the enabling legislation was enacted and administered through CSREES now NIFA.

The WCRME's mission is to provide risk management education to agriculture producers. This is accomplished through administering a competitive grant program and providing Extension risk management education as required by the enabling legislation:

From Sec. 524 of the Agriculture Risk Production Act of 2000

> ''(B) the Secretary, acting through the Cooperative State Research, Education, and Extension Service, (now NIFA) shall carry out the program established under paragraph (3).
>
> ''(3) PARTNERSHIPS FOR RISK MANAGEMENT EDUCATION.— ''(A) AUTHORITY.—The Secretary, acting through the Cooperative State Research, Education, and Extension Service, shall establish a program under which competitive grants are made to qualified public and private entities (including land grant colleges, cooperative extension services, and colleges or universities), as determined by the Secretary, for the purpose of educating agricultural producers about the full range of risk management activities, including futures, options, agricultural trade options, crop insurance, cash forward contracting, debt reduction, production diversification, farm resources risk reduction, and other risk management strategies.
> ''(B) BASIS FOR GRANTS.—A grant under this paragraph shall be awarded on the basis of merit and shall be subject to peer or merit review.

The WCRME provides risk management education to 13 Western states (see the map contained in the organization chart for the Western region states and the other regional Centers). The WCRME has been annually awarded $1.168 M (see section on organizational resources) to conduct its Partnerships for Risk Management Education program. The awarded funds support the WCRME to administer an annual competitive grant program. The grant program uses a call for Pre-Proposals issued in November that are merit reviewed. Full proposals are invited in January and merit reviewed in April. Information on the grant process and the 2013 RFA can be found at http://westrme.wsu.edu/grants-program/. The program grants 12-month awards (with the possibility of one 6-month no cost extension) with a fiscal calendar that begins on July 1, of the year awarded and are to be completed on or before June 30 of the year following the award.

The WCRME grant program is based on results based funding for agricultural producers. Risk management results and outcomes help farm and ranch families improve their economic viability through targeted risk management education. The results or outcomes producers learn, achieve or apply immediately after, or within six months to a year following completion of a project should help to improve participant farm or ranch economic viability. Economic viability refers to the farm's or ranch's ability to improve profitability and to increase opportunities for equity growth over time. A searchable data base of all past funded projects is available at http://extensionrme.org/ProjectSearch/Default.aspx. Users can search the past funded project data base by risk topic, region and year to obtain information on project overview, project steps, project results and materials developed and applied in their agricultural risk management education award. This is a rich source of materials to develop effective programs with the capacity to download education materials. Educators can use and enhance risk management curriculum and decision aids as opposed to re-developing the wheel as they disseminate risk management education. The Pre-Proposal requires applicants to review two past projects related to their proposal from this database to make them aware of the available resources on this web site.

The WCRME is entirely self-funded and does not receive any funds from Washington State or the University, but is strongly supported by administration in the College of Agriculture, Human and Natural Resource Sciences, Extension and the School of Economic Sciences. WCRME leverages its resources to obtain additional funding to extend its mission to deliver risk management education to agricultural producers.

The WCRME was successfully awarded a sub-contract in 2010 with an additional budget allocation in 2013 to support and deliver risk management education for Trade Adjustment Assistance for Farmers, TAA, http://www.taaforfarmers.org/. This is a national program to support farmers that have been negatively affected by free trade agreements. TAA helps producers respond to production and market risk for commodities that have seen increased competition from imports. Washington asparagus is an example of an approved TAA commodity. Producers are supported through training and to develop a business plan. The WCRME in partnership with the WSU SESRC is charged with conducting the TAA national program evaluation.

Another example of leveraging resources is the WCRME participation in the Building Farmers in the West program http://buildingfarmersinthewest.org/. The WCRME led and administered a seven state consortium USDA Beginning Farmer Rancher grant, which built business planning capacity for over 250 beginning farmer and rancher participants. A peer reviewed core curriculum along with supporting resource materials was developed by the seven state Building Farmers in the West leadership team and is available for anyone interested in providing this type of programming. Evaluations were administered to measure the socio-economic impacts experienced by beginning farmer and ranchers. Over 78% of participants reported that they "currently have a business plan for their operation" after attending the workshops.

The WCRME supports the Western Extension Committee that is comprised primarily of agricultural economists from the Western region. The committee fosters collaborations to provide regional Extension programs and to enhance the ability to deliver risk management

education. The Building Farmers in the West project originated from collaborations within this committee. Another example is Ag in Uncertain Times, http://www.farmmanagement.org/aginuncertaintimesenglish/ which is a nationally recognized webinar series to help producers manage risk and price volatility. A recent series addressed managing drought and disaster.

The WCRME has several programs targeting Farm Bill Special Emphasis audiences. The WCRME in conjunction with RuralTax.org and partner organizations provided a series of free tax workshops and tax webinars for Native American Farmers and ranchers. Workshops were targeted at Keepseagle settlement recipients to presents general tax filing information and record keeping training. Partner organizations are working with the Center to improve approaches that can help Hispanic/Latino producers successfully achieve their risk management goals.

b. Effectiveness in Reaching Goals and Fulfilling Function

The WCRME's effectiveness is evidenced by its continued success in obtaining competitive awards. The Center applied in 2012 for WSU to serve as the ERME Western Region Center. The WSU Center was competitively reviewed by NIFA and was awarded a three year continuation to serve as the WCRME. The continuation award is a result of providing effective risk management education and training to agricultural producers.

The WCRME has been a leader in developing results based grant programs. The Center works with each of the funded projects Project Directors (P.D.s) to support their success. Award initialization interviews are conducted at the start of each project to support P.D.s in program delivery and reporting. An exit interview is conducted at the conclusion of each project to review successes and challenges. The exit interview also supports project final reporting into the ERME project results database. This database has been used to evaluate the effectiveness of each ERME Center in providing risk management education. The WCRME is also maintaining an archive of project success stories to illustrate the impact projects have had on producers, see http://westrme.wsu.edu/category/producer-stories/.

Sections c. d. and f.

These sections in the provided application outline are largely not applicable to the WCRME. The nature and scope of the WCRME's activities have not changed. Its mission has remained the same since its inception to provide risk management education to agricultural producers. The mission is tied to the authorizing language and to the success, need and demand for agricultural risk management education. The WCRME does not impact instructional programs.

e. WCRME's Function relative to other units in the University community

The WCRME maintains a merit reviewed balanced portfolio of risk topics and regional projects. The WCRME has funded projects to WSU faculty and Extension educators through its competitive grant program and to Washington non-profit entities that often use WSU Extension faculty in program delivery. Table 1 presents the 20 Washington projects that WCRME funded for $816,985 from 2008 to 2012. WCRME has also supported WSU Extension by providing

travel stipends for WSU faculty and Extension educators to attend the National Extension Risk Management Education Conferences and National Extension Women in Agriculture Conferences. The Center supports WSU faculty to attend and be part of the Western Extension Committee. The Center has also supported various WSU Extension activities such as paying the Livestock Marketing Information Council dues in 2008 and supporting the 2013 WSU Women in Agriculture Conference.

Table 1. WCRME Funded Projects in Washington 2008 to 2012.

Year	Funded Agency	Project Title	Award
2012	Washington Association of Wheat Growers	Risk Management Education for Eastern Washington Grain Farmers	$ 50,000
2012	Washington State University Extension	Micro-Dairy Development Program	$ 20,173
2012	Washington State University Extension	Low-Stress Cattle Handling Training: Identifying and Managing Risk in the Work Force and Cattle Herd	$ 28,683
2012	Washington State University Extension	Identifying and Managing Risk in Livestock Finishing, Direct Market Meat Enterprises	$ 49,697
2011	AgVentures NW, LLC	Risk Management Education for Eastern Washington Wheat and Barley Producers	$ 47,500
2011	Washington State University Extension	Riparian Grazing and Water Quality Risk Management Strategies	$ 49,982
2011	Northwest Natural Resource Group	Managing Young Stands: Forest Management for New Forest Owners	$ 40,000
2010	Washington State University Extension	Educational Opportunities for Women Involved in Agriculture	$ 48,214
2010	AgVentures NW, LLC	Risk Management Education for Lincoln County Small Grain Producers	$ 42,177
2010	Washington State University	Enhancing Marketing Opportunities by Facilitating Food Safety Risk Management Practices on the Farm	$ 50,000
2009	Washington State University and Oregon State University	Mid-Columbia Ag Enterprise Investigation Series	$ 33,995
2009	Northwest Natural Resource Group	Northwest Certified Forestry Workshops	$ 47,500
2009	Washington State University	Cull Cow Marketing and Management for Washington Livestock Producers	$ 34,109
2009	Washington State Horticultural Association	Safe and Sustainable Practices for Tree Fruit	$ 42,500
2008	Washington State University	Managing Food Safety Risks through Good Agricultural Pactices (GAP's) Education	$ 40,684
2008	Washington State University Extension	Women and Agriculture: Cultivating Our Reality	$ 38,277
2008	Northwest Natural Resource Group	Northwest Certified Forestry Workshop Expansion	$ 42,000
2008	Pacific Coast Shellfish Growers Association	Managing Risk and Reducing Liability: Understanding How Environmental Laws and Land Use Regulation Affect How You Farm	$ 16,770
2008	Pacific Coast Shellfish Growers Association	Reducing Vibrio Parahaemolyticus Illnesses through Appropriate Oyster Harvest Protocols	$ 44,991
2008	Northwest Agriculture Business Center	Transitioning to Value-Added Products	$ 49,733
		Total 20 projects	$ 816,985

g. Contribution and impact on the University and other clients

Starting from the 2008 fiscal year, the WCRME has been competitively awarded approximately $9.2 million that has generated close to $1.67 million in indirect funds for the University, see section on organizational resources. Table 1 presents 20 WCRME funded projects ~~from~~ that have impacted Washington agricultural producers. Additionally the WCRME's TAA program has contributed to impacting 10,127 producers nationwide that have participated in the program.

In Washington, 37 Asparagus producers participated in the TAA risk management training and to date, 27 have completed a business plan. A finished business plan qualifies the producer to receive a $12,000 TAA payment to help them implement their business plan or respond to the increased market risk from imports.

h. Strategic vision of the WCRME

Agriculture commodity price volatility is increasing. Increased demand for corn as a result of the Renewable Fuel Standard program has greatly increased corn price as well as its price volatility. The 2012 mid-west drought sent corn prices to record high. This has indirect effects throughout agriculture including Washington farm and livestock production as producers respond to volatile corn prices in their planting, feeding and marketing decisions. The result is, risk in agriculture is increasing and the demand for risk management decision tools, education and implementation support is ever increasing.

Nationally recognized climatologist Elywnn Taylor, in a keynote presentation at the 2013 National Extension Risk Management Conference, presented an extended outlook of increased climate variability which will increase production, market and financial risks. The outlook for the Farm Bill with expected federal budget cuts is to minimize or eliminate direct commodity support payment programs, but to expand crop and livestock insurance programs. The proposed 2012 Farm Bill insurance programs changes greatly increases producer insurance options and thus the complexity of farm risk management. There is tremendous need now and in the future for risk management education and thus the WCRME.

The future goals of the WCRME are to maintain its successful mission and successfully compete for new project funds that coincide with the Center's mission. This will diversify the Center's revenue base as well as expand the Center's outputs and impacts. The Center continually seeks to improve reporting project results and quantifying impacts for producers.

Organizational Structure

The WCRME is managed according to operating guidelines established by the five ERME Centers in partnership with the USDA NIFA National Program Leader. These Operational Guidelines outline a coordinated strategy for administering the Agriculture Risk Protection Act's Partnerships for Risk Management Education in a manner that makes the results of risk management research, education and outreach programs available to agricultural producers. The Guidelines are premised on principles of transparency, fairness, equity, consistency, cooperation, stakeholder participation, and consensus-building. The Guidelines are also premised on the belief that the goals of risk management education will be most effectively attained by this coordinated strategy of administration and implementation. The Guidelines ensure that the regional ERME programs meet the federal requirements for competitive grant programs.

Figure one presents the WCRME Organizational Chart. The right hand side of the chart shows the relationships between the enabling legislation, NIFA and the ERME Centers. The left hand

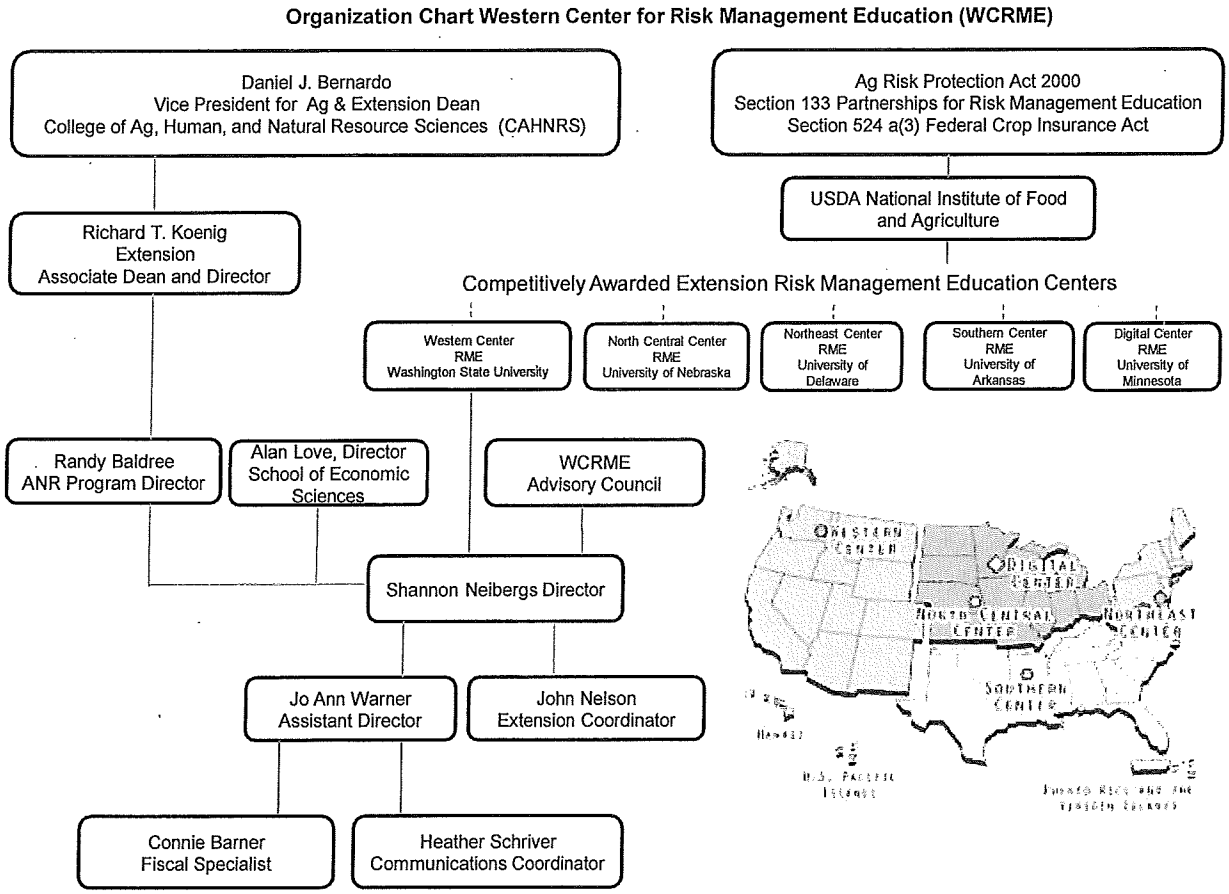


Figure 1. WCRME Organizational Chart

side of the chart details the Center's WSU administrative support and oversight. The WCRME is administered within the WSU College of Agricultural, Human, and Natural Resource Sciences in Extension and is housed in the School of Economic Sciences. The WSU administrative personnel are identified in the organization chart.

The WCRME Director is Dr. Shannon Neibergs who has a split appointment as an Extension Economist Specialist in the School of Economic Sciences and the WCRME Director. Shannon has served as the WCRME Director since July 2011 when the previous Director, Jon Newkirk retired. Shannon's CV is provided as Appendix 1 to the report. Four personnel support the Center functions and are key the Center's operation and success. Jo Ann Warner is the Assistant Director. Connie Barner is the Administrative Assistant and Heather Schriver is the Communications Coordinator. John Nelson is an Extension Coordinator and works primarily for the TAA program.

a. Criteria and method for selecting the Director and term

When the Director retires or resigns by choice or at the request of the host institution or NIFA following a review process, the host institution, in consultation with the NIFA National Program Leader, will determine a strategy to solicit applications for a replacement, or to initiate a search for a new host institution. With concurrence from the National Program Leader, the Dean/Director will solicit applications for a replacement and provide names of prospective candidates that will be screened and interviewed by the host institution. When a selection of a qualified replacement is made, the host institution will assure sufficient overlap between the appointments of the incoming and outgoing Directors to maintain program integrity. If the search process is not successful, a search for a new host institution and Director may be initiated.

Sections b., c., and d. – not applicable to the WCRME at this point in time.

e. College and Department responsible for support of the WCRME

As identified in the organizational chart in Figure 1, the WCRME is in CAHNRS Extension and the School of Economic Sciences. The Center is self-funded and does not receive operating funds from CAHNRS, Extension or SES. It does receive administrative support, review and guidance from these units.

WSU's Office of Grant and Research Development, Sponsored Programs Services; and CAHNRS Grant Development Office and Business Center staff support the WCRME as needed to successfully administer our existing streamlining agreement with USDA/NIFA. From the beginning of the Center we have forged a strong partnership with WSU grants staff and they are members of our Western Center Program Team.

f. List of the WCRME's Advisory Council

Table 2. WCRME Advisory Council 2012-2013.

Name	Title/Employer	City/State
Joel Clairmont	Deputy Director/Administrator - Montana State Dept. of Agriculture	Helena, MT
Roger Cramer	Senior VP Risk Management - Northwest Farm Credit Services	Spokane, WA
Staci Emm	Extension County Director - UNCE, Mineral County	Hawthorne, NV
Dave Green	Retired - USDA RMA	Spokane Valley, WA
C. Wilson Gray	District Extension Economist - University of Idaho	Twin Falls, ID
Danielle Gunn	Extension FRTEP Educator - University of Idaho Extension	Fort Hall, ID
Cara McCarthy	Deputy Director - USDA Risk Management Agency	Spokane Valley, WA
Alex Ott	President - California Apple, Olive and Blueberry Commissions	Fresno, CA
Joanie Quinn	Organic Commodity Advisor - New Mexico Dept. of Ag Organic Prog.	Albuquerque, NM
Jeff Tranel	Ag & Business Mgmt Economist - Colorado State University Coop Ext.	Pueblo, CO

Organizational Resources

a. Current and expected levels of support

The WCRME is self-funded through competitive awards. Table 3 presents a summary of funds generated by the Center for the fiscal years starting in 2008. The WCRME is a competitive award program under the Partnerships for Risk Management Education. The TAA for Farmers is a competitive sub-award from the University of Minnesota for work delivering the TAA program and to support the TAA program evaluation in partnership with WSU SESRC. The Beginning Farmer Rancher, BFR, was a $748,641 award in FY 2010. Each of these programs are previously described.

The WCRME award was continued in 2012 for three years. The TAA for Farmers program was not appropriated funds for program renewal. It is not expected given the emphasis on federal budget reduction that TAA for Farmers will be appropriated funds in the near future despite its well documented success. The BFR award was completed in June 2012. Future funding in this project area depends largely on what is provided in the upcoming Farm Bill. The Center continually looks for expanded funding opportunities.

Table 3. Summary of Funds Generated by the WCRME

	Funds Awarded			WSU Indirect Funds Developed		
Year	WCRME	TAA/BFR/Misc.	Total	WCRME	TAA/BFR/Misc.	Total
FY2008	$ 1,200,000	$ 82,271	$ 1,282,271	$ 247,619	$ 1,080	$ 248,699
FY2009	$ 1,200,000	$ -	$ 1,200,000	$ 247,619	$ -	$ 247,619
FY2010	$ 1,168,912	$ 1,552,651	$ 2,721,563	$ 242,460	$ 158,779	$ 401,239
FY2011	$ 1,168,912	$ -	$ 1,168,912	$ 241,204		$ 241,204
FY2012	$ 1,168,912	$ -	$ 1,168,912	$ 241,204		$ 241,204
FY2013	$ 1,168,912	$ 486,800	$ 1,655,712	$ 241,204	$ 48,676	$ 289,880
Total	$ 7,075,648	$ 2,121,722	$ 9,197,370	$ 1,461,310	$ 208,535	$ 1,669,845

Notes: TAA is Trade Adjustment Assistance and BFR is Beginning Farmer Rancher Programs
All funds were competively awarded through NIFA

b. Current and needed space, staff, equipment and other support

The WCRME rents office space at WSU Spokane County Extension at 222 N. Havana, Spokane WA. This is the official station for JoAnn Warner and John Nelson. The Center provides $5,000 annually in goods and services for the use of the Extension office space, meeting and conference rooms and parking. This amount is not inclusive of the T-1 internet line provided by the Center to the Spokane County Extension building. Additionally, Spokane County Extension bills the Center for postage used and telephone lines on a monthly basis. The $5,000 is paid by the purchase of one piece of equipment (laptop or desk top computer, projector etc.) not to exceed $2,600. Spokane County Extension invoices the Center $200 per month for a total of $2,400 to cover the remaining portion of the $5,000. If there is a remaining equipment balance, this portion is used for Spokane County Extension office supplies. The official station for Shannon Neibergs and Connie Barner is in SES, Hulbert Hall.

Appendix 1. WCRME Director CV

WASHINGTON STATE UNIVERSITY
EXTENSION

VITA
J. Shannon Neibergs, Associate Professor Livestock Economist, E-3

OFFICE PHONE:	**509-335-6360**	**EMAIL: sneibergs@wsu.edu**
FAX:	**509-335-1173**	**WEB: www.ses.wsu.edu/People/neibergs.htm**

DATE OF FIRST EMPLOYMENT AT WSU: August 16, 2006

TENURED? Yes

EDUCATION

A. Degrees Earned
1993 Ph.D., Agricultural Economics, Texas A & M University
1987 M.A., Agricultural Economics, Washington State University
1983 B.S., Animal Science, Washington State University

EMPLOYMENT

A. University Related
Associate Professor Extension Livestock Specialist E-3, School of Economic Sciences, Washington State University, 2006 to present

Director, Western Center for Risk Management Education, July 2012 to present.

Assistant and Associate Professor, Department of Equine Business, College of Business, University of Louisville, 1995 -2006.

HONORS AND AWARDS

NACAA, Excellence in Livestock Programming, Team award for National Communications Award winner in Team Newsletter category for Washington Animal Agriculture Team Newsletter, 2011.

NACAA, National Communications Award winner in Team Newsletter category for Washington Animal Agriculture Team Newsletter, 2011.

NACAA, National Finalist for Team Newsletter, Central Washington Animal Agriculture Team, 2010.

NACAA, Regional Finalist for Team Newsletter, Central Washington Animal Agriculture Team, 2008.

Meritorious Service Evaluation, College of Business and Public Administration, University of Louisville, 2003.

Outstanding Service Award Bonus, College of Business and Public Administration, University of Louisville, $1,000, 2001.

Exceptionally Meritorious Annual Evaluation, College of Business and Public Administration, University of Louisville, 1999.

Research Award Bonus, College of Business and Public Administration, University of Louisville, $1,000, 1998.

AAEA Research Poster Competition, Finalist, American Agricultural Economics Association, 1998.

Faculty Member of the Year Award, Equine Industry Program, College of Business and Public Administration, University of Louisville, 1997.

Best Paper Award, Kentucky Economics Association, 1996.

Superior Service Team Award, Texas Agricultural Extension Service, Texas A&M University, 1993.

Outstanding Thesis, Department of Agricultural Economics, Washington State University, Major Professor - Dr. Norman K. Whittlesey, 1987.

FUND GENERATION

A. Grants and Awards - Funded

2012 - Western Center Risk Management Education, 2012 to 2015, $3,506,736, USDA NIFA, PI.

2012 - Yield, Feed Quality and Total Productivity of Teff Overseeded in Timothy, Washington State Hay Growers Association, $26,500, Co-PI.

2011 - Mitigation of Air Emissions from Dairy Operations via Adoption of Select Multiple Best Management Practices, $410,491, USDA NRCS, Co-PI.

2011 - Economic Impact of Washington's Dairy Industry At the Farm Level and from Farm Gate to Retail Sales, $23,490, Washington Dairy Federation, PI.

2010 - Integrated Program for Reducing BRDC in Beef and Dairy Cattle, $9,744,968, USDA AFRI CAP, Co-PI.

2010 – Asparagus Trade Adjustment Assistance – Curriculum, $24,389, USDA TAA, University of Minnesota, Project Director

2010 - Sustainable Alternatives to the Conservation Reserve Program (CRP), $50,000 WSARE, Project Collaborator

2010 - Organic Dairy Production Budget and Market Analysis, CSNAR, $17,312, and Organic Valley Dairy Cooperative, Project Director

2009 – Risk Management Education for Washington Livestock Producers and Cull Cow Marketing Strategies, Western Center for Risk Management Education, $42,977, Co-PI.

2009 – Economics of Asparagus Mechanized Harvest and Economic Effect of Free Trade Agreements on the Asparagus Industry, USDA Specialty Crops, $18,196, Project Director.

2008 – Nutrient Capture and Redistribution in a Community Anaerobic Digester, USDA CIG, $414,013, Project Collaborator.

2008 – Economics of Asparagus Establishment and Production, USDA CSREES, $8,981, Project Director.

2008 - Western Regional Beef Quality Assurance: Implementation & Enhancement of Record Keeping, NCBA BQA, $20,000, Co-PI.

2007 – Washington State Certified Beef Quality Assurance Program, National Cattlemen's Beef Association, $11,000, Co-PI.

2007 – Development of a WA State Cattle Health Assurance Program: BVD Pilot Project, WSU Extension, $75,270, Co-PI.

2007 – Grass Fed Beef Production Systems/Pasture Management. WSU Extension, $71,729, Team Member.

2007 - Phosphorous and Solids Removal from Anaerobic Digestion Effluent through Electrochemical Technology, USDA CIG, $398,454, Co-Director

2007 - An Integrated, Multifunction Ammonia Removal and Nutrient Recovery System for Mitigating Air and Water Quality Impacts of Animal Operations, USDA NRI, $544,853, Project Member.

2007 - Beefing Up the Palouse - A Sustainable Alternative to the CRP, Ag Pilots Project - William D. Ruckelshaus Center, $81,713, Project member.

2006 – Washington Dairy Farms Economic Impact, Washington Dairy Federation, $17,283, PI

B. Grant Proposals – Unfunded

Year	Total Grants	Total Dollars
2007	4	$420,853
2008	1	$44,363
2009	3	$814,525
2010	2	$310,389
2011	3	$1,051,268
2012	6	$3,803,279

C. Program Sponsors, Partners, and Revenue

2011 – Beef/Lamb/Pork Workshop Series, Donations and Registrations, $2,300.

2010 – Lamb 100 and Sustainable Livestock Production, Registrations and Donations, $5,600.

2009 – Beef 300 and Lamb 300 Registrations and Donations, $25,400.

2008 – Washington Hay Growers Association, $500.

2007 - WSU Beef 300 Programming Registration & Donations, State Organizations, Feedlots, and Producers, $18,000.

PUBLICATIONS

A. Professional Articles, Refereed or Peer Reviewed

Sieverkropp, E., J.S. Neibergs and M. Taylor, "Determining the Impacts of Trade Restrictions and Other Economic Factors on Washington's Cull Cow Price". JAAE submitted for review, 2012.

Neibergs, H. R. Zanella, E. Casas, G.D. Snowder, J. Wenz, J.S. Neibergs and D. Moore., "Loci on *Bos Taurus* Chromosomes 2 and Bos Taurus choromose 26 ar linked with Bovine Resiratory Disease and Associated with Persisten Infection of Bovine Viral Diarrhea Virus". J. Anim. Sci. 89:2(2011), 907-915.

Bosch, K.A., Powell, D., Neibergs, J.S., Shelton, B., & Zent, W., "Impact of Reproductive Performance over Time and Mare Quality on Economic Returns among Thoroughbred Mares in Lexington, Kentucky USA". Equine Veterinary Journal. 41:9(2009), 889-894.
Neibergs, J. Shannon, "The Importance of Estate Planning", The Good Fruit Grower, 59(2008):52.

Neibergs, J. Shannon, "Economics of Broodmare Reproduction", Equine Disease Quarterly 15(2006):4-5.

Neibergs, J. Shannon, "A Hedonic Price Analysis of Thoroughbred Broodmare Characteristics", Agribusiness: An International Journal, 17(2001):299-314.

Neibergs, J. Shannon and Richard Thalheimer, "An Economic Analysis of the Effectiveness of Thoroughbred Breeder/Owner Incentive Policies", Journal of Agricultural and Applied Economics, 31(1999):581-592.

Neibergs, J. Shannon, "Kentucky Parimutuel Revenue Policy Simulator", Gaming Research and Review Journal, 5(1999):17-31.

Neibergs J. Shannon and Patrick L. Vinzant, "Maximum-Likelihood Estimates of Racehorse Earnings and Profitability", Journal of Agribusiness, 17(1999):37-49.

Neibergs, J. Shannon, "Macroeconomic Conditions and Agribusiness Profitability: An Analysis Using Pooled Data", International Food and Agribusiness Management Review, 1(1998):91-105.

Neibergs J. Shannon and Richard Thalheimer, "Price Expectations and Supply Response in the Thoroughbred Yearling Market", Journal of Agricultural and Applied Economics, 29(1997):419-435.

B. Abstracts and Proceedings

Neibergs J.S., J. Harrison, E. Whitefield and M. De Hart, Applications of an Economic Anaerobic Digester Optimization Model, Proceedings US Environmental Protection Agency AgSTAR Annual Conference, 2012.

Neibergs J.S., J. Harrison, E. Whitefield and M. De Hart, Development and Application of an Economic Anaerobic Digester Optimization (ADOPT) Model, NRCS CIG Showcase, Washington D.C. July 2011.

Neibergs, J.S., J. Wentz, H. Neibergs, and D. Moore, An Economic Analysis of Bovine Viral Diarrhea Persistently Infected Disease Prevalence in Washington Beef Herds, ASAS Annual Meetings, Denver, July 2010.

Heitstuman, M.D., Smith, S.M., Busboom, J.R., & Neibergs, J.S. (2007). 2007 WSU BEEF 300 Program Summary of Cattle Evaluation. *Beef 300 Workshop proceedings*

C. Extension Publications, Peer Reviewed

Norberg, S. and J.S. Neibergs, 2012 Enterprise Budget for Establishing and Producing Irrigated Alfalfa in the Columbia Basin in Washington, 2012 Submitted for Review.

Neibergs, J.S. and Don Nelson, 2008 Estimated Costs and Returns for a 150-Head Cow-Calf to Grass Finished Beef Production System in the Channel Scablands Range Area of East-Central Washington, Extension Bulletin, EM010, 2009.

Platt, T.E., Hinman, H.R., & Neibergs, J.S. (2007). Financial Measures used in FINPACK. WSU Lincoln, County Extension

D. Other Publications

Neibergs, J.S. and S. Shrey, Evidence of Economic Harm to Washington, Michigan and California Asparagus Producers from the Andean Trade Preference Act and North American Free Trade Agreement, Farm Business management Report. June 1, 2009.

Neibergs, J.S. and T. Waters, Establishment and Annual Production Costs for Washington Asparagus in 2009. WSU Extension Publication, 2009.

Neibergs, J.S. and D. Holland, Economic Impact of Washington Dairy Farms: An Input-Output Analysis, Farm Business Management Report. October 16, 2007

Moore, Dale, Jan Busboom and J. Shannon Neibergs, "Cow-Calf Herd Notebook" Western Region Alliance for Beef Quality Assurance, 2008.

Neibergs, J. Shannon "COOL Economics". Ketch Pen - News of the Washington Cattlemen's Association, 2007 26(2), pp 7.

Neibergs, J. Shannon, James M. McGrann and John Parker, "FINYEAR - Financial Statement Preparation Software that Conforms to the Farm Financial Standards Task Force Guidelines", Abstract Southern Journal of Agricultural Economics, 24(1992):295.

Neibergs, J. Shannon and Bruce A. McCarl, "Application of a Discrete Stochastic Programming Model to Marketing Decisions Under Price Uncertainty", Abstract, American Journal of Agricultural Economics 73(1991):1544.

Neibergs, J. Shannon , Robert G. Lawrence and Richard D. Morgan, "2001 American Saddlebred Horse Association Demographic Study, University of Louisville, 2002.

Robert G. Lawrence, Richard D. Morgan and J. Shannon Neibergs, "A Feasibility Study for an Equestrian Facility in Oldham County", Equine Industry Program, University of Louisville, 2002.

Neibergs, J. Shannon and Robert G. Lawrence, "Kentucky Breeding Industry Issues Survey - Summary Results", Equine Industry Program, University of Louisville, 1999.

Osei, Edward, P.B. Lakshminarayan, J. Shannon Neibergs, Aziz Bouzaher and Stanley R. Johnson, "Livestock and the Environment: A National Pilot Project - The Policy Space, Economic Model, and Environmental Model Linkages", Staff Report 95-SR 78 (1995).

Neibergs, J. Shannon and Aziz Bouzaher, "A Conceptual Framework to Analyze Livestock Waste Issues", Great Plains Agricultural Council, Confined Animal Waste and Water Quality Task Force, Proceedings, (1994).

Bouzaher, Aziz., Stanley. R. Johnson, J. Shannon Neibergs, and Ron Jones, "The Conceptual Framework for the National Pilot Project on Livestock and the Environment", Staff Report 93-SR 67, Iowa State University, Ames Iowa, (1993).
Jones, Ron, Larry Frarey, Aziz Bouzaher, Stanley R. Johnson, and J. Shannon Neibergs, "Livestock and the Environment: A Detailed Problem Statement", TIAER, Staff Report, Stephenville TX, (1993).

McGrann, James M., and J. Shannon Neibergs, "Beef Cattle Breeding Stock Accounting", Texas Agricultural Extension Service, Farm Management Handbook, RI-6 (1992).

McGrann, James M., and J. Shannon Neibergs, "Accounting for Cattle Transfers Between Business Entities", Texas Agricultural Extension Service, Farm Management Handbook, RI-7 (1992).

McGrann, James M., J. Shannon Neibergs, K. Karkosh, and L. Falconer, "AFAES - Agricultural Financial Analysis Expert Systems", Department of Agricultural Economics, Texas Agricultural Experiment Station, (1990).

Neibergs, J. Shannon and Herb Hinman, "Cost of Producing Crops in Kittitas County", Extension Bulletin No. 1293, Cooperative Extension Service, Washington State University, Pullman WA. 1987.

PRESENTATIONS

A. International

Cross Hedging Alfalfa to CME Corn Futures Contracts, Invited speaker 2010 Canadian Agricultural Economics Society, Workshop on Risk Management, Robson Square, Vancouver BC, April 12, 2010,

B. National

Managing Drought and Disaster Impacts Webinar Series: Drought Impacts on Livestock and Feed Markets November 20 2012; Tax and Financial Risks Due to Drought and Disaster December 7, 2012, Drought Outlook 2013 January 22 2013. AAEA Extension Section and Ag in Uncertain Times, http://www.farmmanagement.org/aginuncertaintimesenglish/.

Effective Programs for Hispanic and Native American Producers in the Western U.S. in Response to the Changing Composition of Agricultural Producers, Agricultural and Applied Economics Association, Extension Symposium, AAEA Annual Meeting Seattle WA, August 13, 2012.

AAEA Agricultural Extension Tour, AAEA Annual Meeting Seattle WA, August 11, 2012.

Top Challenges Facing Agriculture in the Next Five Years, Invited Speaker, Coalition of Agricultural Mediation Programs Annual Conference Coeur d'Alene, ID June 6, 2012.

Development and Application of an Economic Anaerobic Digester Optimization Model, US Environmental Production Agency AgSTAR Conference, Syracuse, New York March 28, 2012.

Hay Outlook and Situation Webinar Presentation, Ag In Uncertain Times, March 14, 2012, http://www.farmmanagement.org/aginuncertaintimesenglish/.

Economic Analysis of BVDV Persistently Infected Prevalence in Washington Beef Herds, ADSA - PSA – AMPA – CSAS-WSASAS – ASAS, Joint Annual Meeting, Denver CO, July 14, 2010.

The Impact of Stochastic Reproductive Efficiency on Economic Returns amongst a Sample of Thoroughbred Mares, Southern Economic Association Annual Meeting, Atlanta, GA, November 21, 2010.

Asparagus Production Economics, USDA Asparagus Trade Adjustment Assistance Program, California Asparagus Growers Association, Stockton CA, December 8, 2010

An Economic Analysis of BVD-PI Incidence in Washington, NACAA National Annual Conference, Selected Presentation, Portland, OR, 09/21/2009.

NPR Market Place Radio Nationally Broadcast radio interview, Livestock Market Situation and Consumer Impacts, 10/14/2009.

C. State

Grid Pricing and Lamb Valuation, Shepherd's Information Day, Spokane, WA, December 8, 2012.

Lamb 300, WSU Extension, Pullman WA, October 18-19, 2012.

Dairy Risk Management Strategies, WSVMA 101st Annual Conference Yakima Washington, September 28-29, 2012.

Economic Considerations of Culling Dairy Cows in Washington, WSVMA 101st Annual Conference Yakima WA, September 28, 2012.
Beef 300, WSU Extension, Pullman WA, May 16-19, 2012.

Beef Lamb Poultry 100, WSU Extension, Spokane WA, March 9-10, 2012.

Beef 200, WSU Extension, Omak WA, February 10-11, 2012.

Small Farm Book Keeping and Taxes, Spokane Ag Expo Farm Forum, February 9, 2012.

Analyzing and Negotiating Agricultural Leases – Applications for Developing Equitable Leases, Spokane Ag Expo Farm Forum, February 8, 2012.

Beef 300, WSU Extension, Pullman WA, 1/5/2011 to 1/8/2011.

Beef Cattle Production Performance Targets, Country Living Expo & Cattlemen's Winter School, Stanwood, WA, January 30, 2010.

An Economic Analysis of BVDV-PI Prevalence in Washington Cattle Herds, Klickitat Co. Cattle Producers' Education Program, Goldendale, WA, DVD Presentation produced at WSU, February 19, 2010.

Anaerobic Digesters Carbon Credits and the Proposed Cap and Trade Bills, Webinar, Livestock Nutrient Management Group, http://breeze.wsu.lnm, March 24, 2010.

2010 Hay Situation and Outlook, Walla Walla Hay Growers Meeting, Walla Walla, WA, April 29, 2010.

Risk Management Strategies and Revenue Insurance Programs for Washington Livestock Producers, WSU Extension Research Webinars: Research that Works for You, http://ext.wsu.edu/pd/Researchforyou.htm, June 2, 2010.

How to Economically Optimize and Anaerobic Digester, Qualco Field Day, WSU Livestock Nutrient Management Program, Monroe WA, July 30, 2010.

Lamb 100, WSU Extension, Sumner WA, 10/1/2010 to 10/2/2010.

Short Course in Sustainable Livestock Production, USDA AFRI Beginning Farmer and Rancher Program, Key Peninsula, WA, October 23, 2010.

Determining the Impacts of BSE International Trade Restrictions and Other Economic Policies on Washington Cull Cow Price, Washington Cattlemen's Association Annual Convention, Cle Elum, WA, November 12, 2010.

CRP Economics and Land Use Opportunities for Expiring CRP Contracts in South Eastern Washington, 2010 WSU—UI Cereal Grain Update, Clarkston, WA, December 10, 2010

Beef 300, Pullman WA 1/7/2009 to 1/9/2009.

How to Survive and Be Profitable in the Beef Business: Process Verified Systems and Mandatory Country of Origin Labeling, Cattlemen Association Meetings,
1/15/2009 Goldendale
1/17/2009 Omak
3/23/2009 Clarkston

Economic Outlook for Pigs, Pork and Feed Cost and Mandatory Country of Origin Labeling, Annual Pork Producers Meeting, Pasco, WA, 2/6/2009.

2009 Hay Situation and Outlook, Walla Walla Hay Growers Meeting, 04/30/2009.

How to be Profitable and Survive in the Beef Business: Planned Grazing and Grass-Fed Beef Production, Ag Pilots Planned Grazing Conference, Richland, WA, 05/19/2009.

Economic Analysis of Mechanized Asparagus Field Trial, Asparagus Growers Field Day, Pasco WA, 08/06/2009.

Lamb 300, Pullman WA 10/01/2009 to 10/03/2009

Asparagus Production Economics, Mechanical Harvesting and Trade, Vegetable Growers Association Annual Meeting, Kennewick WA, 11/11/2009.

An Economic Analysis of BVD-PI Incidence in Washington, Washington Cattlemens Annual Convention, Pasco, WA, 11/12/2009.

Women in Agriculture Workshop Series, Leases – Economic, Tax and Legal Issues,
11/30/2009 Spokane
12/09/2009 Goldendale
Cap and Trade Carbon Market – Overview and Agriculture Carbon Offset Opportunities, WSU Nutrient Management Webinar Series, 12/01/2009.

Farm Leases – Economic, Tax and Legal Issues, Surviving as a Grain Farm in Tough Economic Times, Asotin and Columbia County Workshop, Clarkston, WA, 12/9/2008.

Washington Hay Market Review and Outlook, North East Washington Hay Growers Association, Annual Meeting, Clayton WA, 12/6/2008

Unit Cost of Production: The Measuring Stick of Beef Production, Washington Cattlemen's Association Convention, Pasco WA, 11/14/2008.

Cow-Calf Herd Notebook: How to Use This Notebook Effectively to Enhance Your Operation, Washington Cattlemen's Association Convention, Pasco WA, 11/13/2008.

Increased Input Cost Impact on Farm Leases, American Society of Farm Managers and Rural Appraisers, Northwest Chapter Fall Meeting, Spokane, WA, 10/3/2008.

Central Washington Livestock and Hay Markey Outlook, Ag. Professional Group Meeting, Pasco WA, 4/17/2008.

Beef Market Outlook and Managing for Profit, Central Washington Beef Information Day, Ellensburg, WA, 2/19/2008.

Economics and Marketing for Tomorrow's Beef Industry, Okanogan Beef Information Days, Omak WA, 1/21/2008.

2008 Washington State Hay Situation Report, Washington State Hay Growers Association, Kennewick, WA, 1/17/2008.

Developing and Maintaining a Business Mentality, 2008 American Angus Association Boot Camp, Pullman, WA, 1/3/2008

SES 2007 Annual Conference on Economic Issues and Outlook, Livestock Outlook, Pasco, WA 12/6/2007.

Estate Planning and Transfer, Washington Grape Growers Society, Prosser, WA, 11/18/2007.

Morbidity, Mortality and Performance: BVD Economic Costs, Washington Cattlemen's Association, Pasco, WA, 11/8/2007.

The Economic Impact of Washington Dairy Farms, Washington Dairy Federation's Annual Meeting, Olympia, WA, 10/24/2007.

Beef 300, Extension Workshop, Pullman, WA, 10/3/2007.

Business Plan Basics, Meat Goat Producer Group Seminar Series,, Prosser and WallaWalla, WA, 5/5/2007 and 9/29/2007.

2007 Central Washington Hay Outlook, Tri Cities Ag Professionals Association, Pasco, WA, 3/15/2007.

Overview of Economic Issues Facing the Swine Industry, Whitman County Swine Producers, 2/22/2007.

Economics and Marketing of Grass-Fed Beef, Spokane Ag. Expo, 2/6/2007.

You Manage What You Measure: Cow-Calf Business Management, Colfax Cattlemen's Association, Colfax, WA, 1/23/2007.

2007 Washington State Hay Situation Report, Washington State Hay Growers Association, Kennewick, WA, 1/18/2007.

Meeting the Needs of Animal Agriculture in the Pacific Northwest, Statewide Extension Workshop, Pullman, WA, 1/3/2007.

OTHER CREATIVE ACTIVITIES

Web Pages – Central Washington Animal Agriculture Team Member, http://animalag.wsu.edu/

Livestock Economics, http://livestockeconomics.wsu.edu/

UNIVERSITY INSTRUCTION

A. Credit Courses Taught

EconS 305, Theory of the Firm and Market Policy, Spring 2006 to 2008, WSU
EconS 451, Advanced Agricultural Marketing, Spring 2006 to 2008, WSU
EconS 335, Business Finance Economics, Spring 2009 to 2011, WSU
EconS 352, Business Management Economics, Spring 2010 to 2011, WSU

PROFESSIONAL SERVICE

A. University

Faculty Senate Representative, Eastern Extension District, 2010 – 2012.

SES Undergraduate Curriculum Committee, 2006-2012.

B. Review Activities

Cost Benefit Analysis of Addressing Rual Diffuse Polluation through the FarmFLOW Framework, Australian Journal of Agricultural and Resource Economics, 2012

Book Review, "Risk Navigator SRM", CRC Press, Taylor and Francis Group, 2009

Recreational and Urban Influences on Agricultural Land Values, Ag. Finance Review, 2008

Hedonic Pricing Models for Australian Thoroughbred Yearlings Australian Journal of Agricultural and Resource Economics, 2008

What Value do Nevada's Horse Owners Place on Cool Season Hay Characteristics? University of Nevada's Extension Fact Sheet, 2007

LMIC Fact Sheet, LM-2, Alternative Marketing Arrangements in the Beef Industry: Definition, Use, and Motives, Livestock Marketing Information Center, 2007

PROFESSIONAL & SCHOLARLY ORGANIZATIONS

American Association of Agricultural Economists

PROFESSIONAL DEVELOPMENT

Livestock Marketing Information Center, Technical Advisory Committee Meeting, 2008-2012.

Livestock Marketing Information Center, International Beef Industry Study to Argentina, Tour, 2007.

Office of Research Faculty Development Series (FDS), The Productive Proposal Writing Track Workshop, 2007.

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Wildlife Habitat-Nutrition Lab Executive Summary

Mission Statement: The School of the Environment's "Wildlife Habitat-Nutrition Lab", located in Vogel 136, is operated under the supervision of Bruce Davitt (Research Technologist Supervisor) and direction of Keith Blatner (Associate Director SOE). The lab maintains a self-sustaining budget that covers salaries, benefits, supplies, and maintenance of equipment. It employs 3 full time staff – a supervisor and 2 research technologists.

The lab determines the food habits of both domestic and wildlife animals and performs chemical analyses to determine the nutritional value of their diets and to help assess the animal's nutritional well being.

The unit:

a) Performs laboratory services for on campus WSU department research projects and allows some equipment use that would otherwise be unavailable to researchers and their students.
b) Performs laboratory analysis services on a contract basis for off-campus state and federal natural resource agencies as well as private industry, foundations, institutions, and other universities . Clientele are both domestic and foreign.
c) Provides training in lab analysis methods and equipment operation for our graduate students as they pursue their degrees.
d) Conducts lectures and laboratory sessions for several classes offered by home department faculty in Methods of Wildlife Ecology, Wildlife Habitat Ecology, and Wildlife Nutrition.

The unit has averaged about $200,000/yr. in income over the past five years. It has added several nutritional analyses now offered to WSU researchers and off campus clients.

The unit has a web site within the School of the Environment (SOE) web site that lists lab services offered and prices. Lab receipts from purchase orders and contracts are subject to an 8% University administration fee and U.S. Federal contracts (run through OGRD) are charged a 38% F&A sponsored activity fee.

The Associate Director (SOE) is provided with a monthly update of the lab budget as well as current progress on client projects. The unit also provides an annual report of income, expenses, list of client projects , types and number of lab analyses performed, class/lab instruction performed, graduate student theses, dissertations, and client publications acknowledging the lab .

List of all directly related theses/dissertations from clients that used lab services:

Woods, B. **2012.** The pygmy rabbit: predation risk, habitat structure and fire dynamics in sagebrush steppe. M.S. Thesis, Univ. Idaho, Moscow, ID. *Major professor J.Rachlow*

Cook, R. **2011.** Links between forage quality and heterogeneity of forage use at multiple scales by elk. PhD Dissertation, WSU, Pullman, WA *Major professor L.Shipley*

Wagoner, S. **2011.** Assessing the effectiveness of targeted cattle grazing for improving wildlife habitat on wildlife management areas in Asotin County, Washington. M.S. Thesis, WSU, Pullman, WA *Major professor L.Shipley*

McCusker, S. **2009.** An evaluation of commercial diets for wild browsing herbivores. M.S. Thesis, WSU, Pullman, WA *Major professor L.Shipley*

Atwood, P. **2009.** Interactions between mule deer and elk on winter range at the Tex Creek WMA, ID. M.S. 91 p.

Kagima, B.W. **2008.** Habitat selection and diet of native ungulates in an ongoing tallgrass prairie reconstruction effort. M.S. Thesis, Iowa State Univ., Ames, Iowa. *Major Professor* W. Sue Fairbanks

List of Client Publications which acknowledged Lab services

McCusker, S., L.A. Shipley, T.N. Tollefson, M. Griffin, and E.A. Koutsos. **2011.** Effects of starch and fibre in pelleted diets on nutritional status of mule deer (Odocoileus hemionus) fawns. Journal of Animal Physiology and Animal Nutrition 95:489-498.

Tollefson, T.N., L.A. Shipley, W.L. Myers, and N. Dasgupta. **2011.** Forage quality's influence on mule deer fawns. Journal of Wildlife Management 75(4):919-928.

Ihl,C. **2010.** Percentage of fecal moss in arctic ungulates as an indicator of wintering area quality. J.Wildl. Manage. 74(4): 690-697.

Tollefson, T.N., L.A. Shipley, W.L. Myers, D.H. Keisler, and N. Dasgupta **2010.** Influence of summer and autumn nutrition on body condition and reproduction in lactating mule deer. Journal of Wildlife Managmement 74(5):974-986.

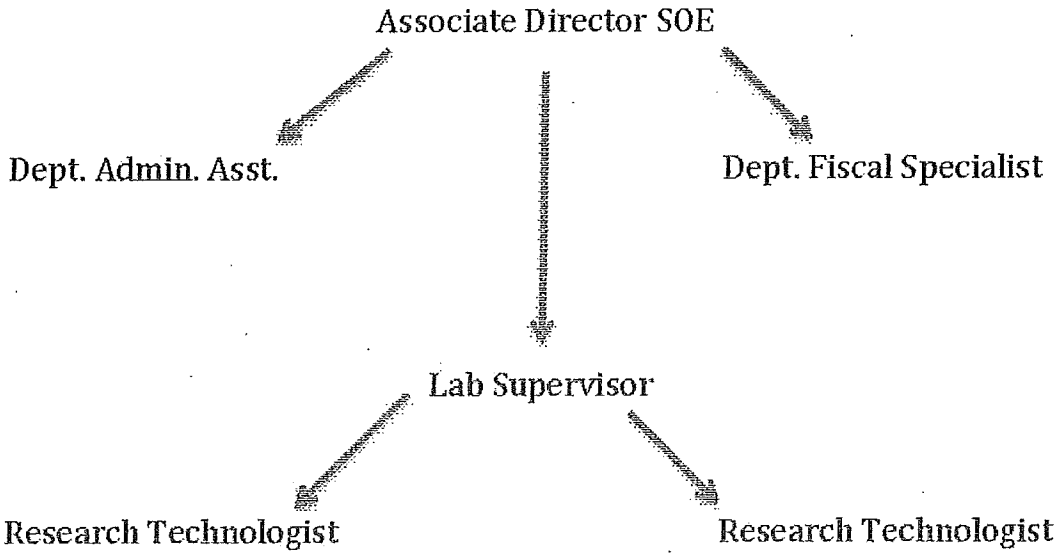
Baldwin,R.A. and L.C.Bender. **2009**. Foods and nutritional components of diets of black bear in Rocky Mountain National Park, Colorado. Canadian Journal of Zoology. 87(11):1000-1008.

Kendrick, E., L.A. Shipley, A.E. Hagerman, and L.M. Kelly. **2009**. Fruit and fibre: the nutritional value of figs for a small tropical ruminant, the blue duiker (Cephalophus monticola). African Journal of Ecology 47:556-566.

Thines, N.J., L.A.Shipley, J.H.Bassman, J.R.Slusser, and W.Geo. **2008**. UV-B effects on the nutritional chemistry of plants and the responses of a mammalian herbivore. Oecologia. 2008 May;156(1):125-35. Epub 2008 Feb 15.

List of all associated with the unit- graduate students, postdoctoral appointments, visiting scientists/scholars: Not Applicable

Organization Flowchart:



Directly supported by unit

Indirect admin. positions

List of those WSU employees and departments not associated with the lab, using the unit's services and resources:

Al_Adwani, Salma / Marryanne	WSU / Vet Microbial & Path
Dr. Chen, Shulin	WSU / B Sys E
Cook, Rachel / Shipley	WSU / SOE
Cummings, Nada	WSU / RIA Core / Animal Sciences
Dr. Felicetti, Laura	WSU / SOE / SBS
Dr. Fortuna, Ann-Marie	WSU / CSS
Kawas, Leen	WSU / VCAPP
Dr. Moore, Barry	WSU / SOE / Water Quality Lab
Dr. Nelson, Mark	WSU / Animal Science
Dr. Robbins / Fortin	WSU / SOE / SBS
Dr. Robbins / Erhlenbach	WSU / SOE / SBS
Dr. Sayler, Rod	WSU / SOE
Scheinost / Stannard	WSU / Plant Material Center
Dr. Shipley / Johnston-Yellin	WSU / SOE
Dr. Shipley / McCusker	WSU / SOE
Dr. Shipley / W. Meyers	WSU / SOE / WA Fish & Game
Dr. Shipley / Ulappa	WSU / SOE
Dr. Shipley / Wagoner	WSU / SOE
Smith, Melissa	WSU / SBS
Subramaniam, Renuka	WSU / Vet. Microbiology & Path
Dr. Yang, Bin / Feng Chen	WSU / B Sys E / TriCities

List of non-WSU people and companies/organizations not associated with the lab using the units services and resources:

Alaska Dept. of Fish & Game

Alaska Fish & Game; Moose Research Center

Bureau of Land Management (BLM), AK
BLM Farmington, N.M.
BLM Rawlins, WYO
California Fish & Game

Cedars Sinai Medical Center
College of Idaho
Delaware Valley College
Dept. Environment & Conservation, Newfoundland
Dept. of Environment, Arviat, Nunavut

Desert Research Institute, NV
Forest & Range Sciences Lab, OR
Government of the Northwest Territories, NT
Idaho Fish & Game

Idaho Fish & Game / Mule Deer Foundation
Idaho Fish & Game, Wildlife Health Lab
Idaho State Univ.

Indiana University of Pennsylvania
Iowa State Univ.
Kansas State Univ.

Keystone Wildlife Research Ltd., Surrey, BC
Longview Fibre Company
Matrix Solutions, Alberta

Montana Fish, Wildlife & Parks

Arthur, Stephen / Dr. Barbosa
Cook/Crouse
Stout, Glenn
White, Kevin / Jemison / Barten
Crouse (Jenkins), Stacy
Crouse, John
Lohuis, Tom
Yokel, Dave
Hansen, John
Warren, Andy
Botta, Randy / Colby, Janene
Stephenson / Bleich / Schroeder
Stephenson/Ellis
Stephenson/Heather Johnson
Stephenson/Lacey Greene
Stephenson/Walsh
Taylor, Tim / Ellsworth
Weitsman, Stacy
Yensen, Eric
Shenko, Alicia
Trindade, Mariana / Keith Lewis
Campbell, Mitch
Goorts, Jaylene/Debbie Jenkins
Rhode, David
Wisdom, Michael
Adamczewski, Jan
Evans Mack, Diane (Dr. Yensen)
Schrempp, Tom (Jay Crenshaw)
Binninger, Clarence
Thiel, Jessie / Dr. Terry Bowyer
Drew, Mark
Guernsey, Noelle / Dr. Kitty Louse
Kie, John / M. Paul Atwood
Lendrum,Patrick / Dr. Terry Bowyer
Heffernan, Lindsey M.
Kagima, Barbara
Blocksome, Carol/ Pam Upham
Conard, Jonathan
Simpson, Keith
MacCracken, Jim
DeWitt, Phillip
Keim, Jonah/ Celia Mailand
Frisina, Mike
DeCesare, Nike

Montana State University	Corn, Janelle
	Marlow, Dr. Clayton
MPG Ranch, MT	Hayes, Teagan
National Park Service, AK	DiFalco, Donna / Brad Griffith
	Joly, Kyle
	Rattenbury, Kumi / Joly
NCASI, OR	Cook, John / Cook, Rachel
New Mexico State Univ.	Avery, Mindi
	Bender/Halbritter
	Hartsough/Bender
	Overstreet, Matthew / Smythe, Lindsay
North Carolina State Univ.	Lashley, Marcus / DePerno
Oregon State University	Heston, Danielle
	Raper, Diane
	Thorne/Gillian
	Wehausen, John (Epps)
San Bernadino National Forest, CA	Borchert, Mark
Summit Environmental Consultants Limited, Alberta	Smyth, Clint
Tacoma Water, WA	Volkhardt, Greg
Technological Educational Institution of Epirus, Greece	Roukos, Christos
Tennessee Fish & Game, Wildlife Resources Agency	Applegate, Roger
Texas Agricultural Experiment Station	Campbell, Erika / Walker
Tongass National Forest	Hanley, Tom
U.S. Fish & Wildlife Service (USFWS), AK	Bertram, Mark
USFWS, Kodiak Refuge, AK	Cobb, McCrea
USFWS, Columbia River Fisheries Program, WA	Dr. Jolley, Jeff
USFWS, ID	Peery, Chris
U.S. Forest Service, ID	Mahalovich, Mary
U.S. For. Serv. Chugach National Forest, AK	Fode, Jason / Bray / Sharon Symthe
Univ. of Alaska Anchorage	Carnahan, Tony / Spalinger
Univ. of Alaska Fairbanks	Barboza, Perry / Joe Welch
	Davis, Leslie (Finstad)
	Gustine, Dave/Dr. Barbosa
	Kielland, Knut
	St.Martin (Finstad)
	Worker/Finstad
Univ. of Alberta	Anderson, Meghan
	DeMars, Craig
	Merrill, Evelyn / Brownrigg/Visscher
Univ. of Arkansas at Monticello	Kissell, Robert
	White, Don
Univ. of California	Forrester, Tavis
	Ricca, Mark
	Schnurrenberger, Catherine
	Walsh, Rachel / Lacey, Eileen
Univ. of Delaware	Kalb, David / Dr. Bowman

Univ. of Idaho	Barnowe-Meyer, Kerey
	Caudill, Dr. Chris / Kal Johnson
	Limberger/Dr. Newingham/Elise
	Mann, Ryan / Caudill
	Naughton, George
	Peery / Caudill / Ben Ho
	Peery, Chris / Ryan Mann
	Rachlow / Leiper
	Rachlow / Shipley
	Shipley/Meghan Camp
	Shipley/Bonnie Woods
	Elise Suronen/Newingham
Univ. of Laval, Quebec	Tran,Chau / Dr. Kennedy
	Giroux, Marie-Andree
Univ. of Maine & Fort Kent	Hins, Caroline
Univ. of Manitoba	Roy, Chris
Univ. of Missouri	Gooch, Scott
	Keller, Barbara
Univ. of Montana	O'Hara, Beth / Dr. Eggert
	Kohl, Michel / Hebblewhite, Mark
	Harris, Rich
	Hupp/Hebblewhite
Univ. of Nevada	Bechtel, Molly
	Curtis, Dan / McGaw
	Gray, Meeghan
Univ. of Northern British Columbia	Hodder, Dexter
	Witter, Leslie/Johnson
Univ. of Washington, Friday Harbor Lab	Ward/Wyllie-Echeverria
Univ. of Western Ontario	Zhao, Elva
Univ. of Wyoming	Beaver, Sara
	Hess, Jenifer/Dr. Jeff Beck
	Middleton, Arthur
	Vartanian, Janess / Kilpatrick, Steve
USGS Alaska Science Center	Adams, Layne
	Ward, David
	Ward/(Daniels, Bryan)
	Ward / Donnelly
	Ward/(Elkinton, Betsy)
	Ward/(Hogrefe, Kyle)
USGS, AZ	Pfeifer, Edwin
USGS, NV	Longshore, Kathleen
USGS Patuxtent Wildlife Reseach Center	Beyer, Nelson
USGS, Columbia River Research Lab, WA	Mesa, Matt / Lisa Weiland
	Rose, Brien
Utah Museum of Natural History	Newmark, William (Bill)
Vermejo Park Ranch, N.M.	Welch, Bob (Robert)
W.Texas A&M Univ.	Muro, Shannon/Kazmaier, Richard

WA Dept F & W	Goodman, Ben
Weber State Univ.	Wilson, Nacole
Western Carolina Univ.	Hillard / DeWald
Wyoming Game & Fish	Astle, Marcell
	Courtemanch, Alyson
	Frost/Gerhart
	Jellison, Bert
	Schoup, Keith
	Woodward/Butler/Heather O'Brian
Yukon Dept. of Environment-Fish & Wildlife	Egli, Kathi
	Marshall, Shelley
	Russell, Kelsey / Matthew Larsen