

# DAVID L. BURRIS

## *Curriculum Vitae*

Assistant Professor  
Mechanical Engineering  
Biomedical Engineering (joint appt.)  
University of Delaware  
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## Education

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**Doctor of Philosophy**, Mechanical and Aerospace Engineering, 2007, University of Florida  
**Master of Science**, Mechanical and Aerospace Engineering, 2006, University of Florida  
**Bachelor of Science**, Mechanical and Aerospace Engineering, 2003, University of Florida

## Professional History

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<b>Materials Tribology Lab PI:</b>	University of Delaware	09/2008-present
<b>Assistant Professor:</b>	University of Delaware	09/2008-present
<b>Postdoctoral Associate:</b>	University of Florida	01/2008-09/2008
<b>Research Assistant:</b>	University of Florida	06/2003-12/2007

## Honors and Awards

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09. Invitation to present "Cartilage Tribology" at the Gordon Research Conference on Tribology, 2014
08. Nomination for UD Excellence in Undergraduate Advisement and Mentoring Award, 2013
07. Nomination for UD Excellence in Undergraduate Advisement and Mentoring Award, 2011
06. University of Florida Outstanding Young Alumnus Award, 2011
05. ASME Pi Tau Sigma Gold Medal, 2010:  
*Early career achievement in mechanical engineering within 10 years of B.S.*
04. AFOSR Young Investigator Award, 2010
03. STLE Walter D. Hodson Award, 2009: *Best paper in Tribology Transactions*
02. ASME Marshall B. Peterson Award, 2008  
*Biennial ASME society award for early career (under 30) achievement in tribology*
01. Gordon Research Conference in Tribology Best Poster Award, 2008

## Research

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### A. Publications

Corresponding author is underlined

\* *Student first author*

ξ *Top 25 hottest articles in Polymer January-March 2010*

£ *won best paper award*

§ *invited feature article*

? *cited as top 6 read papers in Macromolecular Materials and Engineering in 2007*

#### i. Journal Articles

##### ***In preparation, Submitted, or Accepted***

- \*43. **Quantitative characterization of solid lubricant transfer films**, J. Ye, H.S. Khare, D.L. Burris, *in preparation*
- \*42. **Wind shear dramatically increases loads on large-scale wind turbine drivetrain bearings**, B. Gould, D.L. Burris, *in preparation*
- \*41. **Effects of sputtering conditions on the chemical properties of polytetrafluoroethylene films**, J. Hertz, P. Zandona, D.L. Burris, *in preparation*
- \*40. **Role of water and third-body contamination in premature failure of wind turbine drivetrains**, B. Gould, D.L. Burris, *in preparation*
- \*39. **Material properties and local function vary across the bovine stifle joint**, A. Moore, D.L. Burris, *in preparation*
- \*38. **Frictional differences throughout the porcine temporal-mandibular joint**, B. Zimmerman, D.L. Burris, X. Lu, *in preparation*
- \*37. **Surface and sub-surface contributions of oxidation and moisture to ambient temperature friction of molybdenum disulfide**, H. Khare, D.L. Burris, *Accepted by Tribology Letters*

##### ***Published after 2008***

- \*36. **An analytical model to predict interstitial lubrication of cartilage in migrating contacts**, A.C. Moore, D.L. Burris, online *in the Journal of Biomechanics*, 10.1016/j.jbiomech.2013.09.020
- \*35. **The effects of environmental water and oxygen on the temperature dependent friction of sputtered molybdenum disulfide**, H. Khare, D.L. Burris, *Tribology Letters*, 52 (2013) 485-493
- \*34. **The extended wedge method: Atomic force microscope friction calibration for improved tolerance to instrument misalignments, tip-offset, and blunt probes**, H.S. Khare, D.L. Burris, *Review of Scientific Instruments* 84 (2013) 055108
- \*33. **Transfer film evolution and its role in promoting ultra-low wear of a PTFE nanocomposite**, J. Ye, H.S. Khare, D.L. Burris, *Wear* 1-2 (2013) 1095-1102

32. **Cell Friction**, T.E. Angelini, A.C. Dunn, J.M. Uruena, D.J. Dickrell, III, D.L. Burris, W.G. Sawyer, *Faraday Discussions* 156 (2012) 31-39.
- \*31. **Functional Characterization of Normal and Degraded Bovine Meniscus: Rate-Dependent Indentation and Friction Studies**, V.J. Baro, E.D. Bonnevie, X. Lai, C. Price, D.L. Burris, L. Wang, *Bone* 51 (2012) 232-240.
- \*30. **Fluid Load Support during Localized Indentation of Cartilage with a Spherical Probe**, E.D. Bonnevie, V.J. Baro, L. Wang, D.L. Burris, *Journal of Biomechanics* 45 (2012) 1036-1041.
- \*29. **In-Situ Studies of Cartilage Microtribology: Roles of Speed and Contact Area**, E.D. Bonnevie, V.J. Baro, L. Wang, D.L. Burris, *Tribology Letters* 41 (2011) 83-95. **\*Student first author**
- \*<sup>ξ</sup>28. **A Quantitative Method for Measuring Nanocomposite Dispersion**, H.S. Khare, D.L. Burris, *Polymer* 51 (2010) 719-729.
27. **Viscoelastic Behavior of Nanotube Filled Polycarbonate: Effect of Aspect Ratio and Interface Chemistry** R.K. Duncan, R. Qiao, J.B. Bult, D. Burris, L.C. Brinson, L.S. Schadler, *I. Journal of Smart and Nano Materials* 1 (2010) 53-68.
26. **Edges, Clearances, and Wear: Little Things that make Big Differences in Bushing Friction**, L.A. Alvarez, M.A. Hamilton, J. G. Steffans, John C. Ziegert, D.L. Burris, W.G. Sawyer, *Journal Wear* 268 (2010) 41-49.
25. **Measurement Uncertainties in Wear Rates**, D.L. Burris, W.G. Sawyer, *Tribology Letters* 36 (2009) 81-87.
24. **Addressing Practical Challenges of Low Friction Coefficient Measurements**, D.L. Burris, W.G. Sawyer, *Tribology Letters* 35 (2009) 17-23.
23. **Multifunctionality of Single-Walled Carbon Nanotube-Polytetrafluoroethylene Nanocomposites**, V.R. Vail, D.L. Burris, W.G. Sawyer, *Wear* 267 (2009) 619-624.
22. **The Effects of Nanoparticle Surface Functionality on the Tribological Properties of Alumina-Polytetrafluoroethylene Nanocomposites**, D.L. Burris, S. Zhao, R. Duncan, J. Lowitz, S.S. Perry, L.S. Schadler, W.G. Sawyer, *Wear* 267 (2009) 653-660.
21. **In-Situ Graphite Lubrication of Metallic Sliding Electrical Contacts**, Bares, J.A., Argibay, N, Dickrell, P, G.R. Bourne, D.L. Burris, J.C. Ziegert, W.G. Sawyer, *Wear* 267 (2009) 1462-1469.
- £20. **Investigation of the Tribological Behavior of Polytetrafluoroethylene at Cryogenic Temperatures**, D.L. Burris, *Tribology Transactions* 51 (2008) 92-100.
19. **A Possible Link Between Wear and Temperature Sensitive Friction Behavior of MoS<sub>2</sub> Coatings**, M.A. Hamilton, L.A. Alvarez, N. Mauntler, R. Colbert, D.L. Burris, C. Muratore, A. Voevodin and W.G. Sawyer, *Tribology Letters* 32 (2008) 91-98.
18. **Tribological Investigation of the Effects of Particle Size, Loading and Crystallinity on Poly(Ethylene) Terephthalate Nanocomposites**, P. Bhimaraj, D.L. Burris, W.G. Sawyer, C.G. Toney, R.W. Siegel and L.S. Schadler, *Wear* 264 (2008) 632-637.

17. **Hierarchically Constructed Metal Foam/Polymer Composite for High Thermal Conductivity**, D.L. Burris and W.G. Sawyer, *Wear* 264 (2008) 374-380.
16. **Spatial Geometric Effects on the Friction Coefficients of UHMWPe**, A.C. Dunn, J.G. Steffens, D.L. Burris, S.A. Banks and W.G. Sawyer, *Wear* 264 (2008) 648-653.

***Published before 2008***

15. **Sliding Orientation Effects on the Tribological Properties of Polytetrafluoroethylene**, W.G. Sawyer, I. Jang, D.L. Burris, P.L. Dickrell, S.S. Perry, S. Philpot and S. Sinnott, *Journal of Applied Physics* 102 (2007) 123509-1 - 123509-7.
- §? 14. **Polymeric Nanocomposites for Tribological Applications**, D.L. Burris, B. Boesl, J.R. Bourne and W.G. Sawyer, *Macromolecular Materials and Engineering* 292 (2007) 387-402.
13. **Macroscopic Evidence of Thermally Activated Friction with Polytetrafluoroethylene**, D.L. Burris, S.S. Perry and W.G. Sawyer, *Tribology Letters* 27 (2007) 323-328 .
12. **Cumulative Damage Modeling of Solid Lubricant Coatings that Experience Wear and Interfacial Fatigue**, N.L. McCook, D.L. Burris, N.H. Kim and W.G. Sawyer, *Wear* 262 (2007) 1490-1495.
11. **Tribological Behavior of PEEK Components with Compositionally Graded PEEK/PTFE Surfaces**, D.L. Burris and W.G. Sawyer, *Wear* 262 (2007) 220-224.
10. **Tribological Results of PEEK Nanocomposites in Dry Sliding against 440C in Various Gas Environments**, N.L. McCook, D.L. Burris, M.A. Hamilton and W.G. Sawyer, *Wear* 262 (2007) 1511-1515.
09. **A Low Friction and Ultra Low Wear Rate PEEK/PTFE Composite**, D.L. Burris and W.G. Sawyer, *Wear* 261 (2006) 410-418.
08. **Improved Wear Resistance in Alumina-PTFE Nanocomposites with Irregular Shaped Nanoparticles**, D.L. Burris and W.G. Sawyer, *Wear* 260 (2006) 915-918.
07. **Epoxy, ZnO and PTFE Nanocomposite: Friction and Wear Optimization**, N L. McCook, B. Boesl, D.L. Burris and W.G. Sawyer, *Tribology Letters* 22 (2006) 253-257.
06. **Tribological Sensitivity of PTFE-Alumina Nanocomposites to a Range of Traditional Surface Finishes**, D.L. Burris and W.G. Sawyer, *Journal Tribology Transactions* 48 (2005) 1-7.
05. **Cryogenic Friction Behavior of PTFE Based Solid Lubricant Composites**, N.L. McCook, D.L. Burris, P.L. Dickrell and W.G. Sawyer, *Tribology Letters* 20 (2005) 109-113.
04. **Wear Resistant Solid Lubricant Coatings Made from PTFE and Epoxy**, N.L. McCook, D.L. Burris, G.R. Bourne, J. Steffens, J.R. Hanrahan and W. Gregory Sawyer, *Tribology Letters* 18 (2005) 119-124.
03. **Effects of Matrix Morphology on the Wear and Friction of Alumina Nanoparticles/Poly(ethylene) Terephthalate Composite**, P. Bhimaraj, D.L. Burris, J.

Action, W.G. Sawyer, C.G. Toney, R.W. Siegel and L.S. Schadler, *Wear* 258 (2005) 1437-1443.

02. **Finite Element Analysis and Validation of Metal/Metal Wear in Oscillatory Contacts**, N.H. Kim, D. Won, D.L. Burris, B. Holtkamp, G.R. Gessel, P. Swanson and W. G. Sawyer, *Wear* 258 (2005) 1787-1793.

£01. **Wear Rate Uncertainty Analysis**, T.L. Schmitz, J. Action, D.L. Burris, J. Ziegert and W.G. Sawyer, *Journal of Tribology* 126 (2004) 802-808.

## **ii. Book Chapters**

01. **Polytetrafluoroethylene Matrix Nanocomposites for Tribological Applications**, D.L. Burris, K. Santos, S.L. Lewis, X. Liu, S.S. Perry, T.A. Blanchet, L.S. Schadler, & W.G. Sawyer, *Tribology of Polymeric Nanocomposites*, editor: Klaus Friedrich and Alois K. Schlarb, (2007) pp. 403-438.

## **iii. Conference Proceedings, extended abstracts and other archival publications**

18. **Relating the structure of articular cartilage to function**, A.C. Moore, D.L. Burris, *Tribology and Lubrication Technology*, in press
17. **Wind shear increases radial loads on wind turbine drivetrains**, B. Gould, D.L. Burris, *Tribology and Lubrication Technology*, August 2013
16. **Methods in characterization of nano-scale friction in solid lubricants**, H.S. Khare, D.L. Burris, *Tribology and Lubrication Technology*, September 2012
15. **Characterization of nanoscale surface films in solid lubricants**, H.S. Khare, D.L. Burris, *Tribology and Lubrication Technology*, May 2012
14. **Rate dependent deformation response of articular cartilage**, E.D. Bonnevie, V.J. Baro, L. Wang, D.L. Burris, *Tribology and Lubrication Technology*, September 2010.
13. **Microtribology of articular cartilage: effects of sliding speed and contact area**, E.D. Bonnevie, V.J. Baro, L. Wang, D.L. Burris, *Tribology and Lubrication Technology*, September 2010.
12. **Nano- and macroscale evidence of thermally activated friction**, D.L. Burris, L.A. Alvarez, M.A. Hamilton, P.L. Dickrell, S.B. Sinnott, S.R. Phillpot, S.S. Perry and W.G. Sawyer, *Proceedings of the STLE/ASME International Joint Tribology Conference* (2008).
11. **Nano- and macroscale evidence of thermally activated friction**, D.L. Burris, L.A. Alvarez, M.A. Hamilton, P.L. Dickrell, S.B. Sinnott, S.R. Phillpot, S.S. Perry and W.G. Sawyer, *Proceedings of the STLE/ASME International Joint Tribology Conference* (2008).
10. **Wear of polytetrafluoroethylene nanocomposites: effects of dispersion, crystallinity and toughness**, D.L. Burris, J.R. Vail, L.S. Schadler, S.S. Perry and W.G. Sawyer, *Proceedings of the STLE/ASME International Joint Tribology Conference* (2008).

09. **Investigation of the tribological behavior of polytetrafluoroethylene at cryogenic temperatures**, D.L. Burris, Tribology and Lubrication Technology, May 2008.
08. **Tribological investigations of a low friction, low wear polymer/polymer composite**, W. G. Sawyer & D. L. Burris, Papers of the American Chemical Society, vol. 231 (2006) pp. 495.
07. **Mechanisms responsible for the tribological properties of PTFE transfer films**, S. B. Sinnott, I. Jang, S. R. Phillpot, P. L. Dickrell, D. L. Burris, & W. G. Sawyer, Papers of the American Chemical Society, vol. 231 (2006) pp. 491.
06. **Transfer of PTFE and PEEK-PTFE composites in tribological interfaces**, C. M. Santos, I. C. Laboriante, S. S. Perry, D. L. Burris, & W. G. Sawyer, Papers of the American Chemical Society, vol. 231 (2006) pp. 259.
05. **20 minutes with...David Burris**, Tribology and Lubrication Technology, October 2006.
04. **Measurement uncertainty in tribological wear Rate testing**, T.L. Schmitz, J. Action, D.L. Burris, J. Ziegert and W.G. Sawyer, Transactions of the 2003 North American Manufacturing Research Institute of the Society of Manufacturing Engineers 260 (2006) 915-918.
03. **Tribological investigation of a low friction, low wear polymer/polymer composite**, D. L. Burris & W. G. Sawyer, World Tribology Congress III (2005), Paper # WTC2005-63524.
02. **Effects of the fraction of PTFE and film thickness on wear and friction in an ePTFE and epoxy composite solid lubricant coating**, N. L. McCook, D. L. Burris, J. R. Hanrahan, & W. G. Sawyer, World Tribology Congress III (2005), Paper # WTC2005-63555.
01. **Nanotribology of a polytetrafluoroethylene transfer films using molecular dynamics simulation and microtribometry**, I. Jang, P. L. Dickrell, D. L. Burris, W. G. Sawyer, S. R. Phillpot, & S. B. Sinnott, World Tribology Congress III (2005), Paper # WTC2005-63881.

## **B. Patents**

05. US Patent #7910527 **Wear resistant Lubricious Composite**, 2011
04. US Patent #7960317 **In-situ lubrication of sliding electrical contacts**, 2011
03. US Patent #7790658 **Inert Wear Resistant PTFE-Based Solid Lubricant**, 2010
02. US Patent #7314646 **Low Friction and Ultra Low Wear Polymer**, 2008
01. US Patent application #11/140, 775 **Hierarchically constructed metal foam/polymer composite for high thermal conductivity**, 2005

## **C. Presentations**

*Presented by the first author*

### **i. Invited Presentations**

15. **Cartilage tribology**, D.L. Burris, *Gordon Research Conference on Tribology*, Bentley University, Waltham MA, Jul. 2014.
14. **A simple in-situ method of AFM calibration for tribological characterization of ultra-thin transfer films**, D.L. Burris, H.S. Khare, *International Conference on Metallurgical Coatings and Thin Films*, San Diego, CA, Apr. 2013.
13. **Joint lubrication, tribological characterization, and the design of self-lubricating joint replacement materials** D.L. Burris, *Food and Drug Administration*, Silver Springs, MD, Jan. 2013.
12. **Theoretical and experimental studies of cartilage tribology and its potential role in osteoarthritis** D.L. Burris, *BIOMS seminar, University of Delaware*, Newark, DE, Oct. 2012.
11. **Cartilage function, breakdown, and replacement: *what we know and what we don't*** D.L. Burris, *Mechanical Engineering Dept. Imperial College*, London, UK, Oct. 2012.
10. **Relating cartilage damage to loss of function: *a possible biomechanical pathway of osteoarthritis?*** D.L. Burris, *American Chemical Society 244<sup>th</sup> National Meeting*, Philadelphia, PA, Aug. 2012.
09. **In-situ studies of cartilage microtribology as a novel route to study osteoarthritis**, D.L. Burris, *Center of Molecular Thermodynamics Seminar , Dept. of Chemical Engineering, University of Delaware*, Newark, DE, Dec. 2011 .
08. **In-situ studies of cartilage microtribology**, D.L. Burris, *American Vacuum Society 58<sup>th</sup> Annual International Symposium*, Nashville, TN, Nov. 2011 .
07. **Fundamental measurements of friction and wear to understand interfacial phenomena** D.L. Burris, *ExxonMobile Seminar, Annandale, NJ*, 2010.
06. **Probing friction at buried interfaces** , D.L. Burris, *Mechanical Based Measurements, Eastern Analytical Symposium*, Somerset, NJ, Nov. 2009 .
05. **Low wear nanocomposites and evidence of thermally activated friction**, D.L. Burris, *Society of Tribologists and Lubrication Engineers local section meeting*, Troy, NY, Oct. 2008.
04. **Low wear nanocomposites and evidence of thermally activated friction**, D.L. Burris, *Mechanical, Aerospace and Nuclear Engineering Department Seminar: **Student Advisory Council Colloquium**, Rensselaer Polytechnic Institute*, Troy, NY, Oct. 2008.
03. **Addressing the lubrication challenges of space flight**, D.L. Burris, *Mechanical Engineering Department Seminar, University of Delaware*, Newark, DE, Oct. 2008.
02. **Understanding tribological phenomena to promote nanocomposite design for use at the extremes**, D.L. Burris, *Department of Mechanical Engineering and Applied Mechanics Colloquium on Tribology Needs of Energy Sustainability, University of Pennsylvania*, Philadelphia, PA, 2008.

01. **Solid lubricant nanocomposites and thermally activated friction**, D.L. Burris.  
Mechanical Engineering Department seminar, *University of Delaware*, Newark, DE, 2008.

***ii. Conference Presentations (not including those presented by Burris's students)***

34. **Cartilage tribology and its potential role in osteoarthritis**, D.L. Burris, A.C. Moore, E.D. Bonnevie, V. Baro, X. Lu, L. Wang, STLE Annual Meeting, Detroit, MI, 2013.
33. **Cartilage tribology and its potential role in osteoarthritis**, D.L. Burris, E.D. Bonnevie, V.J. Baro, A. Moore, B. Henry, X. Lu, L. Wang, American Vacuum Society Annual meeting, Tampa, FL, 2012.
32. **Cartilage tribology and its potential role in osteoarthritis**, D.L. Burris, E.D. Bonnevie, V.J. Baro, A. Moore, B. Henry, X. Lu, L. Wang, ASME/STLE International Joint Tribology Conference , Denver, CO, 2012.
31. **Cartilage tribology and its role in osteoarthritis**, D.L. Burris, E.D. Bonnevie, V.J. Baro, J. Ye, M. Durst, M. Aldrich, X. Lu, L. Wang, STLE Annual Meeting, St. Louis, MO, 2012.
30. **In-situ studies of cartilage microtribology as a novel route to study OA**, D.L. Burris, E.D. Bonnevie, V.J. Baro , L. Wang, Advances in Lubrication, Puntarenas, Costa Rica, 2012.
29. **Interstitial lubrication of cartilage and implications for OA**, D.L. Burris, E.D. Bonnevie, V.J. Baro , L. Wang, ASME/STLE International Joint Tribology Conference, Los Angeles, CA, 2011.
28. **In-situ studies of cartilage microtribology**, D.L. Burris, E.D. Bonnevie, V.J. Baro, L. Wang, STLE/ASME International Joint Tribology Conference, San Francisco, CA, 2010.
26. **Variable environment tribology studies of polytetrafluoroethylene** , D.L. Burris, W.G. Sawyer, P.L. Dickrell, R. Colbert, *STLE Annual Meeting*, Orlando, FL, 2009 .
25. **A route to wear resistant PTFE via trace loadings of functionalized nanofillers**, D.L. Burris, L.S. Schadler, S.S. Perry, W.G. Sawyer, S. Zhao, R. Duncan and J. Lowitz, *Wear of Materials Conference*, Las Vegas, NV, 2009.
24. **Nano- and macroscale evidence of thermally activated friction**, D.L. Burris, M.A. Hamilton, P.L. Dickrell, L.A. Alvarez, S.R. Phillpot, S.B. Sinnott, S.S. Perry and W.G. Sawyer, *ASME/STLE Joint Tribology Conference*, Miami, FL, 2008 .
23. **Wear of polytetrafluoroethylene nanocomposites: studies of dispersion, crystallinity and toughness**, D.L. Burris, J.R. Vail, L.S. Schadler, S.S. Perry and W.G. Sawyer, *ASME/STLE Joint Tribology Conference*, Miami, FL, 2008.
22. **An overview of polytetrafluoroethylene nanocomposite wear: transfer films, bulk properties, nanoparticle dispersion, and PTFE morphology**, D.L. Burris, J.R. Vail, L.S. Schadler, S.S. Perry and W.G. Sawyer, *STLE Annual Meeting*, Cleveland, OH, 2008 .
21. **Environmental effects on MoS<sub>2</sub> based solid lubricant coatings**, L.A. Alvarez, R.S. Colbert, D.L. Burris, D.W. Hahn and W.G. Sawyer, *STLE Annual Meeting*, Cleveland, OH, 2008.



20. **Thermally activated friction**, W.G. Sawyer, S.S. Perry, S.B. Sinnott, S.R. Phillpot, A.A. Voevodin, X. Zhao, M.A. Hamilton, D.L. Burris, C. Muratore, L.A. Alvarez, R. Colbert, N. Argibay, N. Mauntler, *MRS*, San Francisco, CA, 2008.
19. **In-Situ lubrication of sliding electrical contacts**, N. Argibay, J.A. Bares, P.L. Dickrell, D.L. Burris and W.G. Sawyer, *STLE Annual Meeting*, Philadelphia, PA, 2007.
18. **Studies of tribological mechanisms in PTFE**, D.L. Burris, P. Berry, P.L. Dickrell, S.S. Perry, S. Phillpot, L.S. Schadler, S. Sinnott and W.G. Sawyer, *STLE Annual Meeting*, Philadelphia, PA, 2007.
17. **Thermally activated friction**, W.G. Sawyer, S.B. Sinnott, S.R. Phillpot, J.C. Ziegert, S.S. Perry, A.A. Voevodin, M.A. Hamilton, L.A. Alvarez, G.R. Bourne and D.L. Burris, *ICMCTF*, San Diego, CA, 2007.
16. **Tribology of PTFE nanocomposites**, T.A. Blanchet, D.L. Burris, S.E. McElwain, S.S. Perry, W.G. Sawyer and L.S. Schadler, *AFOSR MURI Program Review*, Dayton, OH, 2006 .
15. **Thermal investigations of a tribological composite**, D.L. Burris and W.G. Sawyer, *STLE Annual Meeting*, Calgary, Alberta, 2006.
14. **Environmental sensitivity of PEEK composites**, N.L. McCook, D.L. Burris and W.G. Sawyer, *STLE Annual Meeting*, Calgary, Alberta, 2006 .
13. **Multidirectional wear of UHMWPE and PEEK/PTFE composite in bovine serum**, A.C. Dunn, D.L. Burris, S. Banks and W.G. Sawyer, *STLE Annual Meeting*, Calgary, Alberta, 2006.
12. **Cumulative damage modeling of solid lubricant coatings that experience wear and interfacial fatigue**, N.L. McCook, D.L. Burris and W.G. Sawyer, *STLE Annual Meeting*, Calgary, Alberta, 2006 .
11. **Hierarchically designed polymer nanocomposites for tribological applications**, W.G. Sawyer and D.L. Burris, *American Chemical Society*, Atlanta, GA, 2006.
10. **Ultra low wear rate PTFE/PEEK composite**, D.L. Burris, W.G. Sawyer, *World Tribology Congress*, Washington DC, 2005.
09. **Effects of film thickness on the life of an expanded PTFE and epoxy coating**, N.L. McCook, D.L. Burris and W.G. Sawyer, *World Tribology Congress*, Washington DC, 2005
08. **Development of an ultra-low wear rate PEEK/PTFE composite**, D.L. Burris and W.G. Sawyer, *STLE Annual Meeting*, Las Vegas, NV 2005 .
07. **Vacuum tribology of an ultra-low wear rate PTFE/PEEK composite**, M.A. Hamilton, D.L. Burris, J.C. Ziegert and W.G. Sawyer, *STLE Annual Meeting*, Las Vegas, NV, 2005.
06. **Effects of film thickness and PTFE volume fraction for an expanded PTFE and epoxy coating**, N.L. McCook, D.L. Burris and W.G. Sawyer, *STLE Annual Meeting*, Las Vegas, NV, 2005.

05. **Development of an ultra-low wear solid lubricating polymer/polymer composite**, D.L. Burris and W.G. Sawyer, *2004 AFOSR Tribology Program Review*, Annapolis, MD, 2004.
04. **Finite element analysis and validation of metal/metal wear in oscillatory contacts**, W.G. Sawyer, D.L. Burris and N.H. Kim, *Panel Discussion on Computation in Tribology, American Society of Mechanical Engineers and Society of Tribologists and Lubrication Engineers Joint International Conference in Tribology*, Long Beach CA, 2004.
03. **Wear resistant solid lubricant coating made from PTFE and epoxy**, N.L. McCook, D.L. Burris, G.R. Bourne, J. Steffens, J.R. Hanrahan and W.G. Sawyer, *American Society of Mechanical Engineers and Society of Tribologists and Lubrication Engineers Joint International Conference in Tribology*, Long Beach CA, 2004.
02. **Tribological sensitivity of PTFE-alumina nanocomposites to a range of traditional surface finishes**, D.L. Burris and W.G. Sawyer, *American Society of Mechanical Engineers and Society of Tribologists and Lubrication Engineers Joint International Conference in Tribology*, Long Beach CA, 2004.
01. **PTFE nanocomposites**, D.L. Burris and W.G. Sawyer, *Society of Tribologists and Lubrication Engineers Annual Meeting*, Toronto, 2004.

**iii. Presentations by Burris' students at national and international meetings:**

13. **Effects of location on the local interstitial lubrication response of cartilage in the bovine stifle joint**, A.C. Moore, D.L. Burris, STLE Annual Meeting, Detroit, MI, 2013.
12. **Wind turbine drivetrains: Assessing potential contributors to premature failure**, B. Gould, D.L. Burris, STLE Annual Meeting, Detroit, MI, 2013.
11. **Nanotribological and nanomechanical properties of tribofilms of MoS<sub>2</sub> and MoS<sub>2</sub> composite solid lubricants**, H.S. Khare, D.L. Burris, STLE Annual Meeting, Detroit, MI, 2013.
10. **PTFE nanocomposites: investigating tribology of transfer films**, J. Ye, H.S. Khare, D.L. Burris, STLE Annual Meeting, Detroit, MI, 2013.
09. **In-situ calibration of lateral forces in AFM-nanotribology**, H.S. Khare, D.L. Burris, ASME/STLE International Joint Tribology Conference , Denver, CO, 2012.
08. **Isolating the effects of water, oxygen, and temperature on MoS<sub>2</sub> tribology**, H.S. Khare, D.L. Burris, ASME/STLE International Joint Tribology Conference , Denver, CO, 2012.
07. **Tribological PTFE nanocomposites: relating transfer and wear**, J. Ye, H.S. Khare, D.L. Burris, ASME/STLE International Joint Tribology Conference , Denver, CO, 2012.
06. **In-situ AFM calibration for quantitative nanotribology studies**, H.S. Khare, D.L. Burris, STLE Annual Meeting, St. Louis, MO, 2012.
05. **Tribological PTFE nanocomposites: relating transfer and wear**, J. Ye, H.S. Khare, D.L. Burris, STLE Annual Meeting, St. Louis, MO, 2012.

04. **Characterization of nanoscale surface films in solid lubricants**, H.S. Khare, D.L. Burris, ASME/STLE International Joint Tribology Conference, Los Angeles, CA, 2011.
03. **Biomechanical response of meniscus to contact loading**, V.J. Baro, E.D. Bonnevie, L. Wang, D.L. Burris, STLE Annual Meeting, Atlanta, GA, 2011.
02. **An in-situ approach to cartilage microtribology**, E.D. Bonnevie, V.J. Baro, L. Wang, D.L. Burris, STLE Annual Meeting, Atlanta, GA, 2011.
01. **A quantitative metric for nanocomposite dispersion analysis**, H.S. Khare, D.L. Burris, STLE Annual Meeting, Las Vegas, NV, 2010.

**iv. Poster Presentations by Burris's students:**

*£ award winning*

- £18. **A model of cartilage tribology**, A.C. Moore, D.L. Burris, STLE Annual Meeting, Detroit, MI, 2013
17. **Wind turbine drivetrains: Assessing potential contributors to premature failure**, B. Gould, D.L. Burris, STLE Annual Meeting, Detroit, MI, 2013.
16. **Tribological PTFE nanocomposites: investigating role of transfer films in wear reduction**, J. Ye, D. L. Burris, STLE Annual Meeting, Detroit, MI, 2013
15. **An evaluation of competing mechanisms in the thermal and environmental dependence of MoS<sub>2</sub> friction**, H.S. Khare, D.L. Burris, STLE Annual Meeting, Detroit MI, 2013
14. **In-situ AFM calibration for quantitative nanotribological studies**, H.S. Khare, D.L. Burris, International Joint Tribology Conference, Denver CO, 2012
- £13. **Effects of oil contamination on gearbox life**, B. Gould, D.L. Burris, International Joint Tribology Conference, Denver CO, 2012
12. **PTFE nanocomposites: investigating tribology of transfer films**, J. Ye, H.S. Khare, D.L. Burris, International Joint Tribology Conference, Denver CO, 2012
11. **Tribological PTFE nanocomposites: relating transfer and wear**, J. Ye, H. S. Khare, D. L. Burris, Gordon Research Conferences on Tribology, Waterville, ME, 2012
10. **Isolating the effects of water, oxygen and temperature on MoS<sub>2</sub> tribology**, H.S. Khare, D.L. Burris, Gordon Research Conference on Tribology, Waterville ME, 2012
09. **In situ study of PTFE nanocomposites: relating transfer and wear**, J. Ye, H. S. Khare, D. L. Burris, STLE Annual Meeting, St. Louis, MO, 2012
- £08. **Methods in characterization of nanoscale friction in solid lubricant tribofilms**, H.S. Khare, D.L. Burris, STLE Annual Meeting, St. Louis MO, 2012
07. **Mechanical loading and sliding speed dependent frictional coefficient of TMJ cartilage and disc**, E.D. Bonnevie, L. Barito, M. Aldridge, L. Wang, D.L. Burris, L. Lu, Orthopedic Research Society Meeting, San Francisco, CA, 2012.

06. **Effect of rate and contact radius on the local contact response of cartilage**, E.D. Bonnevie, V.J. Baro, L. Wang, D.L. Burris, Orthopedic Research Society meeting, San Francisco, CA, 2012.
05. **PTFE nanocomposites: relating transfer and wear**, J. Ye, A. J. Szela, J. Zheng, D. L. Burris, STLE Annual Meeting, Atlanta, GA, 2011
- £04. **Characterization of Nanoscale Surface Films in Solid Lubricants**, H.S. Khare, D.L. Burris, International Joint Tribology Conference, Los Angeles CA, 2011
03. **Characterization of nanoscale surface films in solid lubricants**, H.S. Khare, D. L. Burris, STLE Annual Meeting, Atlanta GA, 2011
- £02. **Microtribological Studies of Bovine Articular Cartilage**, E.D. Bonnevie, P. Yao Koffi, L. Wang and D.L. Burris, STLE Annual Meeting, Las Vegas NV, 2010.
01. **Microtribological Studies of Bovine Articular Cartilage**, E.D. Bonnevie, P. Yao Koffi, L. Wang and D.L. Burris, UD Science and Engineering Scholars Program Review, Newark, DE, 2009.

#### v. Colloquia and Workshops:

06. **Scanning Probe Microscopy (SPM) Applications in Tribology**, H.S. Khare, D.L. Burris, Bruker Nano Surface Metrology Workshop, UD Center for Composite Materials, Newark, DE 2012
05. **Applications of 3D Optical Microscopy in Tribology Research**, H.S. Khare, J. Ye, F. Feng, D.L. Burris, Bruker Nano Surface Metrology Workshop, UD Center for Composite Materials, Newark, DE 2012
04. **Measurement Resources and Philosophies**, D.L. Burris, *W.L. Gore*, Elkton, MD, 2009.
03. **Investigation of Wear Resistance Mechanisms in Polytetrafluoroethylene**, D.L. Burris and W.G. Sawyer, Colloquium on Paths Forward in PTFE Tribology Research, *W.L. Gore and University of Florida*, Gainesville, FL, 2006 .
02. **Overview of PTFE Composites Tribology**, W.G. Sawyer, D.L. Burris and N.L. McCook, Colloquium on Current Understanding of PTFE-based Solid Lubricants, *W.L. Gore and University of Florida*, Elkton, MD, 2006 .
03. **PTFE and Epoxy Composite Coatings**, N.L. McCook, D.L. Burris, J.R. Bourne and W.G. Sawyer, Colloquium on Future Directions in Material Development, *W.L. Gore and University of Florida*, Elkton, MD, 2004 .
01. **Design of a Bushing Tribometer**, J.A. Bardt, D.L. Burris and P.L. Dickrell, Colloquium on Component Level Testing for Materials Selection, *Harris Corporation and University of Florida*, Gainesville, FL, 2004.

## D. Research Grants Awarded

### i. Principal Investigator

09. **ExxonMobil Knowledge Build Grant:** *High resolution repositioning tools for interrupted surface analysis of chemistry, topography, and nanomechanical properties*  
Amount: \$12,000  
Date: 8/01/2013-12/31/2013
  08. **Tribologix/Rolls-Royce cooperative:** *Developing tools for tribo-testing vibratory contacts*  
Amount: \$70,000  
Date: 1/01/2013-12/31/2014
  07. **Gamesa Innovation and Technology, First State Marine Wind:** *Characterizing the Quasi-Static Loads and the Deformation Response of the Lewes G90 Wind Turbine*  
Amount: \$50,886  
Date: 7/1/2010-6/31/2012
  06. **NIH COBRE Pilot:** *Functional Evaluation of the Meniscus and Implications for Meniscal Allograft Surgery*  
Amount: \$37,750  
Date: 6/1/2011-5/31/2012
  05. **AFOSR Young Investigator Award:** *Linking Tribo-Film Nanomechanics to the Origins of Low Friction and Wear*  
Amount: \$332,126  
Date: 7/15/2010-7/14/2013
  04. **University of Delaware Research Foundation:** *Research Experience for Undergraduates*  
Amount: \$3,500  
Date: 6/1/2010-8/31/2010
  03. **NIH COBRE Pilot:** *Assessing the Effects of Cartilage Damage on Joint Lubrication Using Novel Microtribological Measurements,*  
Amount: \$50,000  
Date: 1/1/2010-12/31/2010
  02. **University of Delaware Research Foundation:** *High Temperature Tribology*  
Amount: \$35,000  
Date: 6/1/2009-5/31/2010
  01. **NIH COBRE Pilot:** *Microtribological Measurements of Cartilage Degradation,*  
Amount: \$50,000  
Date: 1/1/2009-12/31/2009
- ii. Co-Principal Investigator**
03. **DOE:** *Advanced Offshore Wind Energy – Atlantic Consortium, PI-Kempton*  
Amount: \$747,540

Burris' portion: \$124,999  
Date: 7/1/2010-12/31/2013

02. **AFOSR:** *Analysis of Tribological Materials Tested in Low Earth Orbit: Active and Passive Experiments from MISSE 7*

Burris' portion: \$9,946  
Date: 7/1/2010-6/31/2012

01. **NASA:** A Novel Sputtered PTFE Nanocomposite Coating as a Route to Extend NASA's Space Exploration Envelope, PI-Hertz

Amount: \$28,000  
Date: 1/1/2010-12/31/2010

## E. Research Mentoring

### i. Ph.D. Students Advised

#### **Current students**

Harmandeep Khare	Ph.D. 2014	
Jiaxin Ye	Ph.D. 2014	
Vincent Baro	Ph.D. (former)	co-advised by Liyun Wang
Laura Barito	Ph.D. 2016 (former)	
Ben Gould	Ph.D. 2017	
Axel Moore	Ph.D. 2017	

### ii. M.S. Students Advised

#### **Current students**

Philip Zandona	M.S. 2013	co-advised by Joshua Hertz
Feifei Feng	M.S. 2013 (former)	

### iii. Undergraduate Students Advised in Research

#### **Graduated**

Bradley Miller	B.S. 2009
Sonly Monclus	B.S. 2009
Pierre Yao Koffi	B.S. 2010
Brendon McCracken	B.S. 2010
Matthew Rector	B.S. 2011
Edward Bonnevie	B.S. 2011 (senior thesis)
Jeffrey Lugo	B.S. 2011
Michael Hospod	B.S. 2011
Alex Szela	B.S. 2012
Blake Bell	B.S. 2012
Kevin Murphy	B.S. 2013
Matthew Durst	B.S. 2013
Matthew Aldridge	B.S. 2013

**Current students**

Ben Henry	B.S. 2014
Brandon Zimmerman	B.S. 2014
Steven Rosekrantz	B.S. 2014
Lauren Kewley	B.S. 2014
Nicolaas Negron	B.S. 2015
Jack Hishmeh	B.S. 2015
Wes McDowell	B.S. 2015
Kyle Lusignea	B.S. 2016

**iv. Visiting students**

Junxi Zheng	Ph.D. 2014	Xi'an Jiaotong University
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**v. Thesis Committees**

Stephen Kohlhafer	M.S. 2011	Advisors: Advani, Gillespie
Eric Fisher	M.S. 2012	Advisor: Hertz
Gregory Kelly	M.S. 2012	Advisors: Advani, Gillespie
Xiaowei Yang	M.S. 2013 (expected)	Advisor: Jia
Jing Qu	Ph.D. 2016	Advisor: Martin

**vi. Awards to Research Mentees**

<b>Student</b>	<b>Award</b>
Haman Khare	2013 STLE Scholarship - Philadelphia section
Axel Moore	2013 Laird Fellowship (36 <sup>th</sup> recipient)
Axel Moore	2013 Force and Motion Scholarship (2 awards given nationally)
Axel Moore	2013 Gold Poster Award, STLE Annual Meeting
Harman Khare	2013 Young Tribologist Award. STLE Annual meeting
Harman Khare	2013 UD Mech. Eng. Dept. Graduate Student Achievement Award
Brandon Zimmerman	2013 Nowinski Award for Excellence in Undergraduate Research
Harman Khare	2012 Young Tribologist Award, STLE Annual Meeting
Benjamin Gould	2012 ASME/STLE IJTC best poster award
Harman Khare	2012 Platinum Poster Award, STLE Annual Meeting
Jiaxin Ye	2012 Best poster runner-up, UD ME Graduate Student Symposium
Harman Khare	2012 University Graduate Fellow
Harman Khare	2012 University of Delaware Professional Development Award
Edward Bonnevie	2012 NSF Graduate Research Fellowship
Harman Khare	2011 ASME/STLE IJTC gold poster award
Laura Barito	2011 NCAA Woman of the year
Edward Bonnevie	2011 Nowinski Award for Excellence in Undergraduate Research
Edward Bonnevie	2011 Young Tribologist Award, STLE Annual Meeting

Edward Bonnevie	2011 Platinum Poster Award, STLE Annual Meeting
Edward Bonnevie	2011 Capital One/CoSIDA District 2 All-Academic first team
Vincent Baro	2011 Best Poster Award, UD CBER research symposium
Edward Bonnevie	2011 Best Poster, UD ME undergraduate research symposium
Pierre Yao Koffi	2010 Nowinski Award for Excellence in Undergraduate Research
Edward Bonnevie	2010 Silver Poster Award, STLE Annual Meeting
Vincent Baro	2010 Best Poster Award, UD CBER research symposium
Edward Bonnevie	2010 Best Poster, UD ME undergraduate research symposium
Harman Khare	2010 Best presentation award, UD ME Graduate Student Symposium
Harman Khare	2010 Top 25 hottest article downloads in the Journal Polymer

## Teaching

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### A. Courses Taught

#### *i. Core Undergraduate Courses*

##### **02. MEEG 216: Mechanics of Solids Lab**

Sophomore level required course, 1 credit (*co-taught as part of MEEG215, a 4 credit course 2009-2011*)

Fall 2009, 119 students

Fall 2010, 109 students

Fall 2011, 114 students

Fall 2012, 113 students

##### **01. MEEG 304: Machine Design Elements**

Junior level required course, 3 credits (*co-taught with J. Glancey, spring 2012*)

Spring 2009, 79 students

Spring 2010, 108 students

Spring 2011, 118 students

Spring 2012, 111 students

#### *ii. Technical Electives*

##### **02. MEEG 467/667: Interface Science and Engineering**

Undergraduate/graduate level course, 3 credit

Spring 2013, 12 students

##### **01. MEEG 467/667: Wind Drivetrain Engineering**

Undergraduate/graduate level course, 1 credit

Spring 2012, 9 students

#### *iii. Independent Studies*

##### **07. Cartilage mechanics and tribology**



Undergraduate level course, 3 cr.  
Spring 2011, 1 student

**06. Fabric wear and scratch toughness**

undergraduate/graduate level course, 3 credit  
Winter 2011, 1 student

**05. Cartilage mechanics and tribology**

Undergraduate level course, 3 cr.  
Fall 2010, 1 student

**04. Cartilage mechanics and tribology**

Undergraduate level course, 0 cr.  
Summer 2010, 1 student

**03. Tribology of single walled carbon nanotubes**

Undergraduate level course, 3 cr.  
Summer 2010, 1 student

**02. Cartilage friction**

Undergraduate level course, 3 cr.  
Spring 2010, 1 student

**01. Research instrument and software design, 1U/G student, summer 2009, 0 cr.**

Undergraduate level course, 0 cr.  
Summer 2009, 1 student

## **B. Courses Developed**

**MEEG 467/667: Interface Science and Engineering**, undergraduate/graduate level course, 3 credit  
*(spring 2013)*

**Course description:** Contacting, rolling, sliding and other tribological interfaces are essential components in nearly every biological or engineered mechanical system. Friction accounts for a significant fraction of the energy consumed by mechanical systems, and most failures initiate at the interface. This course provides an introduction to tribology, imparts a basic understanding of interfacial phenomena, and surveys emerging interface challenges including those involved in wind power, and osteoarthritis treatment.

**MEEG 467/667: Wind Drivetrain Engineering**, undergraduate/graduate level course, 1 credit  
*(spring 2012)*

**Course description:** This course presents basic tools, elements and approaches for the design and analysis of wind turbine drivetrains. Thematically, instruction will cover: 1) basic wind turbine elements and configurations; 2) bearings, gears and lubrication; 3) load and failure analysis. The students apply the course content to the design of a residential wind turbine drivetrain.

## **C. Educational Improvement Activities**

- 04. Inside-out classroom in MEEG 304, spring 2012
- 03. Developed the Mechanical Engineering Statistics and Communication track, spring, 2011
- 02. Redesigned Mechanical Engineering Solid Mechanics Laboratory (MEEG 216), spring 2009
- 01. Developed a MEEG 304 product dissection and reverse engineering project, fall 2008

## Service

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### A. Academic Service

#### i. University Committees

Distinguished Scholars Selection Committee 2011

#### ii. College Committees

Chair, Early Career Faculty Committee 2013-present

Chair, Elections Committee 2010-present

Search Committee, Associate Director for Development 2010

#### iii. Mechanical Engineering Committees

Design Studio Committee 2013-present

Undergraduate Curriculum Committee 2012-present

Seminar Committee chair 2012

Seminar Committee vice chair 2011

Chair, Undergraduate Laboratory Committee 2010-present

Publicity Committee 2009-2012

Undergraduate Laboratory Committee 2008-present

Faculty search committee, design non-tenure track 2010

Ad-Hoc Qualifying Exam Committee 2009-2010

#### iv. Biomedical Engineering Committees

Graduate program task force, ME Representative 2011

#### v. Other University Services

ME Senior design review panelist 2010-2011

Undergraduate Decision Days, Solid Mechanics lab 2010-present

Solid Mechanics qualifying exam writer and grader 2009-present

Blue and Gold Saturdays, Solid Mechanics lab 2009-present

Graduate student recruitment 2009-present

### B. Professional Service

#### i. Professional Membership

STLE - Society of Tribologists and Lubrication Engineers (2003 – present)

ASME - American Society of Mechanical Engineers (2003 – present)

ASEE - American Society for Engineering Education (2006-present)

ii. **Professional Committees**

Conference Initiation Committee, STLE Tribology Frontiers Research Conference	2013-present
Conference Planning Committee, ASME/STLE International Joint Tribology Conference (IJTC)	2011-2013
Chair, Boundary Lubrication track, IJTC	2012-present
Chair, Biotribology track, IJTC	2012-present
Chair, Materials Tribology Committee, STLE	2011-present
Chair, Early Career Tribologist Committee, STLE	2011-present
Chair, Fluid Film Lubrication track, IJTC	2011
Pi Tau Sigma Scholarship Committee, ASME	2011
Young Tribologist Committee, STLE	2008-present
Paper Solicitation Chair, Materials Tribology Committee, STLE	2010
Paper Solicitation Chair, Solid Lubricants Committee, STLE	2008-2009

iii. **Symposium Organizer**

**STLE Tribology Frontiers Research Conference**

Medical Applications in Tribology Track Organizer: 2013

**STLE Tribology Frontiers Research Conference**

Natural Tribological Processes Track Organizer: 2013

**American Vacuum Society Meeting**

Tribology Focus Topic Co-Organizer: Friction in Biological Systems, Molecular Origins of Friction and Wear, Low friction Coatings, Self-Healing Coatings and Lubricants: 2012

**ASME/STLE International Joint Tribology Conference**

Boundary Lubrication track organizer, 2012

**ASME/STLE International Joint Tribology Conference**

Biotribology track organizer, 2012

**ASME/STLE International Joint Tribology Conference**

Fluid Film Lubrication track organizer, 2011

**STLE Annual Meeting**

Contact Mechanics, Joint Session Organizer, 2011 *joint session between Materials Tribology and Nanotribology Committees*

**STLE Annual Meeting**

In-situ and Multi-scale Methods, Joint Session Organizer, 2011 *joint session between Materials Tribology and Nanotribology Committees*

**STLE Annual Meeting**

Materials Tribology, Track Organizer, 3 sessions, 2011

**STLE Annual Meeting**

Solid Lubricants, Track Organizer, 3 sessions, 2010

**STLE Annual Meeting**

Solid Lubricants, Track Organizer, 3 sessions, 2009

**iv. Editor**

Associate Editor, Tribology Transactions, 2009-present

Editorial Director, Tribology and Lubrication Technology (TLT), 2007-2009

**v. Proposal Reviewer**

National Science Foundation, June, 2013

National Science Foundation, May, 2012

National Science Foundation, January, 2012

National Science Foundation, December, 2009

National Science Foundation, May, 2009

National Science Foundation, December, 2008

**vi. Journal Reviewer**

ACS Applied Materials and Interfaces, ASME Journal of Tribology, Biomechanics, Composites Science and Technology, Journal of Composite Materials, Journal of Engineering Tribology, Journal of Polymer Science Part B: Polymer Physics, Journal of Materials Science, Journal of the Royal Society Interface, Materials, MRS proceedings, Materials Research Letters, Nanotechnology, Royal Society of Chemistry Advances, Tribology International, Tribology Letters, Tribology Transactions, Wear

**C. Educational outreach service**

**i. Invited Service Panel Discussions:**

03. Invited Panelist: **“Strategies for obtaining an academic position”** workshop for best practices in preparing to secure an academic position for post-docs, graduate students, and undergraduate students, Mechanical Engineering Graduate Association, University of Delaware, December 3, 2012.

02. Invited Panelist: **“Success in Your Academic Job”** assistant professor, post-doc, and graduate student mentoring workshop sponsored by NIH UD WISE brown bag lunch series, University of Delaware, December 8, 2010.

01. Invited Panelist: **“Success in Your Academic Job”** Post-doc mentoring and recruiting workshop sponsored by the University of Delaware College of Engineering, University of Delaware, September 12, 2010.

**ii. K-12 outreach activities:**

**Formerly alive at 10:45**

2011-present

This module has been developed to educate young students about joints and joint anatomy. The students (typically middle-school aged) use scalpels to dissect cow knees

after learning about joint anatomy and function. This module has become a favorite of the COE outreach coordinator, Melissa Jurist, who has run this module 4-6 times per year since 2011.