



## Lawrence T. Drzal

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 Michigan State University, College of Engineering  
 Department of Chemical Engineering and Materials Science  
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Google Scholar: 11/12/18: Publications 476; Patents 41; Citations 45495; Publications H index = 101

### EDUCATION

Ph.D. Case Western Reserve University, 1974  
 BChE. University of Detroit, 1967

### PROFESSIONAL EXPERIENCE

2015 - Director, Vehicle Applications, DOE Institute for Advanced Composites Manufacturing Innovation  
 2009 - Chief Scientist, XG Sciences, Inc.  
 2007 - Co-founder of XG Sciences, Inc., [www.xgsciences.com](http://www.xgsciences.com) Graphene Nanoplatelet Manufacturer  
 1997 - University Distinguished Professor  
 1991 - Co-Director, NSF State Industry University Center for Low-Cost, High-Speed Polymer Composites Processing  
 1989 - Professor, Department of Materials Science and Mechanics (jointly with Chemical Engineering)  
 1986 - Professor, Department of Chemical Engineering  
 1985 - Director, Composite Materials and Structures Center, College of Engineering Michigan State Univ  
 1985 - 1986 Associate Professor, Department of Chemical Engineering, Michigan State University  
 1981 - 1985 Adjunct Professor of Materials Engineering, University of Dayton  
 1977 - 1985 Materials Research Engineer, Air Force Wright Aeronautical Laboratory, Wright Patterson Air Force Base, Ohio  
 1976 - 1977 Materials Research Engineer, University of Dayton Research Institute, Dayton, Ohio  
 1972 - 1976 Captain, Chemical Engineer, United States Air Force, Air Force Materials Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio  
 1967 - 1972 Graduate Student Research Assistant, Department of Chemical Engineering, Case Western Reserve University, Cleveland, Ohio  
 1967 - 1967 Chemical Engineer, Ford Motor Company, Glass Technical Center, Lincoln Park, Michigan

### HONORS AND AWARDS

2019 Elected Fellow, National Academy of Inventors 2019  
 2018 Technology Transfer Achievement Award, MSU Technologies Inventor  
 2016 SPE Automotive Division's 2016 Lifetime Achievement Award  
 2016 Medal of Excellence in Composite Materials U Delaware CCM 2016  
 2015 Elected to National Academy of Inventors  
 2012 NASA Space Technology Research Fellowship, Advisee, Diandra Rollins,  
 2011 Best Paper Award, 2011 Automotive Composites Conference and Exposition,  
 2008 "Best Technical Paper Award" 2008 Society of Plastics Engineers, Thermoset Division  
 2007 Nano 50TM Award National Nano Engineering Conference 2007 (NNEC), Boston  
 2006 Elected Fellow of SAMPE  
 2006 "Educator of the Year", SPE Composites Division  
 2005 "Best Paper Award", Coatings for Plastics Symposium  
 2004 Elected Fellow of the Society of Plastics Engineers  
 2004 Elected Fellow of the American Society for Composites  
 2003 "Highly Cited Materials Science Researcher," in ISI Highly Cited Listing  
 2003 "Best Paper Award" - SPE ANTEC 2003-Composites Division  
 2002 Fellowship- Japan Society for the Promotion of Science  
 2002 Elected Robert Patrick Fellow of the Adhesion Society

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| 2002 | Elected Fellow of the American Institute of Chemists   |
| 1999 | "Best Paper Award – Composites Division" American Society for Composites   |
| 1997 | University Distinguished Professor, Michigan State University  |
| 1997 | "Best Performing Research Project" Mich. Matrls & Proc Inst  |
| 1996 | American Society for Composites Technomic Award for Outstanding Achievement<br>in Research, Education and Public Service in the Field of Composite Materials |
| 1994 | Adhesion Society & 3M Award for Excellence in Adhesion Science Research  |
| 1994 | "Best Performing Research Project" Mich. Matrls & Proc Inst  |
| 1994 | "Best Paper Award," Advanced Composites Conference   |
| 1993 | Distinguished Faculty Award, Michigan State University   |
| 1993 | "Best Performing Research Project" Mich. Matrls & Proc Inst  |
| 1992 | Withrow Distinguished Scholar Award, College of Engineering, Michigan State Univ   |
| 1992 | Edwin P. Plueddemann Award for Excellence in Composites Research<br>Dow Corning Corporation & Intern. Conf. on Composite Interfaces                          |
| 1991 | "Best Performing Research Project" Mich. Matrls & Proc Inst  |
| 1990 | "Best Academic Paper" Award, Advanced Composites Conference  |
| 1983 | "Best Paper" Award, SAMPE Technical Conference   |
| 1981 | Air Force Scientific Achievement Award, U.S.A.F. Systems Command   |
| 1979 | Charles J. Cleary Scientific Materials Research Award, U.S.A.F. Materials Laboratory   |
| 1968 | NSF Traineeship, Case Western Reserve University   |
| 1967 | Engineer of the Year, University of Detroit  |
| 1967 | Fellowship, Case Western Reserve University  |
| 1966 | American Institute of Chemists' Student Award in Chemical Engineering  |

#### **TECHNICAL AND PROFESSIONAL SOCIETIES**

Adhesion Society (*Fellow*) (Board 1989-90, 00-02, Vice-President 1996-1998, President 1998-2000)  
 American Institute of Chemists (*Fellow*)  
 American Society for Composites (*Fellow*) (Officer 1990-91, 1998-99)  
 Society of Plastic Engineers (*Fellow*) Composites Division, Board Member (2000- 2003)  
 Society for the Advancement of Material and Process Engineering (SAMPE) (*Fellow*)  
 American Chemical Society ASM International (ASM)  
 American Institute of Chemical Engineers  
 Tau Beta Pi  
 Institute of Materials  
 Omega Chi Epsilon  
 Sigma Xi

#### **PROFESSIONAL ACTIVITIES**

##### *Editorial Board Member:*

Nanocomposites  
 Composite Materials Science  
 Science and Engineering of Composite Materials  
 Composite Interfaces  
 Composites Part A: Applied Science and Manufacturing  
 Journal of Biobased Materials and Bioenergy  
 Carbon Letters

##### *Reviewer for:*

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| Journal of Composite Materials   | Journal of Colloid and Interface Science     |
| Journal of Adhesion              | Composite Interfaces                         |
| Composite Materials Science      | Polymer Composites                           |
| Petroleum Research Fund          | Journal of Adhesion Science and Technology   |
| National Science Foundation      | Journal of Thermoplastic Composite Materials |
| Composite Science and Technology | Journal of Surface and Interface Analysis    |
| Science                          | Nature Materials                             |
| Polymer Engr & Science           | Composite Science and Technology             |

##### *Professional Committee Memberships:*

Member, Board of Directors, Mid Michigan Technology Council (1988-1992)  
 Member, Organizing Committee ASM-ESD Advanced Composite Conference (1987- 1990)

Member, Michigan Materials and Processing Institute Technical Committee I (1988- 1999)  
 Member, Board of Directors, Michigan Materials and Processing Institute (1992- )  
 Member, National Academy of Science, National Research Council, Science and Technology Subcommittee of the Army Board on Science and Technology (1992-1994 )  
 Member, Michigan Plastics Advisory Council (1988-1992)  
 Member, SAMPE Academic Advisory Council (1992- 1997)  
 Member, Advisory Board, Virginia Polytechnic Institute, NSF Science & Technology Center on High Performance Polymeric Adhesives and Composites (1990-1994)  
 Member, Federal Highway Administration, Advisory Comm. on Adhesives Res. (1993-1995)  
 Member, Michigan Jobs Commission, Plastics Advisory Council (1995- 1997)  
 Reviewer, University of Michigan, Center for Biomaterials (1995- 2001)  
 Scientific Committee Member, 5<sup>th</sup> European Conference on Adhesion (2000)  
 External Advisory Board, University of Delaware Center for Composite Materials (2001-2003)  
 External Reviewer, Southern Illinois University, Materials Research Center (2001)  
 Society of Plastics Engineers, Composites Division Board Member (1999-2003)  
 Reviewer, NASA Polymer Program (2003)  
 Reviewer, NSF DMII Career (2003)  
 Reviewer, NSF-PATH (2003)  
 USAF Research Lab, Materials and Manufacturing Directorate, Scientific Advisory Board, (2005-2007)  
 Member, Scientific Advisory Board of Nanopolis World of Knowledge (2005-  
 Member, Engineering Materials Achievement Award Selection Committee, ASM International (2007-2010)

*General Chairman, Technical Chair and/or Organizer:*

2006 The Council for Chemical Research: 11th New Industrial Chemistry and Engineering (NICHE) Conference: Advanced Polymers: Developing High-Performance Polymeric Materials for the Future, Orlando  
 2002 Society of Plastics Engineers, Composites Division, Advanced Composites Conference and Exhibition  
 2002 International Organizing Committee, ICCI-IX, Quanzhou, China  
 2001 Society of Plastics Engineers, Composites Division, Automotive Composites RETEC  
 1997 Gordon Research Conference on Composite Materials  
 1997 20th International Anniversary Meeting of the Adhesion Society  
 1995 MRS Symposium on the "Interphase," San Francisco  
 1994 ASTM Fall Technical Symposium on "Fiber, Matrix and Interphase Properties of  
 1990 5th National Meeting of American Society for Composites  
 1987 International Meeting of the Adhesion Society  
 1985 NASA Workshop on Thermoplastic Composite Interphases  
 1982 Gordon Research Conference on Adhesion  
 1980 Adhesion Society Meeting  
 1976 AFOSR Workshop on Polymer Interphase

*Session Chairman:*

2008 Gordon Research Conference on Composites  
 1998, 1999 American Society for Composites  
 1998 International World Congress on Adhesion, Garmisch-Partenkirchen, Germany  
 1996 AIChE National Meeting  
 1995 MRS Spring Meeting on Polymer/Inorganic Interphases  
 1993 NIST Workshop on "Liquid Molding"  
 1993 AIChE National Technical Meeting "Interface Engineering of Composites"  
 1990 IUPAC Meeting- Montreal  
 1990 ALCOA Symposium on Chemistry and Physics of Surfaces and Interfaces  
 1988 American Institute of Chemical Engineers  
 1988 ALCOA Symposium on Polymers  
 1986, 1993 American Society of Composites Meeting  
 1986 Gordon Research Conference on Adhesion  
 1986 - 1992 ASM-ESD Advanced Composites Conference  
 1982 Adhesion Society Meeting  
 1979 Adhesion Society Meeting

*MSU Committees:*

College Tenure and Promotion Committee  
CMSC Advisory Committee  
University Fellowship Selection Committee  
Lifelong Education Committee  
CHEMS Promotion Committee

OVRPGS SPG Selection Committee  
College International Programs Committee  
Comm. on Commercialization of Inventions  
OVRPGS Faculty Advisory Committee  
Provost AdHoc Comm on Outside Work for Pay

**PUBLICATIONS**

**Google Scholar: 11/12/18: Publications 476; Patents 41; Citations 45495; Publications H index = 101**

1. Drzal, L. T. "Adsorbate-Adsorbent Interactions by Gas Adsorption" Ph.D. dissertation prepared under the direction of Professor T. Fort of Case Western Reserve University, Department of Chemical Engineering, (January, 1974).
2. Drzal, L. T.; Fort, T.; Putnam, F. "A High Precision Gas Volumetric Adsorption Apparatus for Surface Studies" *Rev. Sci. Instr.*, **45**, 1331-5 (1974).
3. Drzal, L. T.; Fort, T. "Adsorption of Freon 113. I. Comparison of the Adsorption of Krypton and 1,1,2 Trichloro-1,2,2 trifluoroethane on Graphitized Carbon Black," *Coll. Poly. Sci.*, **254**, 795-802 (1976).
4. Drzal, L. T.; Fort, T. "Adsorption of Freon 113. II. Comparison of The Adsorption of Krypton and 1,1,2 Trichloro-1,2,2 trifluoroethane on Anatase, Silicon and Silica Spheres" *Coll. Poly. Sci.*, **254**, 803-811 (1976).
5. Drzal, L. T. "The Surface Composition and Energetics of Type A Graphite Fibers" *Carbon*, **15**, 129-138 (1977).
6. Drzal, L. T. Camping, J.; Teeters, G. "Graphite Fiber-Epoxy Interfacial Defect Analysis," International ASM-ISM Metallographic Exhibit (1978).
7. Drzal, L. T.; Camping, J.; Teeters, G. "A Photomicrographic Technique for Analysis of the Composite Interphase under Mechanical Stress," *International ASM-ISM Metallographic Exhibit* (1978).
8. Drzal, L. T.; Mescher, J.; Hall, D. "The Surface Composition and Energetics of Type HM Graphite Fibers," *Carbon*, **17**, 375-382 (1979).
9. Drzal, L. T.; Hammer, G. "Graphite Fiber Surface Analysis through XPS and Polar/Dispersion Free Energy Analysis," *Appl. Surf. Sci.*, **4**, 340-355 (1980).
10. Drzal, L. T.; Rich, M. J.; Park, W.; Camping, J. "A Single Filament Technique for Determining Interfacial Shear Strength and Failure Mode in Composite Materials," Paper 20-C, *35th Annual Technical Conference, Reinforced Plastics/Composites Institute, SPI* (1980).
11. Drzal, L. T. "The Surface Composition and Energetics of Graphite Fiber Surfaces," in *Treatise on Adhesion and Adhesives*, **5**, R. Patrick, editor (1981).
12. Drzal, L. T. "Graphite Fiber-Epoxy Interfacial Failure Analysis," *International ASM-ISM Metallographic Exhibit* (1981).
13. Drzal, L. T. "Microscopic Characterization: Structural Adhesive Joint Interphase," *International ASM-ISM Metallographic Exhibit* (1981).
14. Drzal, L. T.; Rich, M.; Lloyd, P. F. "Interphase Effects on Fiber-Matrix Adhesion," *Poly. Preprints*, **22**, 199-202 (1981).
15. Drzal, L. T.; Rich, M.; Hall, D. "Structure-Property Relationships at the Composite Interphase," Proceedings of the 15th Carbon Conference, Philadelphia (1981).
16. Drzal, L. T. "Surface Characterization of Graphite Fibers," Proceedings of the Conference on Techniques for the Characterization of Composite Materials, MIT (1981).
17. Drzal, L. T.; Rynd, J.; Fort, T. "Effects of Calcination on the Surface Properties of Kaolinite," *J. Coll. Int. Sci.*, **93**, 126-139 (1983).
18. Drzal, L. T.; Rich, M.; Lloyd, P. "Adhesion of Graphite Fibers to Epoxy Matrices. I. The Role of Fiber Surface Treatment," *J. Adhesion*, **16**, 1-30 (1983).
19. Drzal, L. T.; Rich, M.; Koenig, M.; Lloyd, P. "Adhesion of Graphite Fibers to Epoxy Matrices. II. The Effect of Fiber Finish," *J. Adhesion*, **16**, 133-152 (1983).
20. Drzal, L. T.; Rich, M.; Koenig, M. "Moisture Induced Interfacial Effects on Graphite Fiber-Epoxy Interfacial Shear Strength," **Paper 4-G**, *38th Annual Technical Conference, Reinforced Plastic/Composites Institute, SPI* (1983).
21. Drzal, L. T. "Composite Interphase Characterization," *SAMPE Journal*, **19**, 7-13 (1983). **BEST PAPER AWARD**
22. Drzal, L. T.; Gupta, V. B.; Chen, Y. L. "A Study of the Fracture Surface of Cured Epoxy Resin," Proceedings of the 41st Annual Meeting of the Electron Microscopy Society of America, 34-35, Phoenix, AZ (1983).
23. Gupta, V. B.; Drzal, L. T.; Omlor, R. "A Modified Replication Technique to Study the Morphology of Cured Epoxy Resin," Proceedings of the 41st Annual Meeting of the Electron Microscopy Society of America, 36-37, Phoenix, AZ (1983).
24. Drzal, L. T. "Interfacial Behavior of Aramid and Graphite Fibers in an Epoxy Matrix," Proceedings of the 15th National

- Sample Tech. Conf., Cincinnati, OH (1983).
25. Drzal, L. T.; Rich, M. J. "Carbon Fiber-Epoxy Interphase Modification and Its Effect of Interface Properties," Proceedings of the 1984 International Carbon Conference, Bordeaux, France (July 1984).
  26. Drzal, L. T. "Hygrothermal Effects on a Modified Carbon Fiber-Epoxy Interphase," Proceedings of the 1984 International Carbon Conference, Bordeaux, France (July 1984).
  27. Drzal, L. T. "Effect of Graphite Fiber-Epoxy Adhesion on Composite Fracture Behavior," Proceedings of the 2nd U.S./Japan ASTM Conference on Composite Materials, (1985).
  28. Drzal, L. T.; Rich, M.; Koenig, M. F. "Adhesion of Graphite Fibers to Epoxy Matrices. III. The Effect of Hydrothermal Exposure," *J. Adhesion*, **18**, 49-72 (1985).
  29. Gupta V. B.; Drzal, L. T.; Rich, M. J. "The Physical Basis of Moisture Transport in a Cured Epoxy Resin System," *J. Appl. Polymer Science*, **30**, 4467-4493 (1985).
  30. Gupta, V. B.; Drzal, L. T.; Lee, C. Y. C; Rich, M. J. "The Effects of Stoichiometry and Structure on the Dynamic Torsional Properties of a Cured Epoxy Resin System," *J. Macromol. Sci., Phys.*, **B23**, 435-466 (1985).
  31. Gupta, V. B.; Drzal, L. T.; Lee, C. Y. C. "The Temperature Dependence of the Mechanical Properties of a Cured Epoxy Resin System," *Poly. Engr. & Sci.*, **25**, 812-824 (1985).
  32. Gupta, V. B.; Drzal, L. T. Adams, W. W.; Omlor, R. "An Electron Microscope Study of the Morphology of a Cured Epoxy Resin," *J. Matr. Sci.*, **20**, 3439-2452 (1985).
  33. Drzal, L. T. "The Epoxy Interphase in Composites," review chapter in Advances in Polymer Science II, **75**, K. Dusek, ed., Spring-Verlag, (1985).
  34. Drzal, L. T. "Physical and Mechanical Characterization of Amorphous Carbon and Silicon Dioxide Coated Graphite Fibers," AFWAL-TR-85-4022, (1985).
  35. Drzal, L. T. "The Interfacial and Compressive Properties of Polybenzothiazole Fibers," AFWAL-TR-86-4003 (1986).
  36. Drzal, L. T., Rich, M. J. and Ragland, W., *Adhesion Between Fiber and Matrix: Its Effect on composite Test Results*, 42nd Annual Reinforced Plastics/Composites Conference, Paper 7A. (1987)
  37. Bascom, W. D.; Drzal, L. T. "The Surface Properties of Carbon Fibers and Their Adhesion to Organic Polymers," NASA Technical Report 4084 (July 1987).
  38. Schiering, D. W.; Katon, J. E.; Drzal, L. T.; Gupta, V. B. "An Infrared Spectroscopic Investigation of the Curing Reactions of the Epon 828/Meta-phenylenediamine System," *J. Appl. Poly. Sci.*, **34**, 2367-2375 (1987).
  39. Whitney, J. M.; Drzal, L. T. "Three Dimensional Stress Distribution Around An Isolated Fiber Fragment," *ASTM STP 937, Toughened Composites*, 179-196 (1987).
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40. Drzal, L. T. "Advanced Composite Opportunities for Wood Based Materials," Conference on Stabilization of the Wood Cell Wall, 7-20, Michigan State University, Department of Forestry (1988).
  41. Rich, M. J.; Drzal, L. T. "Interfacial Properties of Some High-Strain Carbon Fibers in an Epoxy Matrix," *J. Rein. Plast. Comp.* **7**, 145-154 (1988).
  42. Drzal, L. T. "Adhesion of Graphite Fibers to Epoxy Matrices," review chapter in, Treatise on Adhesion and Adhesives, R. Patrick, editor, **6**, Marcel Dekker, New York (1988).
  43. Drzal, L. T.; Rich, M. J.; Subramoney, S. "The Interdependence Between Fiber-Matrix Adhesion and Composite Mechanical Properties," Proceedings of the 1988 Meeting of the American Society for Composites, 217-222 (1988).
  44. Drzal, L. T. "Interfacial Considerations in Composite Materials," Proceedings of an NSF Workshop on "Opportunities and Research Needs in Adhesion Science and Technology", Ch. 4, 39-48 (1988).
- 1989---
45. Iyer, S. R; Drzal, L. T. "Effect of Distributor Structure on the Fluidization of Type C Powders," *Powder Technology*, **57**, 127-133 (1989).
  46. Agrawal, R.; Drzal, L. T. "Effects of Microwave Processing on Fiber-Matrix Adhesion in Composites," *J. Adhesion*, **29**, 63-79 (1989).
  47. Waterbury, M. C.; Drzal, L. T. "Determination of Fiber Volume Fractions by Optical Numeric Volume Fraction Analysis," *J. Reinf. Plast. & Comp.*, **8**, 627-636 (1989).
  48. Ozzello, A.; Grummon, D. S.; Kalantar, J.; Drzal, L. T.; Lohand, I-H.; Moody, R. A. "Interfacial Shear Strength of Ion Beam Modified UHMW-PE Fibers in Epoxy Matrix Materials," Proceedings of the 1989 Materials Research Society Symposium, San Diego (1989).
  49. Waterbury, M. C.; Drzal, L. T. "The Influence of Fiber Nucleated Crystallization on the Interfacial Shear Strength of Graphite Fibers in Nylon 6,6," Proceedings of the 2nd Topical Conference on Emerging Technologies in Materials (AIChE), San Francisco (1989).
  50. Rao, V.; Drzal, L. T. "Interphase Mechanical Property Effects on Fiber-Matrix Adhesion in Composite Materials," American Society for Composites, Proceedings of the 4th Technical Meeting, (1989).

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51. Drzal, L. T. "The Role of the Fiber/Matrix Interphase on Composite Properties," *Vacuum*, **41**, 1615-1618 (1990).
52. Kalantar, J.; Drzal, L. T. "The Bonding Mechanism of Aramid Fibers to Epoxy Matrices. Part I. A Review of the Literature," *J. Matr. Sci.* **25**, 4186-4193 (1990).
53. Kalantar, J.; Drzal, L. T. "The Bonding Mechanism of Aramid Fibers to Epoxy Matrices. Part II. An Experimental Investigation," *J. Matr. Sci.* **25**, 4194-4202 (1990).
54. Larson, B.; Drzal, L. T. "Carbon Fiber-Cement Adhesion in Carbon Fiber Reinforced Cement Composites," *Composites*, **21**, 205-215 (1990).
55. Drzal, L. T. "Intrinsic Material Limitations in Using Interphase Modification to Alter Fiber-Matrix Adhesion in Composite Materials," *Proceedings of the Materials Research Society*, **170**, 275-28 (1990).
56. Kalantar, J.; Grummon, D. S.; Drzal, L. T.; Loh, I. H.; Moody, R. A. "Effect of Ti<sup>+</sup>, Ar<sup>+</sup>, N<sup>+</sup> and He<sup>+</sup> Ion Implantation of Aramid Fiber Adhesive Properties," *Proceedings of the Materials Research Society*, **170**, 315-320 (1990).
57. Drzal, L. T. "The Effect of Polymeric Matrix Mechanical Properties on Fiber-Matrix Interfacial Shear Strength," *Mat. Sci. Engr.*, **A126**, 289-293 (1990).
58. Kalantar, J.; Hook, H. J.; Drzal, L. T. "A Novel Sample Preparation Technique for Ion and Electron Beam Analysis of the Fiber-Matrix Interphase in Polymeric Composites," *J. Vac. Sci. Tech.*, **A 8(5)**, 3878-3880 (1990).
59. Kalantar, J.; Drzal, L. T. "Structural Properties of Aramid Fibers and Their Influence on Fiber Adhesion," *Controlled Interphases in Composite Materials*, p. 685, H. Ishida, Elsevier Press, New York (1990).
60. DeLong, J.; Hook, K. J.; Rich, M. J.; Drzal, L. T. "Spectroscopic Characterization of Fiber-Polymer Interphases," *Controlled Interphases in Composite Materials*, p. 87, H. Ishida, Elsevier Press, New York (1990).
61. Drzal, L. T. "Fiber-Matrix Interphase Structure and Its Effect on Adhesion and Composite Mechanical Properties," *Controlled Interphases in Composite Materials*, p. 309, H. Ishida, Elsevier Press, New York (1990).
62. Waterbury, M. C.; Drzal, L. T. "Interfacial Shear Strengths of Carbon Fibers in Bisphenol-A Polycarbonate," *Controlled Interphases in Composite Materials*, p. 731, H. Ishida, Elsevier Press, New York (1990).
63. Hook, K. J.; Agrawal, R. K.; Drzal, L. T. "Effects of Microwave Processing on Fiber-Matrix Adhesion. II. Enhanced Chemical Bonding of Epoxy to Carbon Fibers," *J. Adhesion*, **32**, 157-170 (1990).
63. Grummon, D. S.; Schalek, R. L.; Ozzello, A.; Drzal, L. T. "Modification of Fiber-Matrix Adhesion in Polyethylene Reinforced Composites by Energetic Ion Irradiation," in *Structural Composites: Design and Processing Technology*, American Society for Metals, 155-162 (1990).
64. Drzal, L. T. Herrera-Franco, P. "Composite Fiber-Matrix Bond Tests," *Chapter in the Engineered Materials Handbook: Adhesives and Sealants*, **3**, 392-405 (1990).
65. Iyer, S. R.; Drzal, L. T. "Manufacture of Powder-Impregnated Thermoplastic Composites," *J. Thermopl. Comp. Matrls.* **3**, 325-355 (1990).
66. Iyer, S. R.; Drzal, L. T. "A Flexible Formable Composite Preform from Powder-Impregnated Fiber Tows," *6th Annual Proceedings of the ASM/ESD Advanced Composites Conference*, 345-350 (1990).
67. Rich, M. J.; Madhukar, M.; Herrera-Franco, P.; Drzal, L. T. "Characterization of Fiber-Matrix Adhesion in Composite Materials," *6th Annual Procs of the ASM/ESD Adv Composites Conf*, 141-154 (1990). **BEST PAPER AWARD**
68. Grummon, D. S.; Ozzello, A.; Schalek, R.; Drzal, L. T. "Modification of Fiber-Matrix Adhesion in Polyethylene Reinforced Composites by Energetic Ion Irradiation," *6th Annual Proceedings of the ASM/ESD Advanced Composites Conference*, 155-162 (1990).

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69. Grummon, D. S.; Schalek, R.; Ozzello, A.; Kalantar, J.; Drzal, L. T. "High-energy Ion Implantation of Polymeric Fibers for Modification of Reinforcement-Matrix Adhesion," *Nucl. Instr. Meth. Phys. Res.*, **B59/60**, 1271-1275 (1991).
70. Rao, V.; Drzal, L. T. "The Dependence of Interfacial Shear Strength on Matrix and Interphase Properties," *Polymer Composites*, **12**, 48-56 (1991).
71. Waterbury, M.C.; Drzal, L. T. "On the Determination of Fiber Strengths by In-Situ Fiber Strength Testing," *J. Comp. Tech. Res.*, **13**, 22-28 (1991).
72. Madhukar, M.; Drzal, L. T. "Fiber-Matrix Adhesion and Its Effect on Composite Mechanical Properties. I. Inplane and Interlaminar Shear Behavior of Graphite/Epoxy Composites," *J. Comp. Matr.*, **25**, 932-957 (1991).
73. Madhukar, M.; Drzal, L. T. "Fiber-Matrix Adhesion and Its Effect on Composite Mechanical Properties. II. Longitudinal (0°) and Transverse (90°) Tensile and Flexure Behavior of Graphite/Epoxy Composites," *J. Comp. Matr.*, **25**, 958-991 (1991).
74. Rao, V.; Herrera-Franco, P.; Ozzello, A. D.; Drzal, L. T. "A Direct Comparison of the Fragmentation test and the Microbond Pull-Out Test for Determining the Interfacial Shear Strength," *J. Adhesion*, **34**, 65-77 (1991).
75. Rao, V.; Drzal, L. T. "Loss of Curing Agent During Thin Film (Droplet) Curing of Thermoset Material," *J. Adhesion*, **35**, 245-249 (1991).

76. Drown, E. K.; Al Moussawi, H.; Drzal, L. T. "Glass Fiber "Sizings" and Their Role in Fiber-Matrix Adhesion," *J. Adhesion Sci. Tech.*, **5**, 865-881 (1991).
77. Herrera-Franco, P.; Wu, W-L; Madhukar, M.; Drzal, L. T. "Contemporary Methods for the Measurement of Fiber-Matrix Interfacial Shear Strength," *Polymer* (1991).

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78. Rao, V.; Drzal, L. T. "The Temperature Dependence of Interfacial Shear Strength for Various Polymeric Matrices Reinforced with Carbon Fibers," *J. Adhesion*, **37**, 83-95 (1992).
79. Herrera-Franco, P.; Drzal, L. T. "Comparison of Methods for the Measurement of Fiber-Matrix Adhesion in Composites," *Composites* **23**, 2-27 (1992).
80. Madhukar, M.; Drzal, L. T. "Fiber-Matrix Adhesion and Its Effect on Composite Mechanical Properties. III. Longitudinal (0°) Compressive Properties of Graphite/Epoxy Composites," *J. Comp. Matr.* **26**, 310-333 (1992).
81. Madhukar, M.; Drzal, L. T. "Fiber-Matrix Adhesion and Its Effect on Composite Mechanical Properties. IV. Mode I and Mode II Fracture Toughness of Graphite/Epoxy Composites," *J. Comp. Matr.* **26**, 936-968 (1992).
82. Herrera-Franco, P.; Rao, V.; Drzal, L. T.; Chang, M. Y. M. "Bond Strength Measurement in Composites-Analysis of Experimental Techniques," *Composites Engr.* **2**, 31-45 (1992).
83. Drown, E. K.; Drzal, L. T. "Characterization of the Sizing Interphase and Its Influence on the Behavior of Glass Fiber-Reinforced Epoxy Composites," Proceedings of ANTEC '92, Detroit, MI (1992).
84. Fisher, G.; Drzal, L. T. "Adhesion of Carbon Fibers to Poly Phenylene Sulfide Polymers," Proceedings of ANTEC '92, Detroit, MI (1992).
85. Herrera-Franco, P. J.; Chiang, M.; Drzal, L. T. "The Microbond Technique for Measurement of Fiber-Matrix Interfacial Shear Strength -A Theoretical Analysis-," Proceedings of ANTEC '92, Detroit, MI (1992).
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  1. Iyer, S. R.; Drzal, L. T. "Method and System for Spreading a Tow of Fibers," US Patent No. 5,042,111, August 27, 1991.

**PRESENTATIONS: (INVITED and SUBMITTED)**

1. "The Surface Composition and Energetics of Graphite Reinforcing Fibers," Gordon Research Conference on Failure and Deformation in Polymeric Composites, California (1977).
2. "The Role of the Graphite Fiber Surface in Advanced Composite Performance," Gordon Research Conference on the Science of Adhesion, New Hampton (1977).
3. "Fiber-Matrix Adhesion in Composites," Adhesion Principles and Practices for Coatings and Polymer Scientists, Kent State University, (1980), (1981), (1983), (1985), (1986), (1988), (1991) and (1994).
4. "Adhesion Aspects in Polymeric Composites," Fundamentals of Adhesion: Theory Practice and Application, State University of New York at New Paltz (1980).
5. "Molecular Aspects of Fiber-Matrix Adhesion and Their Effect on Interfacial Shear Strength," Gordon Research Conference on Composites (1981).
6. "Interphase Aspects of Fiber-Matrix Adhesion," Polymer Institute, Polytechnic Institute of New York (1981).
7. "Dependence of Fiber-Matrix Failure Modes on Interphase Properties," Union Carbide Technical Center, Parma (1981).
8. "Dependence on Fiber-Matrix Failure Modes on Interphase Properties," University of Cincinnati, Department of Material Engineering Seminar Series (1981).
9. "Composite Interphase Fracture: Effect of Graphite Fiber/Epoxy Matrix Adhesion," Akron Polymer Conference, University of Akron (1982).
10. "Composite Interphase Characterization," 28th National SAMPE Symposium, Anaheim, CA (1983).  
\*\*\* BEST PAPER AWARD \*\*\*
11. "Adhesion at the Fiber-Matrix Interphase in Composite Materials," Massachusetts Institute of Technology, MIT Industry Polymer Processing Seminar Series (1983).
12. "The Relationship Between Fiber-Matrix Adhesion and Composite Fracture," Symposium of Advanced Composites, California Institute of Technology, Pasadena, CA (May 1983).
13. "Interphase Modification as an Approach to Composite Toughness," NASA Composite Toughness Workshop, NASA-Langley, Newport, VA (May 1983).
14. "Interphase Response to Hygrothermal Exposure," Gordon Research Conference on Composites, Santa Barbara (January 1984).
15. "Thermoplastic Composite Interphase," NASA, Langley Research Center Workshop (December 1985).
16. "Hygrothermal Interfacial Behavior," Society of Engineering Sciences, Pennsylvania State University (September 1985).
17. "The Role of the Interphase on Composite Properties," American Chemical Society, Anaheim, CA (September 1986).
18. "Interfacial Considerations in Composite Materials," NSF Workshop on Adhesion Science and Technology," Stanford Sierra Lodge, CA (September 1987).
19. "Unresolved Problems at the Fiber-Matrix Interphase," DARPA Materials Research Council Workshop on Instrumentation for the Characterization of Materials, La Jolla, CA (1987).
20. "Polymer Composite Interfaces: Adhesion Dependence on Interfacial Microstructure," Symposium on Polymer Surfaces, Interfaces and Adhesion, Materials Research Society (1987).
21. "The Role of the Interphase on Composite Properties," The Metallurgical Society, Detroit Chapter (1988).
22. "The Effect of Microwave Processing on Fiber-Matrix Adhesion in Composites," 1988 US Army Sagamore Materials Conference (1988).
23. "Interfaces, Adhesion and Composite Materials," Gordon Research Conference on Adhesion (1988).
24. "Interfacial Considerations in Composite Materials," Department of Chemical Engineering, Michigan Technological University (1988).
25. "The Interdependence Between Fiber-Matrix Adhesion and Composite Mechanical Properties," American Society for Composites (1988).
26. "Structure-Property Relationships Between the Fiber-Matrix Interphase and Composite Materials," Polymer Surfaces Symposium, U. Connecticut (1988).
27. "The Interdependence Between Fiber-Matrix Adhesion and Composite Mechanical Properties," AT & T Bell Laboratories, Murray Hill (1988).
28. "Advanced Composite Opportunities for Wood Based Materials," Conference on Stabilization of the Wood Cell Wall, Michigan State University, Department of Forestry (1988).
29. "Advanced Composite Materials," West Michigan Group of the American Society of Mechanical Engineers (1989).
30. "Fiber/Matrix Interphase Properties and Their Effect on Composite Properties," Gordon Research Conference on Composites (1989).
31. "Interfaces and Adhesion in Composite Materials and Their Effect on Composite Properties," Ford Motor Company, Scientific Research Lab, Distinguished Lecture Series (1989).
32. "The Role of the Fiber/Matrix Interphase on Composite Properties," 11th International Vacuum Congress (IVC-11)

- and 7th International Conference on Solid Surfaces (ICSS-7), Cologne, Germany (1989).
33. "Intrinsic Materials Limitations in Using Interphase Modification to Alter Fiber-Matrix Adhesion in Composite Materials," Symposium on Tailored Interfaces in Composite Materials, Materials Research Society (1989).
  34. "The Role of the Fiber/Matrix Interphase on Composite Properties," 11th International Vacuum Congress/7th International Conference on Solid Surfaces, Cologne, Germany (1989).
  35. "The Role of the Fiber/Matrix Interphase on Composite Properties," Central Michigan University, Department of Chemistry, Mt. Pleasant, MI (1989).
  36. "Intrinsic Materials Limitations in Using Interphase Modification to Alter Fiber-Matrix Adhesion in Composite Materials," BF Goodrich Company, Research and Development Center, Brecksville, Ohio (1989).
  37. "Longitudinal (0) Compressive Properties of Graphite/Epoxy Composites," Thick Composites in Compression Workshop, Knoxville, TN (1989).
  38. "Fiber-Matrix Interphase Structure and Its Effect on Adhesion and Composite Mechanical Properties," 3rd International Conference on Composite Interfaces, ICCI-III, Cleveland, OH (1990).
  39. "The Development of Adhesion During Composite Processing," D. Taylor Research Center, US Navy, Annapolis, MD (1990).
  40. "The Age of Composite Materials," Mason Rotary Club (1990).
  41. "Fiber-Matrix Adhesion in Composite Materials," Pennsylvania State University Materials Science Colloquium, State College, PA (1990).
  42. "A Flexible Formable Composite Preform from Powder-Impregnated Fiber Tows," 6th Annual ASM/ESD Advanced Composites Conference (1990).
  43. "Characterization of Fiber-Matrix Adhesion in Composite Materials," 6th Annual ASM/ESD Advanced Composites Conference (1990). \*\*\* BEST ACADEMIC PAPER AWARD \*\*\*
  44. "Fiber-Matrix Adhesion in Composites," PPG 1991 Technical Seminar Series, Pittsburgh, PA (February 1991).
  45. "Glass Fiber "Sizings" and Their Role in Fiber-Matrix Adhesion," International Symposium in Honor of Ed Plueddemann, Midland, MI (1991).
  46. "The Hierarchical Structure of the Interphase," Asylomar Conference on Polymers sponsored by the Army, Asylomar, CA (1991).
  47. "The Structure of the Fiber-Matrix Interphase in Composite Materials," Office of Naval Research Symposium, NC (1991).
  48. "The Age of Composite Materials," Okemos Rotary Club (1991).
  49. "Optimum Design of the Fiber-Matrix Interphase in Composite Materials," 8th International Conference on Composite Materials, ICCM-8, Honolulu (1991).
  50. "Polymeric Matrix Adhesion to Reinforcing Fibers: A Molecular, Microscopic and/or Macroscopic Viewpoint," Frontiers Symposium, Virginia Tech, Blacksburg, VA (1991).
  51. "Fiber-Matrix Adhesion and Its Effect on Composite Mechanical Properties: A Molecular, Microscopic and/or Macroscopic Viewpoint," Ethyl Corporation Corporate seminar Series, Baton Rouge, LA (1991).
  52. "Fiber-Matrix Interphase Structure, Adhesion and Composite Mechanical Properties," Gordon Research Conference on Composite Materials, Santa Barbara, CA (1992).
  53. "Fiber-Matrix Adhesion in Composite Materials," EPIC Center for Adhesives, Sealants and Coatings, Chemistry and Physics of Adhesion, Cleveland, OH (1992).
  54. "The Role of Fiber-Matrix Adhesion on Composite Properties," ANTEC '92, Detroit, MI (1992).
  55. "Adhesion to Carbon Fiber Surfaces: Surface Chemical and Energetic Effects," Advances in Fiber Reinforced Composites Technology, Capri, Italy (1992).
  56. "The Fiber-Matrix Interphase in Composite Materials: Its Effect on Adhesion and on Composite Mechanical Properties," Gordon Research Conference on Adhesion, New Hampton, NH (1992).
  57. "The Composite Interphase: Unresolved Issues," 4th International Conference on Composite Interfaces, Cleveland, OH (1992).
  58. "Molecular, Microscopic and Macroscopic Aspects of Fiber-Matrix Adhesion in Polymeric Matrix Composites," NRL/ONR Workshop on Adhesion and Intermolecular Forces, Alexandria, VA (1992).
  59. "The Fiber-Matrix Interphase In Composite Materials: Its Effect on Adhesion and on Composite Mechanical Properties," University of Michigan, College of Engineering, Materials Science and Engineering Colloquia, Ann Arbor, MI (October 1992).
  60. "The Polymer Interphase and Adhesion in Composite Materials," International Meeting of the Adhesion Society, Williamsburg, VA (February 1993).
  61. "Molecular, Microscopic and Macroscopic Aspects of Fiber-Matrix Adhesion in Polymeric Matrix Composites," Pennsylvania State University, (February 1993).
  62. "Molecular, Microscopic and Macroscopic Aspects of Fiber-Matrix Adhesion in Polymeric Matrix Composites," Materials Research Society, San Francisco, (April 1993).
  63. "The Fiber-Matrix Interphase: Molecular, Microscopic and Macroscopic Aspects," 2nd European Tri Service

Workshop on Surfaces/Interfaces of Polymer Composites, London, England (May 1993).

64. "Molecular, Microscopic and Macroscopic Aspects of Fiber-Matrix Adhesion in Polymeric Matrix Composites," ACS, Colloid and Surface Science Symposium, Toronto, (June 1993).
65. "Adhesion in a Liquid Molding Environment," Interfacial Phenomena in Composite Materials, University of Cambridge, England, (September 1993).
66. "The Fiber-Matrix Interphase, Adhesion and Their Effect on Polymer Matrix Composite Mechanical Properties," INTERFACES II, International Conf. of the Structure and Properties of Interfaces, Ballarat, Victoria, Australia (November 1993).
67. "The Science and Technology of Composite Materials," Michigan State University High School Science Teachers Seminar Series (1993).
68. "Powder Processing of Composite Materials," SAMPE, Dayton, Ohio Chapter (1993).
69. "Sizing/Resin Interactions in Liquid Composite Molding," NIST Workshop on Liquid Molding (1993).
70. "Transitioning Technology from University Laboratory to the Industrial Manufacturing Environment: The Missing Element in the Process," ASM-ESD Advanced Composites Conference and Exposition, Dearborn, MI (1993).
71. "Powder Processing of Composite Materials," Owens-Corning Fiberglas Research Center, Granville, OH (1994).
72. "Glass Fiber Sizing-Matrix Interphase Formation in Liquid Composite Molding: Effects on Fiber-Matrix Adhesion and Mechanical Properties," Owens-Corning Fiberglas Research Center, Granville, OH (1994).
73. "Adhesion and Its Effect on Composite Properties," Vanderbilt University, Dept. of Chemical Engineering, Nashville, TN (1994).
74. "Chemical, Physical and Morphological Aspects of the Interphase in Composite Materials and Their Role in Fiber-Matrix Adhesion," 15th Annual Meeting of the Adhesion Society, Orlando, FL (1994).
75. "Adhesion in Composite Materials: Principles, Measurement and Effect on Composite Mechanical Properties," Short Course on Adhesion Science and Technology, Kent State University, Kent, OH (1994).
76. "Effect of Interfacial Chemical Bonding and Surface Topography on Adhesion in Carbon Fiber/Epoxy Composites," 10th Annual Meeting of the American Society for Composites. Wilmington, DE (1994).
77. "The Polymer-Fiber Interphase and Adhesion in Composite Materials" VII National Conference of the Mexican Polymer Society, Cancun, Mexico (1994).
78. "Role of the Molecular Weight of the Thermoplastic Matrix on Fiber-Matrix Adhesion in BPA-Polycarbonate/Carbon Fiber Composites," 10th Annual ASM/ESD Advanced Composites Conference (1994).  
\*\*\*\* BEST MATERIALS PAPER AWARD \*\*\*\*
79. "Adhesion of Carbon Fibers to Polymers in Composites: Surface Chemical and Topographical Effects," International Meeting of the Adhesion Society of Japan, Yokohama, JAPAN (1994).
80. "Role of the Molecular Weight of the Thermoplastic Matrix on Fiber-Matrix Adhesion in BPA-Polycarbonate/Carbon Fiber Composites," ACS Workshop on the Polymer Interphase, Brewster, MA (1994).
81. "Measurement of Interphase Mechanical Properties," Army Materials and Mechanics Research Center, Polymers and Composites Development Branch, Watertown, MA (1994).
82. "Hygrothermal Exposure Effects on Fiber-matrix Adhesion and the Interphase of Sized Carbon Fiber Reinforced Vinyl Ester Composites," ASTM Meeting on Fiber, Matrix and Interphase, Phoenix, AZ (November 1994).
83. "Adhesion to Polymers in Composite Materials," 18th Annual Asylomar Conference on Polymers, Monterey, CA (1995).
84. "Adhesion of Polyurethanes to Glass Surfaces," 18th Annual Meeting of the Adhesion Society, Hilton Head, SC (1995).
85. "Adhesion of Carbon Fibers to Polymers in Composites: Surface Chemical and Topographical Effects," Michigan Technological University, Seminar Series (April 1995).
86. "Effects of Matrix Phase Separation on the Polyurethane/Glass Interphase Region" Materials Research Society Meeting, San Francisco, CA (April 1995).
87. "Adhesion of Carbon Fibers to Polycarbonate Matrices - Interphase Composition and Structure," Society of Plastics Engineers, ANTEC '95, Boston, MA (May 1995).
88. "Adhesion of Carbon Fibers to Polymers in Composites: Surface Chemical and Topographical Effects," Department of Chemical Engineering, Ohio State University, Columbus, OH (May 1995).
89. "Sizings and Finishes and Their Effect on Glass and Carbon Fiber/Matrix Adhesion and Interfacial Durability," National Institute of Standards and Technology, Building Materials Div., Gaithersburg, Maryland (June 1995).
90. "Comparison of the Single-Fiber Fragmentation and Micro-Indentation Tests for Composite Interfacial Shear Strength Measurement," Proceedings of the 10th International Conference on Composite Materials (ICCM-X), Vancouver, BC (1995).
91. "The Effect of Molecular Weight and processing on Adhesion of Carbon Fibers to Polycarbonate Matrices," Proceedings of the 10th International Conference on Composite Materials (ICCM-X), Vancouver, BC (1995).
92. "Wetting and Spreading in Resin Transfer Molding," University of Delaware/Michigan State University Joint Composites Workshop: Manufacturing Science of Composites-Molding Processes, Newark, DE (September

- 1995).
93. "Structure-Processing-Property Relationships for Polymer Interphases in Fiber Reinforced Composite Materials," Creation, Utilization and Recycling of Multiphase Polymer Systems, An International Meeting, The Intersociety Polymer Conference, co-sponsored by the American Chemical Society, American Institute of Chemical Engineers and the Society of Plastic Engineers, Baltimore, MD (October 1995).
  94. "Adhesion Mechanisms of Polyurethane to Glass: Interphase Formation and Structure," 1st International Congress on Adhesion Science & Technology, Amsterdam, The Netherlands (October 1995).
  95. "UV Treatments of Polymer Surfaces," Advanced Composites Conference and Exposition, Dearborn, MI (November 1995).
  96. "Alternative Manufacturing Process for Polymer Composites Using Dry Polymer Powders," American Chemical Society, Midland Chapter, Annual Technical Meeting ( November 1995).
  97. "The Polymer Interphase in Composites: Intrinsic Limitations to Adhesion," The 6th International Conference on Composite Interphase, Microphenomena and Advanced Interfaces, Zichron Yaacov, Israel (May 1996).
  98. "Glass Fiber Sizings and Their Role in Adhesion and Composite Processing and Properties," PPG Industries Fiberglass Research Center Technical Seminar Series, Pittsburgh, PA (1996).
  99. "Glass Fiber Sizings and Their Role in Adhesion and Composite Processing and Properties," Shell Chemical Company, Westhollow Research Center Technical Seminar, Houston, TX (1996).
  100. "Fiber-Matrix Chemical Bonding in Composite Materials and Its Effect on Adhesion," Fundamentals of Adhesion and Interfaces Symposium, Orlando ACS meeting (August 25-30, 1996).
  101. "The Role of Chemical Bonding at the Fiber-matrix Interface on Adhesion in Carbon Fiber/thermoset Matrix Composites," Distinguished Lecturer at International Conference on Composites Engineering/3, New Orleans, LA (1996).
  102. "Fiber Sizing/Matrix Interactions in Liquid Molding and the Role of Wetting and Spreading on Fiber/Matrix Adhesion" Liquid Molding Workshop, Ohio State University, Columbus, OH (1996).
  103. "Structure-property Relationships for Polymer Interphase in Fiber Reinforced Composite Materials," ACS Polymer Surfaces Workshop, Tampa, FL (1996).
  104. "Manufacturing Process for Polymer Composites Using Dry Polymer Powders," 28th Central Regional Meeting of the ACS, Dayton, OH (1996).
  105. "Fiber-matrix Chemical Bonding in Composite Materials and its Effect on Adhesion," Analytical Sciences Discussion Group, Dow Chemical Company, Midland, Mi (October 1996).
  106. "Adhesion of Carbon Fibers to Polymers: Structure-property Relationships for Polymer Interphase in Fiber Reinforced Composite Materials," Goodyear Tire and Rubber Company, Akron, OH (August 1996).
  107. "The Role of Chemical Bonding at the Fiber-matrix Interface on Adhesion in Carbon Fiber/thermoset Matrix Composites" Ashland Chemical Company, R & D Center, Columbus, OH (September 1996).
  108. "Ultraviolet Light Pretreatment of Surfaces of Polymers, Polymer Composites and Metals Prior to Adhesive Bonding or Painting," Manufacturing Center Consortium's Project Review, East Lansing, MI (May 1996).
  109. "Adhesion of Carbon Fibers to Polymers: Structure-Property Relationships for Polymer Interphases in Fiber Reinforced Composite Materials," Depts of Chemical Engineering and Materials Science, Wayne State University (January 1997).
  110. "Surface Activation of Polymers Using Ultraviolet Radiation," Society of Plastics Engineers Annual Technical Conference (ANTEC'97), Toronto (April 1997).
  111. "Surface Pretreatment of Plastics and Polymer Composites Using Ultraviolet Light," Advanced Coatings Technology Conference and Exposition (ACT'97), Detroit (April 1997).
  112. "Adhesion of Polymers to Fibers in Composites: Surface Treatments, Sizings, Finishes and Interphases" Science of Adhesion Short Course, SUNY-New Paltz, Orlando (May 1997).
  113. "Overview of Interface Test Methods" Invited Keynote Speaker, NIST Interfaces Workshop, Gaithersburg, MD (May 1997).
  114. "Improving Adhesion And Processing of Carbon Fiber to Vinyl Ester Matrices For Structural Composite Applications," Zoltek, Inc. Technical Center, St. Louis, MO (June 1997).
  115. "Adhesion of Reinforcing Fibers to Polymers: Surface Modification Strategies for Polymer Composite Systems," Johnson & Johnson Technical Center, J & J Corporate Biomaterials Center, Ethicon, Inc., Somerville, NJ (August 1977).
  116. "Surface Pretreatment of Polymers and Polymer Composites: Sulfonation and Ultraviolet light ," Goodyear Tire and Rubber Company, Akron, OH (September 1997).
  117. "Polymer Interphase Design in Thermoset and Thermoplastic Composites," Southeast Regional Meeting of the American Chemical Society, Roanoke, VA (October 1997).
  118. "The Interaction of Glass-fiber Finishes with a Reacting Matrix During Liquid Molding: Wetting, Dissolution and Fiber-Matrix Adhesion," Owens Corning Fiberglass Technical Center, Granville, OH (October 1997).
  119. "Powder Impregnation of Advanced Composite Materials," NSF Composite Manufacturing Workshop, The

- Dearborn Inn (October 1997).
120. "Ultraviolet Light Surface Treatment of TPO's," 4<sup>th</sup> Thermoplastic Polyolefin Conference, Novi Hilton, Novi, MI (November 1997).
  121. "Wetting and Spreading in Resin Transfer Molding," University of Delaware/Michigan State University Joint Composites Workshop: Manufacturing Science of Composites-Molding Processes, Newark, DE (September 1997).
  122. "Ultraviolet Light Pretreatment of Polymers and Polymer Composite Surfaces for Adhesive Bonding," Structural Adhesives in Engineering - V, Bristol, England (April 1998).
  123. "Ultraviolet Light Pretreatment of Polymers and Polymer Composite Surfaces for Adhesive Bonding," RADTECH Conference, Chicago, IL (May 1998).
  124. "The Interaction of Glass-Fiber Finishes (with and without silane coupling agents) with a Polyurethane Matrix," 2<sup>nd</sup> International Symposium on Silanes and other Adhesion Promoters (1998).
  125. "Adhesion of Glass Fibers to Fast Reacting Matrices During Liquid Molding," Proceedings of the American Society for Composites, (1998).
  126. "Sizings and Silanes and the Dynamics of Resin Spreading and Fiber wetting in Liquid Composite Molding," 2<sup>nd</sup> International Symposium on Silanes and other Adhesion Promoters (1998).
  127. "Sizings and Silanes and the Interphase in Resin Spreading Fiber Wetting in Liquid Composite Molding," Japan ICCI-7, Shonan Institute of Technology, Fujisawa, Japan (1998) (invited).
  128. "Adhesion of Carbon Fibers to Polymers: Structure-property Relationships For Polymer Interphases in Fiber Reinforced Composite Materials," Teijin, Ibaraki, Japan (1998) (invited).
  129. "Adhesion of Carbon Fibers to Polymers: Structure-property Relationships For Polymer Interphases in Fiber Reinforced Composite Materials," Mitsubishi Rayon, Nagoya, Japan (1998) (invited).
  130. "Polymers Interfaces: What do we know?...Where do we go?," NMAB-AFOSR Workshop On Structural Materials Research Advancements, Washington, DC, March (1998).
  131. "Elevated Temperature Treatment of Aramid Fiber," Gordon Research Conference on Science of Adhesion, Tilton, New Hampshire (1998).
  132. "The Capabilities and Research Strengths of the Faculty and Staff at the MSU Composite Materials and Structures Center," MARCAV Consortium Meeting, Concurrent Technology, Harrisburg, PA (1998).
  133. "Functions, Activities, and Format of a Sister SIUCR Center," North Carolina State University NCSU (1998).
  134. Morgan, R.; Shin, E.; Zhou, J.; Lincoln, J.; Rozenberg, B. A.; Cho, D.; Drzal, L. T. "Current Durability Issues in High Temperature Polymer Matrix Composites for Aerospace Applications," High Temple Workshop XIX, Denver, CO 1-4 February, 1999.
  135. (*Invited Plenary Speaker*) "Adhesion of Carbon Fibers to Polymers: Structure-property Relationships for Polymer Interphase in Fiber Reinforced Thermoset Matrix Composite Materials" Adhesion Society of Japan, May 31-June 4, 1999.
  136. "Possible Mechanisms Responsible For Low Levels of Fiber-Matrix Adhesion Between Carbon Fibers And Epoxy Matrices In E-Beam Processed Composites," Proceedings of 44th International SAMPE Symposium & Exhibition, May 24 – 27, 1999.
  137. "The Impact of the NSF State/Industry/University Cooperative Research Center on Low-Cost, High-Speed Polymer Composites Processing on the Research and Educational Programs at Michigan State University," ASEE'99 Ostrova, Czechoslovakia, August 5-10, 1999.
  138. (*Invited Plenary Speaker*) "Polymers at Interfaces in Composite Materials" XII Mexican Congress of Polymers, CICY, Merida, Yucatan, Mexico, November 17-19, 1999.
  139. "Polymer Composite Materials and the Composite Materials and Structures Center at Michigan State University," Michigan Plastics Roundtable, Port Huron, Michigan, September 16, 1999.
  140. "Sizings for Glass Fibers and Their Role in Fiber Wetting and Adhesion in Liquid Molding," University of Delaware, Newark, DE, October 4-6, 1999.
  141. "Interfacial Engineering for Optimized Adhesion in Polymeric Composite Materials," 1999 Fall Meeting of the Materials Research Society, MRS Symposium on Interfacial Engineering for Optimized Properties, Boston, MA, December 1, 1999.
  142. "Limitations in Adhesion of Aramid Fibers to Epoxy: Wetting, Chemical Bonding and Surface Structure," 2000 Seminar Series, Materials Science and Mechanics Department, Michigan State University, January, 2000.
  143. Bhurke, A. S.; Drzal, L. T. "Ultraviolet Radiation Surface Treatment Of Polymers," Adhesion Society 23<sup>rd</sup> Annual Technical Meeting, Myrtle Beach, SC, February 21-24, 2000.
  144. Drown, E. K.; Drzal, L. T. "Glass Fiber Finishes In RTM Polyurethane Composites And Their Role In Fiber Wetting And Adhesion", Adhesion Society 23<sup>rd</sup> Annual Technical Meeting, Myrtle Beach, SC, February 21-24, 2000.
  145. Shi, G.; Drzal, L. T. "A High Speed/ Low Cost/ Environmentally Benign Method To Improve The Surface Wettability And Interfacial Adhesion Of Polyetherimide (PEI)," Adhesion Society 23<sup>rd</sup> Annual Technical Meeting

- , Myrtle Beach, SC, February 21-24, 2000.
146. Fukushima, H.; Drzal, L. T. "Adhesion of Graphite Nanoreinforcements to Polymers," Adhesion Society 23<sup>rd</sup> Annual Technical Meeting, Myrtle Beach, SC, February 21-24, 2000.
  147. Xu, L.; Drzal, L. T. "Influence Of Interphase Chemistry And Properties On The Adhesion Between Vinyl Ester Resin And Carbon Fibers," Adhesion Society 23<sup>rd</sup> Annual Technical Meeting, Myrtle Beach, SC, February 21-24, 2000.
  148. Askeland, P. A.; Drzal, L. T. "Effect Of Ultraviolet Radiation On Adhesion And Wettability Of Surllyn Materials," Adhesion Society 23<sup>rd</sup> Annual Technical Meeting, Myrtle Beach, SC, February 21-24, 2000.
  149. Schalek, R. L.; Askeland, P. A.; Drzal, L. T. "UV/Ozone Surface Treatment For Flexible Polyimide/Copper Laminates," Adhesion Society 23<sup>rd</sup> Annual Technical Meeting, Myrtle Beach, SC, February 21-24, 2000.
  150. Raghavendran, V. K.; Drzal, L. T. "Adhesion of Thermoplastic Matrices to Carbon Fibers: Effect of Polymer Properties and Fiber Chemistry," Adhesion Society 23<sup>rd</sup> Annual Technical Meeting, Myrtle Beach, SC, February 21-24, 2000.
  151. Drzal, L. T. "Microengineering of the Polymer Interphase for Optimized Adhesion in Composite Materials," Center for Fundamental Materials Research Annual Technical Symposium, East Lansing, MI, February 27-28, 2000.
  152. Choi, Y.; Cho, D.; Drzal, L. T. "Dynamic Mechanical Behavior of Immiscible BMI/LaRC PEI-5 Blends," The Polymer Society of Korea, 24, (2) paper 1PS-48, pg 126, 1999.
  153. Cho, D.; Drzal, L. T. "Cure behavior and Thermal Stability of a Phenylethynyl Terminated Polyimide" The Polymer Society of Korea, 24, (2) paper 1PS-48, pg 103, 1999.
  154. Cho, D.; Drzal, L. T. "Monitoring of Imidization and Phenylethynyl End Group Reaction in LaRC PETI-5 by Means of FT-IR Spectroscopy" The Polymer Society of Korea, 24, (2) paper 1PS-48, pg 39, 1999.
  155. Choi, Y.; Cho, D.; Drzal, L. T. "Identification of Imidization and Cure Reaction of a Phenylethynyl terminated Polyimide by Dynamic Mechanical Analysis", The Polymer Society of Korea, 25, (1) paper 2PS-3, pg 173, 2000.
  156. Yang, K.; Cho, D.; Drzal, L. T. "A study of Interdiffusion in Bismaleimide/LaRC PETI-5 Thin Layers by a Solid State Fluorescence Technique," The Polymer Society of Korea, 25, (1) paper 2PS-4, pg 173, 2000.
  157. Khan, M. A.; Drzal, L. T. "Influence Of Silane Coupling Agents Of Different Functionalities On The Performance Of Jute-Polycarbonate Composites" 3rd International Wood and Natural Fiber Composite Symposium, September 19-20, 2000 Kassel, Germany.
  158. Khan M. A. and Drzal L. T. (2000): Modification of Jute Surface by Photocuring, RadTech Japan 2000 Symposium, 13-15 April, 2000, Yokohama, Japan.
  159. Khan M. A. and Drzal L. T. (2000): Role of Amino-silane on Mechanical and Dynamic Mechanical Properties of Jute- Polycarbonate Composites, International Conference, Workshop and Exhibition on Advances in Composites-2000, 24-26 August 2000, Bangalore, India.
  160. (*Keynote Lecture*) Drzal, L. T. "Adhesion and the Fiber-Polymer Interphase in Composite Materials: Structure-Property Relationships and Interphase Design," ANTEC 2000, Composites Division, Society of Plastics Engineers Annual Technical Conference, Orlando, FL, May 7-11, 2000.
  161. Drzal, L. T. "Interfacial Phenomena and Their Effect on Adhesion of Carbon Fibers to Epoxy Matrices in Electron Beam Processed Composites" Invited Lecture at the Symposium, "Current Topics in Adhesion Science and Composites," University of Connecticut, Storrs, CT, May 21-22, 2000.
  162. Drzal, L. T. "Adhesion Mechanisms of Polyurethane to Glass" Huntsman Chemical Technical Center, Auburn Hills, MI, May 12, 2000.
  163. Drzal, L. T. " Adhesion Of Thermoplastic Matrices To Carbon Fibers: Effect Of Polymer Properties And Fiber Surface," Goodyear Technical Center, Akron, OH, June , 2000.
  164. Drzal, L. T. "Fiber-Matrix Adhesion and NanoEngineering the Interphase in Polymer Composite Materials," Short Course on Interfaces, ACCE/SAMPE/DOE/ESD Conference, Detroit, September 2000.
  165. (Invited Plenary Speaker) "Limitations in Adhesion to the Surface of Aramid Fibers: Chemical Bonding and Surface Structure," 5<sup>th</sup> European Adhesion Conference, EURADH 2000, Lyon, France, September 18-21, 2000.
  166. Mohanty, A. K.; Misra, M.; Drzal, L. T. "Recent Developments on Interfacial Adhesion in Natural Fiber Reinforced Thermoplastic Composites: an Overview", International Symposium on Interfaces in Polymer Composites November 30 to December 1, 2000
  167. Drzal, L. T. "Adhesion to Aramid Fibers in Polymer Composites: Chemical Bonding and Surface Structure," Case Western Reserve University, Dept of Chemical Engineering, Cleveland, OH, November 9, 2000.
  168. Drzal, L. T. "Adhesion to Aramid Fibers in Polymer Composites: Chemical Bonding and Surface Structure," Michigan Technological University, Dept of Mechanical Engineering and Engineering Mechanics, Houghton, MI, March 15, 2001.
  169. Cho, D.; Y Choi, Y.; Drzal, L. T. "Carbon/BMI Composites Sized with a Phenylethynyl Terminated Imide Oligomer: Improved Interfacial Properties and the Interpretation," Society of Adhesion and Interface of Korea (SAIK) Conference, v.1, No. 2, November 1, 2000.



170. Choi, Y.; Cho, D.; Drzal, L. T. "Dynamic Thermal Properties of Carbon/BMI Composites Sized at Different Temperatures with a Phenylethynyl Terminated Imide Oligomer (LaRC PETI-5)," *Polymer Society of Korea, IPS-95*, v.25, No.2, P.125 October (2000).
171. Cho, D.; Drzal, L. T. "Adhesion Enhancement by Introducing a LaRC PETI-5 Interphase to IM7/BMI Composites" submitted to ICCM-13, China (2001).
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183. Drzal, L. T.<sup>1</sup>; Herrera-Franco, P. J. "Micro and Macro Fiber-Matrix Adhesion Measurement Methods in Composite Materials" Proceedings of the 24<sup>th</sup> Annual Technical Meeting of the Adhesion Society , Williamsburg, Virginia, February 25-28, 2001.
184. Mohanty, A. K.; Misra, M.; Drzal, L. T. □ "Surface Modification Of Natural Fibers To Improve Adhesion As Reinforcements For Thermoset Composites," Proceedings of the 24<sup>th</sup> Annual Technical Meeting of the Adhesion Society, Williamsburg, Virginia, February 25-28, 2001.
185. Misra, M.; O'Donnell, A.; Drzal, L. T.; Mohanty, A. K. "Determining Interfacial Shear Strength of Surface Treated Natural Fiber Composites," Proceedings of the 24<sup>th</sup> Annual Technical Meeting of the Adhesion Society, Williamsburg, Virginia, February 25-28, 2001.
186. Drzal, L. T. (Invited) "Interphase Formation in Glass Fiber-Sizing-RIM Systems and Its Role in Fiber Wetting and Adhesion," Proceedings of the 24<sup>th</sup> Annual Technical Meeting of the Adhesion Society, Williamsburg, Virginia, February 25-28, 2001.
187. Drzal, L. T. (Invited) "Adhesion and the Fiber-Polymer Interphase in Composite Materials: Structure-Property Relationships and Interphase Design" University of Nebraska-Lincoln, Dept of Engineering Mechanics, Seminar, Lincoln, NE , March 27, 2001.
188. Drzal, L. T. (Invited) "Limitations in Adhesion to the Surface of Aramid Fibers: Chemical Bonding and Surface Structure," North Carolina State University, Center for NonWoven Research, Seminar Series, Raleigh, NC, April 18, 2001.
189. Defoort, B.; Drzal, L. T. "Adhesion between Carbon Fibers and Cationic Matrices in E-Beam Processed Composites" SAMPE 2001 Annual Technical Conference, Long Beach, CA May 6-10, 2001.
190. Defoort, B.; Drzal, L. T. "Influence of a Post Curing Treatment on Electron Beam Cured Composites," SAMPE 2001 Annual Technical Conference, Long Beach, CA May 5-10, 2001.
191. Drzal, L. T.; Cho, D. "Interphase Engineering in Carbon Fiber/BMI Composites to Improve Fiber-Matrix Adhesion and Composite Shear Strength," AFOSR Polymer Matrix Composite Review, Hyatt Regency, Long Beach, CA, 11-12 May 2001

192. Drzal, L. T. (Invited) International Consultive Group on Research in Agroforestry (ICRAF)/MSU C Sequestration and Utilization Workshop, "Corporate And Industrial Utilization Of Micro-Sized Cellulose Fibers From Agroforestry Production Systems.," Nairobi, Kenya June 11-12, 2001
193. Drzal, L. T. (Invited) International Consultive Group on Research in Agroforestry (ICRAF)/MSU C Sequestration and Utilization Workshop, "Microenterprize Industrial Potential For Microfiber Production.," Nairobi, Kenya June 11-12, 2001
194. Xu, L.; Drzal, L. T. "Adhesion Improvement Between Vinyl Ester Resin and Carbon Fibers," 13<sup>th</sup> International Conference on Composite Materials, ICCM-13, Beijing, China, June 27-20, 2001.
195. Ch, D.; Drzal, L. T. "Adhesion Enhancement By Introducing A LARC PETI-5 Interphase To IM7/BMI Composites," 13<sup>th</sup> International Conference on Composite Materials, ICCM-13, Beijing, China, June 27-20, 2001.
196. Drzal, L. T. (Invited) "Application of UV Treatment for Polymer and Metal Joint Surfaces" Chungnam National University, Yusung, Taejon, Korea, June 18, 2001
197. Drzal, L. T. (Invited) "Adhesion Mechanisms of Epoxy to Carbon Fibers Under Electron Beam Processing" Korean Aerospace Defense Department (ADD) Chungnam National University, Yusung, Taejon, Korea, June 18, 2001
198. Drzal, L. T. (Invited) "Quantification of the Fiber-Matrix Interphases" Korean Aerospace Defense Department (ADD) Chungnam National University, Yusung, Taejon, Korea, June 19, 2001
199. Drzal, L. T. (Invited) "Application of UV Treatment for Polymer and Metal Joint Surfaces" Korean Aerospace Defense Department (ADD) Chungnam National University, Yusung, Taejon, Korea, June 19, 2001
200. Drzal, L. T. (Invited) "Adhesion of Vinyl Ester to Carbon Fibers" Korean Aerospace Defense Department (ADD) Chungnam National University, Yusung, Taejon, Korea, June 20, 2001
201. Drzal, L. T. (Invited) "Biofiber Composites" Korean Institute of Materials and Metallurgy (KIMM) Changwon , Korea, June 21, 2001
202. Drzal, L. T. (Invited) "Quantification of the Fiber-Matrix Interphase for Optimum Adhesion in Composite Materials", Toray Industries, Ehime, Japan, July 2-3, 2001.
204. Han, S. O.; Defoort, B.; Drzal, L. T. "Curing of epoxy and glucose maleic acid ester vinyl copolymer" , 222nd National Meeting of the American Chemical Society (ACS) Chicago, IL August 26-30, 2001.
205. Drzal, L. T.; Mohanty, A. K.; Misra, M. "Environmentally benign powder impregnation processing and role of novel water-based coupling agents in natural fiber-reinforced thermoplastic composites. , 222nd National Meeting of the American Chemical Society (ACS) Chicago, IL August 26-30, 2001.
206. Drzal, L. T.; Fukushima, H. "Graphite nanoplatelets as reinforcements for polymers" , 222nd National Meeting of the American Chemical Society (ACS) Chicago, IL August 26-30, 2001.
207. Hokens, D.; Mohanty, A. K.; Misra, M.; Drzal, L. T. "Environmentally friendly "green" biodegradable composites from natural fiber and cellulosic plastic." , 222nd National Meeting of the American Chemical Society (ACS) Chicago, IL August 26-30, 2001.
208. LBelcher, L. K.; Drzal, L. T.; Misra, M.; Mohanty, A. K. "Natural fiber reinforced thermoset composites: Studies on fiber-matrix adhesion of aligned Henequen fiber epoxy composites." , 222nd National Meeting of the American Chemical Society (ACS) Chicago, IL August 26-30, 2001.
209. Mohanty, A. K.; Drzal, L. T.; Hokens, D.; Misra, M. "Eco-friendly composite materials from biodegradable polymers: Biocomposites to nanocomposites." , 222nd National Meeting of the American Chemical Society (ACS) Chicago, IL August 26-30, 2001.
210. Drzal, L. T. (Invited) "*Nanoreinforcements for Polymer Matrix Composites*," National Materials Advisory Board (NMAB), Committee on Materials Research for Defense-After-Next," Structural/multifunctional materials panel, Irvine, CA, October 10-11, 2001.
211. Defoort, B.; Drzal, L. T. "*Interfacial Phenomena And Fiber-Matrix Adhesion In Electron-Beam Processed Composites*," International SAMPE Technical Conference, Seattle, WA, November 4-8, 2001.
212. Drzal, L. T.; Ishihara, S. "*Aramid Fiber Surface Treatments To Improve Adhesion To Epoxy Matrices: Thermal And Chemical Treatments*," International SAMPE Technical Conference, Seattle, WA, November 4-8, 2001.
213. Drzal, L. T.; Schalek, R. L.; Askeland, P.; Rich, M.; Bhurke, A.; Tummala, P. "*Ultraviolet Light Surface Treatment Of Polymers, Composite And Metals As An Environmentally Benign Surface Preparation*," International SAMPE Technical Conference, Seattle, WA, November 4-8, 2001.
214. Han, S. O.; Defoort, B.; Askeland, P. A.; Drzal, L. T. "*Environmentally Friendly Biocomposites For Automotive Applications*," International SAMPE Technical Conference, Seattle, WA, November 4-8, 2001.
216. Drzal, L. T. (Invited); Mohanty, A. K.; Misra, M. "*Structural Bio-Composites Produced From Engineered Natural Fibers and Petro and/or Bio Polymers*" Symposium on "Advanced Fibers, Plastics, Laminates and Composites from Natural, Renewable and Non-Renewable Sources," Materials Research Society Meeting, Boston, MA, November 26-30, 2001.
217. Defoort, B.; Drzal, L. T. "*Problems And Solutions To Carbon Fiber-Matrix Adhesion In Electron-Beam Processed Composites*," Proceedings of the Annual Technical Meeting Adhesion Society, Orlando, Florida, February 2002.

218. Han, S. O.; Defoort, B.; Drzal, L. T. "Curing of epoxy and glucose maleic acid ester vinyl copolymer" 222<sup>nd</sup> American Chemical Society Meeting Polymer Division, Chicago, IL, 2001, August 26-30.
219. Khan, M. A. and Drzal, L. T. (2001): Characterization of Modified Jute Surface with 2-Hydroxy Ethyl Methacrylate under UV Radiation USM-JIRCAS Joint International Symposium "Lignocellulose-Materials of the Millennium, Technology and Application" 20-22 March 2001, Penang, Malaysia.
220. Mohanty, A. K.; Drzal, L. T.; Misra, M.; Mase, G. T.; Jurek, R.; Dunn, C. (Invited) "Engineered Natural Fiber Reinforced Polypropylene Composites: Synergism of Environmentally Benign Processing and Water-Based Coupling Agent," Presented at 6th International Conference on Woodfiber-Plastic Composites, Madison, Wisconsin, May 15-16, 2001.
221. Mohanty, A. K.; Misra, M.; Drzal, L. T. (Invited) "Recent Developments on Interfacial Adhesion in Natural Fiber Reinforced Thermoplastic Composite: an overview" International Symposium on Interfaces in Polymer Composites, Newark, NJ, USA, November 31-December 1, 2000.
222. Mohanty, A. K.; Misra, M.; Drzal, L. T. "Surface modification of natural fibers and performance of the resulting biocomposites: An overview," International Conference on Composite Interfaces (ICCI-VIII) at Case Western Reserve University Cleveland, Ohio, USA, October 11-14, 2000.
223. Mohanty, A. K.; Drzal, L. T.; Misra, M. (Invited) "Sustainable Green Composite Materials From Renewable Resources: The Present Status and Future Prospect," 10<sup>th</sup> Annual Meeting of Bio-Environmental Polymer Society, Sept. 19-22, (2001).
224. Mohanty, A. K.; Drzal, L. T.; Misra, M. "Eco-friendly Bio-Composite From Plant Derived Fiber and Crop Derived Plastics – A direction In "Greening the Composite Industry," American Institute of Chemical Engineers (AIChE) Conference, November 4-9, Nevada, 2001.
225. Misra, M.; Drzal, L. T.; Mohanty, A. K. "Engineered Natural Fiber Reinforced Thermoplastic Composites: Non-biodegradable Polypropylene vs. Biodegradable Cellulosic Plastic Based Bio-Composites," American Institute of Chemical Engineers (AIChE) Conference, November 4-9, Nevada, 2001.
226. Mohanty, A. K.; Drzal, L. T.; Misra, M. "Bio-based Plastics and Bio-Composites: Role of Compatibilizer To Improve Adhesion," 25<sup>th</sup> Annual Meeting of Adhesion Society Meeting (USA) and 2<sup>nd</sup> World Congress on Adhesion and Related Phenomenon (WCARP-2), Orlando, Florida, 2002.
227. Misra, M.; Drzal, L. T. ; Mohanty, A. K. "Role of Silane and Novel Water-based Coupling Agent In Increasing The Adhesion Between Natural Fiber and Polypropylene," 25<sup>th</sup> Annual Meeting of Adhesion Society Meeting (USA) and 2<sup>nd</sup> World Congress on Adhesion and Related Phenomenon (WCARP-2), Orlando, Florida, 2002.
228. Drzal, L. T.; Mohanty, A. K.; Misra, M. "Bio-Composite Materials As Alternatives To Petroleum-Based Composites For Automotive Applications," Automotive Composite Conference, Troy-Michigan, September 19-20, 2001.
229. Belcher, L. K.; Drzal, L. T.; Misra, M.; Mohanty, A. K. "Physico Mechanical & Morphological Study Of Epoxidized Vegetable Oil-Modified DGEBA Epoxy Resin Based Biocomposites For Automotive Exterior Applications," Division of Polymeric Materials, Science and Engineering, 224<sup>th</sup> ACS National Meeting, Boston, MA, August 18-22, 2002
230. Drzal, L. T.; Mohanty, A. K.; Tummala, P.; Misra, M. "Environmentally Friendly Bio-Composites From Soy-Based Bio-Plastic And Natural Fiber," Division of Polymeric Materials, Science and Engineering, 224<sup>th</sup> ACS National Meeting, Boston, MA, August 18-22, 2002
231. Cho, D.; Yang, G.; Drzal, L. T. "Fluorescence Studies On The Interdiffusion at the Interface Between PETI-5 and BMI Films," Division of Polymeric Materials, Science and Engineering, 224<sup>th</sup> ACS National Meeting, Boston, MA, August 18-22, 2002
232. Wibowo, A.; Mohanty, A. K.; Misra, M.; Drzal, L. T. "Thermal And Morphological Studies On Environmentally Friendly Plasticized Cellulose Acetate Polymer" 224<sup>th</sup> ACS National Meeting, Boston, MA, August 18-22, 2002
233. Han, S. O.; Han, M. H.; Schalek, R. L.; Drzal, L. T. "Effects Of Curing Temperature On The Stability Of Hydrophilic Polymer Matrix In Wet Environment" Division of Polymer Chemistry (Poster) 224<sup>th</sup> ACS National Meeting, Boston, MA, August 18-22, 2002.
234. Wibowo, A.; Drzal, L. T. ; Mohant, A. K.; Misra, M. "Effect of Process Engineering on the Performance of Natural Hemp Fiber Reinforced Cellulose Ester Composites" 17<sup>th</sup> Annual Meeting of the American Society for Composites, Purdue University, October (2002) 3<sup>RD</sup> PLACE-STUDENT POSTER AWARD
235. Mehta, G.; Drzal, L. T.; Mohanty, A. K.; Misra, M. "Low Cost Composite Panels For Housing Panel Applications: Studies on Physico-Mechanical Properties of Natural Fiber Reinforced Unsaturated Polyester Composites" 17<sup>th</sup> Annual Meeting of the American Society for Composites, Purdue University, October (2002)
236. Tummala, P.; Drzal, L. T.; Mohant, A. K.; Misra, M. "Green Composites From Biofiber & Soy Protein based Bioplastic: Role of Novel Hybrid Plasticization," 17<sup>th</sup> Annual Meeting of the American Society for Composites, Purdue University, October (2002).
237. Rich, M. J.; Drzal, L. T.; Hunston, D.; Holmes, G.; McDonough, W. Round Robin Assessment Of The Single Fiber Fragmentation Test, Paper 158, Proceedings of the 17<sup>th</sup> Annual Meeting of the American Society for Composites,

- Purdue University, October (2002).
238. Miyagawa, H.; Rich, M. J.; Drzal, L. T. “*Thermal Properties of Epoxy/Clay Nanocomposites*,” paper 159, Proceedings of the 17<sup>th</sup> Annual Meeting of the American Society for Composites, Purdue University, October (2002)
  239. Fukushima, H.; Drzal, L. T. “*Graphite Nanoplatelets as Reinforcements for Polymers: Structural and Electrical Properties*,” Paper 160, Proceedings of the 17<sup>th</sup> Annual Meeting of the American Society for Composites, Purdue University, October (2002).
  240. Drzal, L. T.; Mohanty, A. K.; Wibowo, A.; Misra, M. “*Eco-friendly Sustainable Bio-Composites From Natural Fibers and Cellulosic Plastics For Automotive Applications*,” Paper 161, Proceedings of the 17<sup>th</sup> Annual Meeting of the American Society for Composites, Purdue University, October (2002).
  241. Mohanty, A. K.; Drzal, L. T.; Misra, M. “*Rationale for Bio-Composite Materials Education For the New Millennium*,” Paper 2088, Proceedings of the 17<sup>th</sup> Annual Meeting of the American Society for Composites, Purdue University, October (2002).
  242. Rich, M. J., Drzal, L. T., Thomason, M. C. and Schroeder, D., “*Reclaimed automotive paint powder as a filler in recycled plastics*.” SPE Global Plastic Environmental Conference (GPEC), February 13<sup>th</sup> and 14<sup>th</sup>, 2002.
  243. Rich, M. J. and Drzal, L. T., “*The Use Of Energetic Ultraviolet Light As An Environmentally Responsible Method For Surface Preparation Of Plastics*,” SPE Global Plastic Environmental Conference (GPEC), February 13<sup>th</sup> and 14<sup>th</sup>, 2002.
  244. Rich, M. J. and Drzal, L. T., “*Removal of Mold Release Compounds from Metal Surfaces Using Ultraviolet Irradiation*.”, Proceedings of RADTECH 2002 Conference, Indianapolis, IN, April, 2002. Presented by M. Rich
  245. Rich, M. J., Pschigoda, S. and Drzal, L. T., “*Surface Cleaning Of Mold Release Compounds From Metals And Non-Metallic Materials*”, SPE Annual Technical Conference, San Francisco, May, 2002.
  246. Rich, M. J., R. E. Maki, and Morena, J., “*Development of a Pavement Management System: Laboratory and Field Assessment of Factors Effecting Retroreflectivity in Pavement Paints*”, Transportation Research Record, No 1794, pg 49-54, 2002.
  247. Miyagawa, H., Rich, M. J., Drzal, L. T., “*Thermomechanical and Chemical Characterization of Anhydride-Cured Epoxy/Clay Nanocomposites*,” Proceedings of North American Thermal Analysis Society Annual Conference, 2002, Pittsburgh PA
  248. L. T. Drzal, A. K. Mohanty, M. Misra, “Opportunities for Value Added Biobased Materials”, Presented (ORAL) at “Creating Value for Biobased Resources: Moving Beyond Petroleum” Conference, November 11-13, 2002, Kansas City, MO.
  249. A. K. Mohanty, L. T. Drzal, M. Misra, “Green Nanocomposites from Renewable Resources - - Challenges and Opportunities”, Presented (ORAL) at “Creating Value for Biobased Resources: Moving Beyond Petroleum” Conference, November 11-13, 2002, Kansas City, MO.
  250. A. K. Mohanty, L. T. Drzal, M. Misra, “Biocomposites To Green Composites: The Hope and The Reality”, Presented (ORAL) at “5<sup>th</sup> Annual American Kenaf Society Conference”, November 7-9, 2002, Memphis, TN.
  251. L. T. Drzal, S. Joshi, A. K. Mohanty, “A Comparative Life Cycle Analysis (LCA) of Natural Fiber Composites and Glass Fiber Reinforced Composites”, American Institute of Chemical Engineers (AIChE) 2002 Annual Conference, November 3-8, 2002, Indianapolis.
  252. A. K. Mohanty, P. Tummala, L. T. Drzal, M. Misra, “Eco-friendly Green Composites from Natural Fiber and Soy Protein-based Bioplastic”, American Institute of Chemical Engineers (AIChE) 2002 Annual Conference, November 3-8, 2002, Indianapolis.
  253. L. T. Drzal, A. K. Mohanty, M. Misra, “Bio-Composites To Green Composites: Past, Present and Future”, American Institute of Chemical Engineers (AIChE) 2002 Annual Conference, November 3-8, 2002, Indianapolis.
  254. L. Belchler, L. T. Drzal, M. Misra, A. K. Mohanty, “Bio-Composites From Aligned Bio-fibers and Bio-based Epoxy Resins”, American Institute of Chemical Engineers (AIChE) 2002 Annual Conference, November 3-8, 2002, Indianapolis.
  255. L. T. Drzal, A. Wibowo, A. K. Mohanty, M. Misra, “Sustainable Biocomposites from Natural Fibers and Cellulosic Plastics Through Novel Powder Impregnation Processing”, American Institute of Chemical Engineers (AIChE) 2002 Annual Conference, November 3-8, 2002, Indianapolis.
  256. G. Mehta, A. K. Mohanty, L. T. Drzal, M. Misra, “Bio-Composites From Engineered Natural Fibers for Housing Panel Applications”, American Institute of Chemical Engineers (AIChE) 2002 Annual Conference, November 3-8, 2002, Indianapolis.
  257. M. Misra, A. K. Mohanty, L. Drzal, T. Smith, “Biomass Grasses As New Renewable Bio-fiber Reinforcements for High-value Bio-Composite Applications” American Institute of Chemical Engineers (AIChE) 2002 Annual Conference, November 3-8, 2002, Indianapolis.
  258. G. Mehta, A. K. Mohanty, M. Misra, L. T. Drzal, “Physico-Mechanical Properties of Non woven Natural Fiber Reinforced Unsaturated Polyester Low Cost Composite Panel for Housing Panel Applications”, Presented

- (POSTER) at American Society of Composites 2002 Annual Meeting (17<sup>th</sup> Annual Technical Conference), 21-23 October 2002 at West Lafayette, Indiana.
259. P. Tummala, A. K. Mohanty, M. Misra, L. T. Drzal, "Green Composites From Biofiber & Soy Protein based Bioplastic: Role of Novel Hybrid Plasticization", Presented (POSTER) at American Society of Composites 2002 Annual Meeting (17<sup>th</sup> Annual Technical Conference), 21-23 October 2002 at West Lafayette, Indiana.
  260. A. Wibowo, A. K. Mohanty, M. Misra, L. T. Drzal, "Effect of Process Engineering on Performance of Natural Hemp fiber Reinforced Cellulose Ester Composites" Presented (POSTER) at American Society of Composites 2002 Annual Meeting (17<sup>th</sup> Annual Technical Conference), 21-23 October 2002 at West Lafayette, Indiana.
  261. A. K. Mohanty, M. Misra, L. T. Drzal, "Green Composites from Renewable Resources: The Present Status and Future Perspectives", Presented (ORAL) at 10<sup>th</sup> Annual Meeting of the BioEnvironmental Polymer Society, Albuquerque, NM, USA, September 10-14, 2002.
  262. A. K. Mohanty, M. Misra, L. T. Drzal, "Biodegradable Polymers - - Is Future in Nano?", Presented (ORAL) at 10<sup>th</sup> Annual Meeting of the BioEnvironmental Polymer Society, NM, USA, September 10-14, 2002.
  263. A. K. Mohanty, M. Misra, L. T. Drzal, "Bio-composites vs. green composites: Opportunities are clearing but challenges are to be made", 224<sup>th</sup> American Chemical Society (ACS) Fall Meeting, August 18-22, 2002.
  264. L. Belcher, M. Misra, A. K. Mohanty, L. T. Drzal, "Development of Bio-Composites from Aligned Bio-fiber and Bio-based Epoxy Resin", POSTER presentation at 8<sup>th</sup> Annual Global Plastics Environmental Conference (GPEC 2002) – Plastics Impact on the Environment, February 13 & 14, 2002, Detroit, MI, Society of Plastics Engineers, Environmental Division (AWARDED 2<sup>nd</sup> best POSTER prize in the Conference).
  265. D. Hokens, A. K. Mohanty, M. Misra, L. T. Drzal, "Eco-friendly Bio-Composites: Natural Fiber Reinforced Thermoplastic Bio-Polyester Composites", POSTER presentation at 8<sup>th</sup> Annual Global Plastics Environmental Conference (GPEC 2002) – Plastics Impact on the Environment, February 13 & 14, 2002, Detroit, MI, Society of Plastics Engineers, Environmental Division (AWARDED 1<sup>st</sup> POSTER prize in the Conference).
  266. L. T. Drzal, A. K. Mohanty, G. Mehta, M. Misra, "Low-cost, Biobased Composite Materials for Housing Applications", Advances in Building Technology, Proc. International Conference on Advances in Building Technology, Vol. 1, M. Anson, J. M. Ko, E. S. S. Lam (Eds.), 225-232 (2002).
  267. A. K. Mohanty, L. T. Drzal, M. Misra, "Rationale Behind Education on Emerging Bio-Composite Materials For a New Millennium", Presented (ORAL) at Technical Session on Composite Materials Education at American Society for Composites (17<sup>th</sup> Annual Technical Conference), 21-23 October 2002 at West Lafayette, Indiana. (Full Paper Published: Proceedings of the American Society for Composites, Eds.: C. T. Sun, H. Kim).
  268. L. T. Drzal, A. K. Mohanty, A. Wibowo, M. Misra, "Eco-friendly Sustainable Bio-Composites From Natural Fibers and Cellulosic Plastics For Automotive Applications", Presented (ORAL) at Technical Session on Automotive Applications at American Society for Composites 2002 Annual Meeting (17<sup>th</sup> Annual Technical Conference), 21-23 October 2002 at West Lafayette, Indiana. ( Full Paper Published in the Proceedings of the American Society for Composites, Eds.: C. T. Sun, H. Kim).
  269. L. T. Drzal, A. K. Mohanty, M. Misra, "Biocomposites To Green Composites: Moving Towards more Eco-friendly Automotive Parts", Presented (ORAL) at 2<sup>nd</sup> Annual Automotive Composite Conference, Troy-Michigan, September 13-14, 2002, Full Paper Published in the Proceeding of Automotive Composite Conference Society of Plastics Engineers, Automotive & Composites Division.
  270. L. T. Drzal, A. K. Mohanty, P. Tummala, M. Misra "Environmentally Friendly Biocomposites from Soy-based Bioplastic and Natural Fiber", Polymeric Materials Science and Engineering, American Chemical Society, 87, 117-118 (2002). Presentation at 224<sup>th</sup> Fall National Meeting, Boston, MA, August 18-22, 2002.
  271. L. Belcher, L. T. Drzal, M. Misra, A. K. Mohanty, "Physico-mechanical and Morphological studies of biofiber reinforced biobased epoxy resin composites for automotive exterior applications", Polymeric Materials Science and Engineering, American Chemical Society, 87, 256-257 (2002).
  272. A. Wibowo, A. K. Mohanty, M. Misra, L. T. Drzal, "Thermal and Morphological Studies on Environmentally Friendly Plasticized Cellulose Acetate Polymer", Polymeric Materials Science and Engineering, American Chemical Society, 87, 259-260 (2002). Presentation at 224<sup>th</sup> ACS Fall National Meeting, Boston, MA, August 18-22, 2002.
  273. A. K. Mohanty, L. T. Drzal, K. J. Ferguson, B. E. Dale, M. Misra, R. Schalek, "Explosion Treatment of Corn Stalk Fibers and Their Characterizations: A New Look At Value Added Applications", Polymer Preprint – Polymer Chemistry Division, American Chemical Society, 43 (2), 749-750 (2002).
  274. A. K. Mohanty, M. Misra, L. T. Drzal, "Sustainable Bio-Composites from Renewable Resources: Opportunities and Challenges in the Green Materials World", Polymeric Materials Science and Engineering, American Chemical Society, Vol. 86,341-342 (2002). ORAL presentation at 223<sup>rd</sup> ACS Spring National Meeting, Orlando, FL, April 7-11, 2002.
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- National Meeting, Orlando, FL, April 7-11, 2002.
276. D. Hokens, A. K. Mohanty, M. Misra, L. T. Drzal “The Influence of Surface Modification and Compatibilization on the Performance of Natural Fiber Reinforced Biodegradable Thermoplastic Composite”, Polymer Preprint – Polymer Chemistry Division, American Chemical Society, Vol. 43(1), 482-483 (2002). Presented at 223<sup>rd</sup> ACS Spring National Meeting, Orlando, FL, April 7-11, 2002.
  277. M. Misra, A. K. Mohanty, L. T. Drzal, “Natural/Bio-fiber Reinforced Polyolefin Composites: Bio-based Opportunities and Challenges in the Materials World”, Proceedings of 8<sup>th</sup> Annual Global Plastics Environmental Conference (GPEC 2002), February 13 & 14, 2002, Detroit, MI, Society of Plastics Engineers, Environmental Division, ORAL PRESENTATION, Full paper published in the proceeding, p. 383-3392, Year 2002.
  278. Drzal, Lawrence T., “Ultraviolet (UV) Light Surface Treatment of Polymers: An Environmentally Benign Manufacturing Process for Enhanced Paint and Adhesive Performance”, 2003 NSF Design, Service and Manufacturing Grantees and Research Conference in Birmingham, Alabama
  279. Drzal, Lawrence T., “Sustainable Composite Materials From Renewable Resources For Automotive Applications” 2003 NSF Design, Service and Manufacturing Grantees and Research Conference in Birmingham, Alabama
  280. Drzal, Lawrence T., Kyoto Institute of Technology (KIT) “‘Green’ Bio-Composites: Opportunities for Structural Use of Biobased Materials”, Kyoto, Japan, January 2003.
  281. Drzal, Lawrence T., Toray Carbon Fibers, “Characterization and Adhesion Evaluation of Torayca T-700G Carbon Fibers”, Ehime, Matsuyama City, Japan, January 2003.
  282. Drzal, Lawrence T., Toray Carbon Fibers, “Biobased Structural Composite Materials: A ‘Green’ Alternative to Petroleum-based Materials”, Ehime, Matsuyama City, Japan, January 2003.
  283. Drzal, Lawrence T., Kagoshima University, “Biobased Structural Composite Materials: A ‘Green’ Alternative to Petroleum-based Materials”, Kagoshima, Japan, January 2003.
  284. Drzal, Lawrence T., Toyota Central R & D, “Biobased Structural Composite Materials: A ‘Green’ Alternative to Petroleum-based Materials”, Nagoya, Japan, January 2003.
  285. Drzal, Lawrence T., Toray Carbon Fibers, “Surface Treatments for Torayca T-700G Carbon Fibers” , Tokyo, Japan, January 2003.
  286. Drzal, Lawrence T., ConocoPhillips Carbon Fibers, “Quantification of the Fiber-Matrix Interphase in Composite Materials”, Tokyo Japan, January 2003.
  287. Drzal, Lawrence T., ConocoPhillips Carbon Fibers, “Biobased Structural Composite Materials: A ‘Green’ Alternative to Petroleum-based Materials”, Tokyo Japan, January 2003.
  288. Drzal, Lawrence T., Mitsubishi Rayon, “Biobased Structural Composite Materials: A ‘Green’ Alternative to Petroleum-based Materials”, Toyohashi Japan, January 2003.
  289. Davis, G. D., M. J. Rich, L. Drzal, R. Harichandran, *Detecting Delamination and Moisture Intrusion of Graphite/Epoxy-Concrete Structures Using Electrochemical Impedance Sensors*, Proceedings Annual Adhesion Society Conference, February, 2003.
  290. A. K. Mohanty, L. T. Drzal\* And M. Misra, “Green Nanocomposites From Renewable Resources: Challenges And Opportunities In The 21<sup>st</sup> Century Materials World”, Proceedings of the 26<sup>th</sup> Annual Meeting of the Adhesion Society, Orlando, FL (2003).
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  292. Hiroyuki Fukushima And Lawrence T. Drzal, “Graphite Nanoplatelets As Reinforcements For Polymers: The Effect Of Nanoreinforcement Adhesion On Structural And Electrical Properties”, Proceedings of the 26<sup>th</sup> Annual Meeting of the Adhesion Society, Orlando, FL (2003).
  293. Hiroaki Miyagawa And Lawrence T. Drzal, “Effect Of Chemical Modification Of Montmorillonite On The Fracture Toughness Of Nanocomposites”, Proceedings of the 26<sup>th</sup> Annual Meeting of the Adhesion Society, Orlando, FL (2003).
  294. Guangda Shi And Lawrence T. Drzal, “Effect Of Surface Chemistry And Topography On The Interfacial Adhesion Of Natural Fibers To An Epoxy Matrix”, Proceedings of the 26<sup>th</sup> Annual Meeting of the Adhesion Society, Orlando, FL (2003).
  295. L. Xu And L.T. Drzal, “Influence Of Cure Volume Shrinkage Of The Matrix Resin On The Adhesion Between Carbon Fiber And Vinyl Ester Resin”, Proceedings of the 26<sup>th</sup> Annual Meeting of the Adhesion Society, Orlando, FL (2003).
  296. G. Mehta, A. K. Mohanty, M. Misra, L. T. Drzal, “A Novel Sizing As Adhesion Promoter In Natural Fiber Reinforced- Polyester Composites”, Proceedings of the 26<sup>th</sup> Annual Meeting of the Adhesion Society, Orlando, FL (2003).
  297. A. K. Mohanty, M. Misra and L. T. Drzal, “Emerging Green Nanocomposites: Striving for Sustainability in Automotive Applications”, Global Plastics Environmental Conference, Detroit, MI, February 2003.
  298. A. Wibowo, A. K. Mohanty, M. Misra, L. T. Drzal, “Eco-friendly Biocomposites from Plant Derived Fiber and

- Plant Derived Plastic For Automotive Applications”, Global Plastics Environmental Conference, Detroit, MI, February 2003.
299. G. Mehta, A. K. Mohanty, M. Misra, L. T. Drzal, “Novel Bio-Composite Sheet Molding Compounds From Engineered Biofibers and Biobased Resins for Housing Panel Application”, Global Plastics Environmental Conference, Detroit, MI, February 2003.
  300. P. Tummala, A. K. Mohanty, M. Misra, L. T. Drzal, “Green Composites From Biofiber and Soy protein based bioplastic: Role of Novel Hybrid Plasticization”, Global Plastics Environmental Conference, Detroit, MI, February 2003.
  301. A. K. Mohanty, M. Misra and L. T. Drzal, “Emerging Green Nanocomposites: Striving for Sustainability in Automotive Applications”, Global Plastics Environmental Conference, Detroit, MI, February 2003.
  302. J-P. Latere Dwan’Isa, A. K. Mohanty, M. Misra, L. T. Drzal, “Biobased Polyurethanes from Plant oil-based Polyols: Physico-mechanical Properties Evaluations”, Global Plastics Environmental Conference, Detroit, MI, February 2003.
  303. Drzal, Lawrence T., “Biocomposites: Research and Commercialization Issues” , Matériaux Industriels Composites D.Origine Naturelle : Développement Et Mise En Marché De Nouveaux Produits, Institut Des Matériaux Industriels Boucherville, Quebec, Canada March 2003.
  304. Lawrence T. Drzal, Per Askeland, Alekh Bhurke, “Surface Treatment of Polymers and Metals with UV Light in Air to Improve Adhesion”, Roche Pharmaceuticals, Indianapolis, IN, April 2003.
  305. Brian R. Harkness, Richard L. Schalek<sup>1</sup>, Satyen K. Sarmah and Lawrence T. Drzal, “Characterizing the Modulus and Hardness of Photopatternable Silicone Compositions Using Depth Sensing Nanoindentation”, MRS Spring San Francisco 2003.
  306. Drzal, Lawrence T. and H. Fukushima, “Exfoliated Graphite Nanoplatelets as Reinforcements for Polymers”, MRS Spring San Francisco 2003.
  307. A.K. Mohanty, L. T. Drzal and M. Misra, “Green Nanocomposites-The Pathway to the Future for Biobased Polymers”, MRS Spring San Francisco 2003.
  308. A. K. Mohanty, M. Misra, L. T. Drzal, “Green composites: Value-added agricultural products from biofibers and bioplastics”, Presented at Division of Industrial and Engineering Chemistry, 225<sup>th</sup> ACS National Meeting, New Orleans, March, 2003.
  309. G. Mehta, A. K. Mohanty, L. T. Drzal, M. Misra “Biocomposites from Engineered Natural Fibers and Unsaturated Polyester Resin for Low Cost Housing Applications”, Polymeric Materials Science & Engineering, 88, 56-57 (2003). Presented at 225<sup>th</sup> ACS National Meeting, New Orleans, March 2003.
  310. A. Wibowo, A. K. Mohanty, M. Misra L. T. Drzal, “Effect of Process Engineering on the Performance of Natural Fiber Reinforced Cellulose Acetate Butyrate based Green Composites”, Polymeric Materials Science & Engineering, 88, 332-333 (2003). Presentation at 225<sup>th</sup> American Chemical Society National Meeting, New Orleans, March 2003.
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  312. A. K. Mohanty, M. Misra and Lawrence T. Drzal, “Structural BioComposites From Natural Fibers and BioPolymers”, Society of Plastics Engineers, Annual Technical Meeting, ANTEC 2003, Nashville, TN May 5-7, 2003.
  313. Drzal, Lawrence T. and H. Fukushima, “A Carbon Nanotube Alternative: Graphite Nanoplatelets as Reinforcements for Polymers”, Society of Plastics Engineers, Annual Technical Meeting, ANTEC 2003, Nashville, TN May 5-7, 2003.
  314. Drzal, Lawrence T. and Alekh Bhurke, “Surface Treatment Of Polymers And Composites With UV Light In Air To Improve Adhesion”, Society of Plastics Engineers, Annual Technical Meeting, ANTEC 2003, Nashville, TN May 5-7, 2003.
  315. Drzal, Lawrence T. and H. Fukushima, “Exfoliated Graphite as a NanoReinforcement for Polymers ”, Society for the Advancement of Materials and Process Engineering, Annual Meeting, SAMPE 2003, Long Beach, CA May 13-15, 2003.
  316. L. T. Drzal, Alekh Bhurke and per Askeland “Ultraviolet Light Surface Treatment As An Environmentally Benign Surface Preparation Method For Adhesive Bonding Surface Treatment Of Polymers And Composites”, Society For The Advancement Of Materials And Process Engineering, Annual Meeting, SAMPE 2003, Long Beach, Ca May 13-15, 2003.
  317. A. K. Mohanty, M. Misra and Lawrence T. Drzal, “Design & Engineering of Biocomposites from Natural Fibers & Bacterial Bio-plastics for Automotive Applications”, 7<sup>th</sup> International Wood Fiber-Plastics Conference, Madison, WI May 19-22, 2003.
  318. A. Wibowo, A. K. Mohanty, M. Misra, and Lawrence T. Drzal, “Development Of Eco-Friendly Biocomposites Derived From Renewable Resources”, 7<sup>th</sup> International Wood Fiber-Plastics Conference, Madison, WI May 19-

- 22, 2003.
319. M. Misra, A. K. Mohanty, and Lawrence T. Drzal, "Soy Protein Based Bio-Plastics", 7<sup>th</sup> International Wood Fiber-Plastics Conference, Madison, WI May 19-22, 2003.
  320. Lee, Jinyong and Drzal, Lawrence T. , "Surface Characterization And Adhesion Of Torayca T-700g Carbon Fibers", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  321. Dwan'isa, J-P. L., Mohanty, A. K., Misra, M., and Drzal, L. T., "Hemp Reinforced Based Polyurethanes for Automotive Applications: Evaluation of Thermomechanical and Morphological Properties", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  322. Fukushima, H. and Drzal, L. T. "Graphite Nanocomposites: Structural and Electrical Properties", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  323. L. T. Drzal, "Exfoliated Graphite as a NanoReinforcement for Polymers", Gordon Research Conference on Composites, Ventura, CA, January 2004.
  324. Donghwan Cho, Sangyeob Lee, Hiroyuki Fukushima, and Lawrence T. Drzal, "Thermal Characterization Of A Phenylethynyl-Terminated Polyimide Nanocomposite Reinforced With Expanded Graphite", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  325. In-Hwan Do and Lawrence T. Drzal, "Alignment Of Conducting Carbon Particles In Epoxy By An Alternating Electric Field", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  326. Hiroyuki Fukushima and Lawrence T. Drzal, "Graphite Nanocomposites: Structural And Electrical Properties", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  327. G.D. Davis, M. J. Rich, L. T. Drzal, And R.S. Harichandran, "Use An Electrochemical Impedance Sensor To Monitor Delamination And Moisture Uptake In CFRP-Reinforced Concrete Structures", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  328. K. Kalaitzidou, H. Fukushima And L.T. Drzal, "Graphite Nanoplatelets As Nano-Reinforcements For Polymers: Comparison Between A Thermoset And A Thermoplastic Matrix", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  329. M. Misra, A. K. Mohanty, N. Cerneka, L. T. Drzal, "Green Composites From Natural Fibers And Bacterial Bioplastic", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  330. G. Mehta, L. T. Drzal, M. Misra, A. K. Mohanty, "Bio-Based Resin As A Means To Toughen Bio-Composites", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  331. Hiroaki Miyagawa And Lawrence T. Drzal, "Fracture Behavior Of Epoxy/Clay Nanocomposites", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  332. A. K. Mohanty, L. T. Drzal, M. Misra, A. Wibowo, R. Schalek, "Green Nanocomposite From Biodegradable Polymer And Organically Modified Clay", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  333. Guangda Shi And Lawrence T. Drzal, "The Contribution Of Interfacial Chemistry To Fiber-Matrix Adhesion And Composite Mechanical Properties In Natural Fiber Reinforced Polymer Composites And Natural Fibers", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  334. P. Tummala, A. K. Mohanty, M. Misra, L. T. Drzal, "Eco-Composite Materials From Novel Soy Protein-Based Bioplastics", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  335. D. H. Walden And L. T. Drzal, "The Effect Of Oxygen Plasma Treatment On The Surface Energy Of Exfoliated Graphite And The Mechanical Properties Of Graphite Nanocomposites", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  336. L. Xu, L.T. Drzal, T. Mase And A. Al-Ostaz, "Influence Of The Cure Volume Shrinkage Of The Matrix Resin On The Adhesion Between Carbon Fiber And Vinyl Ester Resin", International Conference On Composite Materials, (ICCM-14) , San Diego, Ca July, 2003.
  337. A. Wibowo, A. K. Mohanty, M. Misra, L. T. Drzal, "Injection Molded Eco-Friendly Bio-Composites from Natural Fiber and Cellulosic Bio-Plastic", International Conference on Composite Materials, (ICCM-14), San Diego, Ca July, 2003.
  338. Drzal, L. T., Invited Seminars (1) Adhesive Bonding to Polymer Surfaces: Review of Fundamentals of Adhesion; (2) UV Light Surface Treatment of Composites for Adhesive Bonding; and (3) Adhesion of Spider Silk. Liberty Technical Center, Warren, MI June 2003.
  339. Drzal, L. T., Invited Seminar, "Adhesive Bonding to Polymer Surfaces: Review of Fundamentals of Adhesion and Adhesion of Spider Silk", University of Windsor, dept of Engineering Materials, Windsor, Ont, July 2003.
  340. Lawrence T. Drzal, Amar Mohanty and Manju Misra, "Biobased Structural Composite Materials: A 'Green' Alternative to Petroleum-Based Materials", 7th Annual Green Chemistry & Engineering Conference, Washington, DC, June 2003.
  341. A. K. Mohanty, M. Misra and L. T. Drzal, "Green Nanocomposites – Moving Towards Sustainability in Automotive and Packaging Applications", 7th Annual Green Chemistry & Engineering Conference, Washington, DC, June 2003



342. Lawrence T. Drzal, Alekh Bhurke, Per Askeland, “Ultraviolet Light Surface Treatment as an Environmentally Benign Surface Preparation Method for Adhesive Bonding and Painting”, 7th Annual Green Chemistry & Engineering Conference, Washington, DC, June 2003
343. M. Misra, A. K. Mohanty and L. T. Drzal, “Sustainable Green Composites from Natural Fibers and Bacterial Bioplastic for Automotive Applications”, 7th Annual Green Chemistry & Engineering Conference, Washington, DC, June 2003.
344. A. K. Mohanty, P. Tummala, J. P. Latere, W. Liu, H. Miyagawa, L. T. Drzal, M. Misra, “Value-Added Nonfood Applications Of Soybean Through Green Composites And Green Nanocomposites: The Hope And Reality For US Agriculture”, 4th International Plant Biomechanics Conference, East Lansing, MI July 2003.
345. Mario J. Quagliata, Rigoberto Burgueño, Geeta Mehta, Amar K. Mohanty, Lawrence T. Drzal and Manjusri Misra, “Environmentally Friendly Biocomposite Beams And Plates From Natural Fibers And Unsaturated Polyester Resin”, 4th International Plant Biomechanics Conference, East Lansing, MI July 2003.
346. Andrew Peot, A. K. Mohanty, L. T. Drzal, T. M. Smith, M. Misra, “Economic Feasibility For Producing Native Grasses In Michigan As A Fiber Source For Use In Biocomposites” □ 4th International Plant Biomechanics Conference, East Lansing, MI July 2003.
347. Salil Arora, A.K. Mohanty , L.T Drzal, M. Misra, S. Joshi, B.E. Dale, “Comparative Life Cycle Assessment Of Biobased Composites And Conventional Composites”.4th International Plant Biomechanics Conference, East Lansing, MI July 2003.
348. Lawrence T. Drzal, (Invited Lecture) “A Carbon Nanotube Alternative: Graphite Nanoplatelets as Reinforcements for Polymers, Zyvex Corporation, Richardson, TX July 2003.
349. Lawrence T. Drzal, “Renewable Structural Biobased Composite Materials”, Dow-MSU Technology Workshop, September 2003.
350. Lawrence T. Drzal, “Exfoliated Graphite – A Carbon Nanotube Alternative Reinforcement for Mechanical, Thermal and Electrical Property Enhancement of Polymers ”, Dow-MSU Technology Workshop, September 2003.
351. A. K. Mohanty, W. Liu, L. T. Drzal & M. Misra and Joseph V. Kurian, Ray W. Miller & Nick Strickland, “Biobased Poly(trimethylene terephthalate): Opportunity in Structural Composite Applications”, 3<sup>rd</sup> Annual Automotive Composites Conference, Automotive and Composites Division , SPE, Troy, MI September, 2003.
352. H. Miyagawa, A. K. Mohanty, M. Misra, and L. T. Drzal, “Thermophysical and Morphological Property Evaluations of Hybrid Bio-based Epoxy Nanocomposites Reinforced with Carbon Nanofibers”, 3<sup>rd</sup> Annual Automotive Composites Conference, Automotive and Composites Division, SPE, Troy, MI September, 2003.
353. Hiroyuki Fukushima and Lawrence T. Drzal, “Graphite Nanoplatelets to Improve the Mechanical Electrical and Thermal Properties of Polymers”, 3<sup>rd</sup> Annual Automotive Composites Conference, Automotive and Composites Division, SPE, Troy, MI September, 2003.
354. Lanhong Xu, Tom Mase and Lawrence T. Drzal, “Improving Adhesion Between Carbon Fibers and Vinyl Ester Resin”, 3<sup>rd</sup> Annual Automotive Composites Conference, Automotive and Composites Division , SPE, Troy, MI September, 2003.
355. Hiroaki Miyagawa, Michael J. Rich, and Lawrence T. Drzal, *Thermo-physical and Mechanical Properties of Epoxy/Silica Nanocomposites*, Proceedings North American Thermal Analysis Society Conference, Albuquerque, NM, Sept. 2003
356. H. Park, A. K. Mohanty, M. Misra, L. T. Drzal, “Environmentally Benign Nanocomposites from Cellulose Ester and Layered Silicates” Presentation at 2003 Fall Scientific Meeting, ACS-Midland Section, Michigan, Oct. 17, 2003.
357. W. Liu, A. K. Mohanty, M. Misra, L. T. Drzal, ‘Green’ Composites from Soy-based Thermoplastic and Natural Fibers, Presentation at 2003 Fall Scientific Meeting, ACS-Midland Section, Michigan, Oct. 17, 2003.
358. H. Miyagawa, A. K. Mohanty, M. Misra, L. T. Drzal, “Biobased Epoxy Matrix for Clay Nanocomposites”, Presentation at 2003 Fall Scientific Meeting, ACS-Midland Section, Michigan, Oct. 17, 2003.
359. P. Mulukutla, L. T. Drzal, A. K. Mohanty, S. Desai, M. Misra, “Mechanical and Morphological Properties of Biocomposites from Microbial Polyesters and Natural Fibers”. Presentation at 2003 Fall Scientific Meeting, ACS-Midland Section, Michigan, Oct. 17, 2003.
360. N. Sgriecia, M. C. Hawley, M. Misra, L. T. Drzal, A. K. Mohanty, “Curing studies of microwave processed biocomposites made from epoxy and hemp fibers” Presentation at 2003 Fall Scientific Meeting, ACS-Midland Section, Michigan, Oct. 17, 2003.
361. A. Wibowo, A. K. Mohanty, M. Misra, L. T. Drzal, “INJECTION MOLDED ECO-FRIENDLY NATURAL FIBER AND CELLULOSIC PLASTIC BIOCOMPOSITES”, Presentation at 2003 Fall Scientific Meeting, ACS-Midland Section, Michigan, Oct. 17, 2003.
362. G. Mehta, L. T. Drzal, M. Misra, K. Thayer, A. K. Mohanty, SMC Bio-composite housing panels and their properties”, Presentation at 2003 Fall Scientific Meeting, ACS-Midland Section, Michigan, Oct. 17, 2003.
363. S. Desai, A. K. Mohanty, M. Misra, L. T. Drzal, ‘Green’ Nanocomposites from Bacterial Polyester and Organically Modified Clay: Thermomechanical and Morphological Properties”, Presentation at 2003 Fall Scientific Meeting,

ACS-Midland Section, Michigan, Oct. 17, 2003.

364. Michael J. Rich and Lawrence T. Drzal, *An Improved Method For The Surface Treatment Of Carbon Fibers*, Proceedings of the American Society for Composites Conference, Gainesville, FL, October, 2003.
365. S. Mani, M. J. Rich, L. T. Drzal and G.D. Davis, *The Application Of Electrochemical Impedance Spectroscopy For Non-Destructive Evaluation Of Composite Bonded Structures*, Proceedings of the American Society for Composites Conference, Gainesville, FL, October, 2003
366. L. T. Drzal and Hiroyuki Fukushima, "Graphite Nanoplatelets: An Old Filler with New Nano Possibilities" (Invited Lecture) NSC/NSF Joint Workshop on Nanosciences and Nanotechnology, Kaohsiung, Taiwan November 2003.
367. L. T. Drzal, M. Misra, A. K. Mohanty, Sustainable Green Composites from Engineered Natural Fiber and Bacterial Polyesters: Next Step for Automotive Materials, American Institute of Chemical Engineers (AIChE) 2003 Annual Conference, November 16-21, 2003, San Francisco, California, paper number [491b].
368. A. K. Mohanty, M. Misra & L. T. Drzal, "Green Nanocomposites - Materials of the Future", San Francisco AIChE Meeting, November 2003.
369. G. Mehta L.T. Drzal, A.K. Mohanty, M. Misra, K. Thayer, Novel Biocomposites Sheet Molding Compounds for Low Cost Housing Panel Applications, San Francisco AIChE meeting, November 2003.
370. L. T. Drzal, Amar K. Mohanty, Manju Misra, "Sustainable Green Composites from Natural fibers and Bacterial Polyesters: Next step for "Green" Automotive Materials", San Francisco AIChE meeting, November 2003.
371. A. K. Mohanty, W. Liu, L. T. Drzal, M. Misra, Joseph V. Kurian, Ray W. Miller and Nick Strickland, "Biobased Poly (trimethylene terephthalate): Future in Structural Composite Applications", American Institute of Chemical Engineers (AIChE) 2003 Annual Conference, November 16-21, 2003, San Francisco, California, paper number [491e].
372. H. Miyagawa, A. K. Mohanty, M. Misra, and L. T. Drzal, "Biobased Epoxy-clay Nanocomposites: Thermophysical Properties and Fracture Behavior Evaluation", American Institute of Chemical Engineers (AIChE) 2003 Annual Conference, November 16-21, 2003, San Francisco, California, paper number [493d].
373. G. Mehta, L. T. Drzal, A. K. Mohanty, K. Thayer, M. Misra, "Novel Biocomposites Sheet Molding Compounds for Low Cost Housing Panel Applications", American Institute of Chemical Engineers (AIChE) 2003 Annual Conference, November 16-21, 2003, San Francisco, California, paper number [490b].
374. R. Burgueno, M. J. Quagliata, G. Mehta, A. K. Mohanty, M. Misra, L. T. Drzal "Sustainable Cellular Biocomposites from Natural Fibers and Unsaturated Polyester Resin for Housing Panel Applications", American Institute of Chemical Engineers (AIChE) 2003 Annual Conference, November 16-21, 2003, San Francisco, California, paper number [492f].
375. J-P. Latere Dwan'Isa, A. K. Mohanty, M. Misra, L. T. Drzal, M. Kazemizadeh "Biobased Polyurethanes and their Composite Materials: A New Look At Greener Perspectives", American Institute of Chemical Engineers (AIChE) 2003 Annual Conference, November 16-21, 2003, San Francisco, California, paper number [493e].
376. Drzal, L. T.,(invited-Keynote) "Graphite Nanoplatelets: Multifunctional Reinforcements for Polymers: Mechanical, Thermal and Electrical Properties", 11<sup>th</sup> US-Japan Conference on Composite Materials, Yamagata, Japan, September 2004.
377. Drzal, L. T.,(invited) "Graphite Nanoplatelets: Multifunctional Reinforcements for Polymers: Mechanical, Thermal and Electrical Properties", Nissan Technical Center, Yokohama, Japan, September 2004.
378. Drzal, L. T.,(invited) "Graphite Nanoplatelets: Multifunctional Reinforcements for Polymers: Mechanical, Thermal and Electrical Properties", AISIN Technical Center, Nagoya, Japan, September 2004.
379. Drzal, L. T.,(invited) "Graphite Nanoplatelets: Multifunctional Reinforcements for Polymers: Mechanical, Thermal and Electrical Properties", Kuraray Technical Center, Tskuba City, Japan, September 2004.
380. Drzal, L. T.,(invited-Keynote) Future NDI and NDE Challenges in Composite Materials, The 10<sup>th</sup> International Workshop on Electromagnetic Nondestructive Evaluation, East Lansing, Michigan June, 2004.
381. Drzal, L. T., (invited) "Nanographite platelets as reinforcement for polymers", Gordon Research Conference on Composite Materials, Santa Barbara, California. January 05, 2004
382. Drzal, L. T., (invited) "Graphite Nanoplatelets: A Nanoreinforcement Capable of Modifying Mechanical, Thermal and Electrical Properties of Polymer Composites", University of Connecticut Storrs, CT, March, 2004..
383. Drzal, L. T., (invited) "Graphite Nanoplatelets: A Nanoreinforcement Capable of Modifying Mechanical, Thermal and Electrical Properties of Polymer Composites", Johns Manville Technical Center, Denver, Colorado, May, 2004.
384. Drzal, L. T., (invited) "Interphase Formation in Glass Fiber-Sizing-RIM Systems and Its Role in Fiber Wetting and Adhesion", Johns Manville Technical Center, Denver, Colorado, May, 2004.
385. Drzal, L. T., (invited) "Improving Fiber/Matrix Adhesion in JSX Composite Wheel," DaimlerChrysler, Troy Michigan May, 2004.
386. Drzal, L. T., (invited) "Nanoreinforcements: Multifunctional Materials for Modifying Properties of Polymers and Composites", Cytec Advanced Materials, California, August, 2004.
387. Drzal, L. T.,(invited) "Producing Polymer Composites with Mechanical, Thermal and Electrical

- Multifunctionality with Graphite Nanoreinforcements”, Society of the Plastics Industries, Kalamazoo, Michigan October, 2004
388. Drzal, L. T., (invited) “Renewable Biobased Structural Polymer Composites”, Dow Chemical Company, Interface Science Seminar Series, Midland, Michigan, November , 2004.
  389. Drzal, L. T., (invited) “Exfoliated Graphite – A Carbon Nanotube Alternative Reinforcement for Mechanical Thermal and Electrical Property Enhancement of Polymers”, Dow Chemical Company, Interface Science Seminar Series, Midland, Michigan, November , 2004.
  390. Drzal, L. T., (invited) “Biobased Structural Composite Materials: A ‘Green’ Alternative to Petroleum-based Materials”, Korean Institute of Energy Research, November, 2004.
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495. M. J. Rich, B. Rook, L. T. Drzal and L. Wang, Measurement of Interfacial Shear Strength Using Dynamic Mechanical Analysis, Proceedings of the Adhesion Society Conference, 2005 Presented by M. Rich
496. H. Fukushima, L. T. Drzal, B. P. Rook and Michael J. Rich, Thermal Conductivity of Exfoliated Graphite Nanocomposites, Proceedings North American Thermal Analysis Society Conference, September 2005, Universal City, LA.
497. Michael J. Rich and Lawrence T. Drzal, Novel Applications of Dynamic Mechanical Spectroscopy for Evaluation of Composite Interphase Properties, Proceedings North American Thermal Analysis Society Conference, September 2005, Universal City, LA (recipient of 3<sup>rd</sup> place award in Poster Paper competition)
498. Tao Wang, M. Misra, B. E. Dale, L. T. Drzal, “Cellulose nanofibers extracted from microcrystalline cellulose and corn stover”, Oral Presentation (Abstract ID: 336a) at AIChE Annual Meeting 2005, October 30- November 4, Cincinnati, Ohio.
499. D. Miloaga, M. Misra, L. T. Drzal, “Nucleating effect of expanded graphite nanoplatelets on poly(hydroxybutyrate)” Oral Presentation (Abstract ID: 336e) at AIChE Annual Meeting 2005, Oct. 30- Nov. 4, Cincinnati, Ohio.
500. S. R. Nartker, M. Misra, L. T. Drzal, “Aligned Electrospun Nanofibers” Oral Presentation (Abstract ID: 418c) at AIChE Annual Meeting 2005, Oct. 30- Nov. 4, Cincinnati, Ohio.
501. M. Misra, M. S. Huda, L. T. Drzal, and A. K. Mohanty, “Studies on Wood and Other Natural Fiber Reinforced Poly(Lactic Acid) Composites” Oral Presentation (Abstract ID: 448d) at AIChE Annual Meeting 2005, Oct. 30-Nov. 4, Cincinnati, Ohio.
502. D. Miloaga, H. A. Hosein, M. Misra, L. T. Drzal, “Sustainable Bio-Nano-Composites from Poly(hydroxybutyrate) and Expanded Graphite Nanoplatelets”, Poster Presentation at 61st Annual Fall Scientific Meeting American Chemical Society—Midland October 14, 2005
503. S. R. Nartker, M. Misra, L. T. Drzal, “Aligned Electrospun Nanofibers for Nanocomposite Applications”, Poster Presentation at 61st Annual Fall Scientific Meeting American Chemical Society—Midland October 14, 2005
504. H. Miyagawa, A. K. Mohanty, R. Burgueno, L. T. Drzal, M. Misra, “Development and Characterizations of Biobased Unsaturated Polyester and Its Organo-Clay Nanocomposites Processed by Sonication Technique”, Poster Presentation at 1st Annual Fall Scientific Meeting American Chemical Society—Midland, October 14, 2005
505. S. R. Nartker, M. Misra, L. T. Drzal, “Aligned Electrospun Nanofibers for Nanocomposite Applications” Poster Presentation at American Society for Composites 20th Annual Technical Conference September 7-9, 2005 - Philadelphia, PA( Awarded 3<sup>rd</sup> prize)
506. W. Liu, M. Misra, L. T. Drzal, A. K. Mohanty, “Influence of processing methods and fiber length on performance of kenaf fiber reinforced soy protein biocomposites”, Poster Presentation at the joint meeting of 2nd International Conference on Green and Sustainable Chemistry and 9th Annual Green Chemistry and Engineering Conference, June 20-24, 2005, Washington, DC.
507. W. Liu, A. K. Mohanty, L. T. Drzal, M. Misra, “Injection molded biocomposites from natural fiber and thermoplastic: effect of coupling agent on physical properties”, Poster Presentation 8<sup>th</sup> International conference on Wood fiber –plastic composites, Madison, Wisconsin, USA, May 23-25, 2005
508. H. M. Park, A. K. Mohanty, L. T. Drzal, E. Lee, D. F. Mielewski, M. Misra, “Nanostructures and Thermo-mechanical properties of ‘Green’ Nanocomposites from Renewable Cellulosic Plastics”, Oral Presentation at 8<sup>th</sup> International conference on Wood fiber –plastic composites, Madison, Wisconsin, USA, May 23-25, 2005
509. M. S. Huda, L. T. Drzal, A. K. Mohanty, M. Misra , K. Williams, & D. F. Mielewski, “Mechanical, thermal and morphological studies of Poly (lactic acid) /Talc/Recycled Newspaper Fibers Hybrid ‘Green’ Composites”, Oral Presentation at 8<sup>th</sup> International Conference on Wood fiber-Plastic Composites, Wisconsin, May 23-25, 2005.
510. D. Miloaga, M. Misra, L. T. Drzal, “Conductive green nanocomposites from poly(hydroxybutyrate) and expanded graphite processed using environmentally friendly ionic liquids.”, Poster Presentation at Department of Chemical Engineering and Materials Science Michigan State University 2005 Annual Research Forum (Lansing Convention Center, Thursday, April 7, 2005).
511. S. R. Nartker, M. Misra, L. T. Drzal, “Aligned Electrospun Nanofibers for Nanocomposite Applications”, Poster Presentation at Department of Chemical Engineering and Materials Science Michigan State University 2005 Annual Research Forum (Lansing Convention Center, Thursday, April 7, 2005).
512. M. S. Huda, L. T. Drzal, M. Misra, and A. K. Mohanty, “Poly (lactic acid) /Talc/Recycled Newspaper Fibers Hybrid ‘Green’ Composites: Mechanical, thermal and morphological properties evaluation”, Poster Presentation at



Department of Chemical Engineering and Materials Science Michigan State University 2005 Annual Research Forum (Lansing Convention Center, Thursday, April 7, 2005).

513. H. Park, X. Liang, Xuemei; A. K. Mohanty, M. Misra, L. T. Drzal, “Nanostructure of the biodegradable cellulose acetate/clay nanocomposites by atomic force microscopy.” Oral Presentation at 229th ACS National Meeting, San Diego, CA, United States, March 13-17, 2005 , IEC-141
514. D. Miloaga, L. T. Drzal, M. Misra, “Conductive green nanocomposites from poly(hydroxybutyrate) and expanded graphite processed using environmentally friendly ionic liquids.” Oral Presentation at 229th ACS National Meeting, San Diego, CA, United States, March 13-17, 2005 (2005), IEC-139.
515. Drzal, L. T. (*invited*) “Bio-based Polymer Composites: Opportunities and Challenges”, The Council for Chemical Research: 11th New Industrial Chemistry and Engineering (NICHE) Conference: Advanced Polymers-Developing High-Performance Polymeric Materials for the Future, February 5 – 8, 2006 Orlando, FL.
516. Drzal, L. T. (*keynote-invited*) “Multifunctional Polymers and Composites for New Applications”, Dutch Polymer Institute, Annual Technical Meeting, *Polymers for a Sustainable Society*, Ternuezen, The Netherlands, Vovember 13-14, 2006.
517. Drzal, L. T., “Developing a New Nanotechnology – Making Polymers Multifunctional”, Plastic Parts Innovations Conference Hyatt Regency Columbus Hotel, Ohio, April 2-4, 2006.
518. Drzal, L. T. (*invited*) Exfoliated Graphite Nanoplatelets (xGnP) For Low Cost Polymer Property Modification, Dow Chemical, May 25, 2006
519. Drzal, L. T. (*invited*) Exfoliated Graphite Nanoplatelets (xGnP) A Carbon Nanotube Alternative for Modifying the Properties of Polymers and Composites, Du Pont, Wilmington, DE. June 13, 2006
520. Drzal, L. T. (*keynote-invited*)” Carbon: A Material to Transform Technology in the 21<sup>st</sup> Century International Carbon Conference, Jeonju City, South Korea, December 1, 2006.
521. Drzal, L. T. (*invited*) Green, Sustainable, Bio-based Polymer Composites Kumoh Technical University, Gumi, S. Korea, December 3, 2006.
522. Drzal, L. T. (*invited*) Green, Sustainable, Bio-based Polymer Composites, Gyeongsang University, Jinju, South Korea, December 4, 2006.
523. Drzal, L. T. (*invited*) Green, Sustainable, Bio-based Polymer Composites, Gyeongsang University, Jinju, South Korea, December 4, 2006.
524. Drzal, L. T. “Developing a New Nanotechnology – Making Polymers Multifunctional”, Plastic Parts Innovations Conference Hyatt Regency Columbus Hotel, Ohio, April 2-4, 2006.
525. Drzal, P. L., Fukushima, H, Sung, L. P., and Drzal, L. T. “Nanomechanical Characterization and Scratch resistance of Nylon 6 Multifunctional Nanocomposites”, 29<sup>th</sup> Meeting of the Adhesion Society, Jacksonville, FL February 19-22, 2006.
526. Drzal, L. T.; “Graphite Nano-Platelets: Multifunctional Reinforcements for Polymers”, SPE/CompDiv Nanocomposites Workshop, MSU, March 14-15, 2006
527. Drzal, L. T., (*invited*) “Exfoliated Graphite Nanoplatelets (xGnP) For Low Cost Polymer Property Modification”, Henckel, April 10, 2006
528. Drzal, L. T., and Fukushima, H., “Graphite NanoPlatelets, a Multifunctional Additive for Polymer Composites” SAMPE Long Beach, CA May 1-4, 2006
529. Fukushima, H. and Drzal, L. T., “Nylon - Exfoliated Graphite Nanoplatelet (xGnP) Nanocomposites with Enhanced Mechanical, Electrical and Thermal Properties”, Nanotech 2006, Boston, MA, May 8-10, 2006.
530. Kalaitzidou, K., Fukushima, H. and Drzal, L. T., Multifunctional Nanocomposites Made of Polypropylene Reinforced with Exfoliated Graphite Nanoplatelets (xGnP) Nanotech 2006, Boston, MA, May 8-10, 2006.
531. Askeland, P., Fukushima, H., Do, I. Kalaitzidou, K., and Drzal, L. T., “Exfoliated Graphite (xGnP) Nanoplatelets Surface Treatment”, Nanotech 2006, Boston, MA, May 8-10, 2006.
532. Drzal, L. T. and Fukushima, H., Exfliated Graphite NanoPlatelets, A Carbon Nanotube Alternative, Nanotech 2006, Boston, MA, May 8-10, 2006.
533. Drzal, L. T., Drzal, L. T., Mohanty, A. K., Dale, B., Pourboghrat, F., Misra, M. and Huda, M. S.; “Effect of Fiber Surface Treatment on Design and Engineering of Laminated Biocomposites from Poly(lactic acid) (PLA) and Biofibers” NSF-DMII Conference, St. Louis, MO, July 25-27, 2006
534. Drzal, L. T., “Multifunctional Composite Materials”, Airbus, Farnborough, UK, September 27, 2006
535. Drzal, L. T. “Multifunctional Composite Materials”, Qinetiq, Manchester, UK, September 29, 2006
536. Drzal, L. T., “Graphite NanoPlatelets, a Multifunctional Additive for Polymer Composites”, SAMPE Dallas, November 6-8, 2006
537. Drzal, L. T. and Fukushima, H., (*invited*) “Graphite Nanoplatelets: A Multifunctional Additive for Polymers and Composites” SAMPE Michigan Chapter, Warren, MI., March 29, 2006.
538. Kalaitzidou, K., Fukushima, H. and Drzal, L. T.; “Exfoliated Graphite Nanoplatelets (xGnP) as a Multifunctional Additive for Polypropylene and TPO Nanocomposites”, 21st Annual Technical Conference of the American Society for Composites (ASC) September 18-20, 2006 Dearborn, MI.

539. Fukushima, H. and Drzal, L. T.; “Enhancement of the Mechanical, Electrical and Thermal Properties of Nylon Nanocomposites via Addition of Exfoliated Graphite Nanoplatelets (xGnP)”, 21st Annual Technical Conference of the American Society for Composites (ASC) September 18-20, 2006 Dearborn, MI.
540. Misra, M.; Drzal, L. T., “Current Status of High Volume Production of Environmentally Friendly Multifunctional Biocomposites: a Review (Paper No. 175)”, 21st Annual Technical Conference of the American Society for Composites (ASC) September 18-20, 2006 Dearborn, MI.
541. Huda, M. S., Drzal, L. T., Misra, M. and Mohanty, A. K. “*Wood Fiber Reinforced Poly(lactic acid) Composites*”, 5<sup>th</sup> Annual SPE Automotive Composites Conference, MSU Management Center, Troy, MI. Sept. 12-14, 2005.
542. Misra, M.; Drzal, L. T., “Recent Advances in Green Nanocomposites: an Overview”, Oral Presentation (Abstract ID: 691d), Session 17000 Green Materials: Forest and Biobased Products III at AIChE 2006 Annual Meeting, November 12-17, 2006, San Francisco, CA.
543. Misra, M.; Drzal, L. T., “Current Status of High Volume Production of Environmentally Friendly Multifunctional Biocomposites: a Review (Paper No. 175)”, 21st Annual Technical Conference of the American Society for Composites (ASC) September 18-20, 2006 Dearborn, MI. Session 5: Natural Fiber Composites 1.
544. Misra, M.; Drzal, L. T., “Current Status of High Volume Production of Environmentally Friendly Multifunctional Biocomposites: An Overview (oral only)”, 6th Annual SPE Automotive Composites Conference, Troy, MI. Sept. 12-14, 2006.
545. Huda, M. S.; Drzal, L. T.; Mohanty, A. K.; Misra, M., “The Effect of Chemical Treatments of Fibers on the Mechanical and Thermo-Mechanical Properties of the Pineapple Leaf Fibers (PALF) - Reinforced Poly(lactic acid) (PLA) Laminated Composites”, 21<sup>st</sup> Annual Technical Conference of the American Society for Composites (ASC) September 18-20, 2006 Dearborn, MI. Session 5: Natural Fiber Composites 2.
546. Wang, T.; Drzal, L. T.; Dale, B. E.; Misra, M., “Cellulose nanowhiskers extracted from biomass and their polymer nanocomposites.” Abstracts of Papers, 232nd ACS National Meeting, San Francisco, CA, United States, Sept. 10-14, (2006)
547. Miloaga, D.; Hosein, H.; Kjoller, K. K.; Misra, M.; Drzal, L. T., “Properties and nanoscale structure of bionanocomposites from polylactic acid and expanded graphite nanoplatelets.” Abstracts of Papers, 232nd ACS National Meeting, San Francisco, CA, Sept. 10-14, (2006).
548. Miloaga, D.; Hosein, H.; Misra, M.; Drzal, L. T., “Electrically Conductive Bio-Nanocomposites from Poly(lactic acid) and Expanded Graphite Nanoplatelets from Biomedical Applications”, Abstracts of Papers # P8, Poster Session, BioEnvironmental Polymer Society (BEPS) 13th Annual Meeting and International Degradable Plastics Symposium: Status of Biobased And Synthetic Polymer Technology June 13-17, 2006 in Chicago, IL.
549. Huda, M. S.; Drzal, L. T.; Mohanty, A. K.; Misra, M., “The Effect of Chemical Treatments of Corncobs on the Properties of Corncob Reinforced PLA Composites”, Abstracts of Papers # 19, Session II PLA-based Materials, BioEnvironmental Polymer Society (BEPS) 13th Annual Meeting and International Degradable Plastics Symposium: Status of Biobased And Synthetic Polymer Technology June 13-17, 2006 in Chicago, IL.
550. Nartker, S. R.; Misra, M.; Drzal, L. T., “Aligned Electrospun Nanocomposite Fibers”, 2006 Nanotechnology Conference and Trade Show May 7-11, Boston, MA, Technical Proceedings of the 2006 Nanotechnology Conference and Trade Show, Volume 1, 278 – 281.
551. Joshi, S. V.; Drzal, L. T.; Mohanty, A. K.; Misra, M., “Assessing life cycle environmental performance of bioplastic-montmorillonite clay”, Abstracts of Papers, 231st ACS National Meeting, Atlanta, GA, United States, March 26-30, 2006 (2006), IEC-019
552. Misra, M.; Huda, M. S.; Drzal, L. T.; Mohanty, A. K., “The effect of fiber surface treatment on laminated biocomposites from poly(lactic acid) (PLA) and natural fibers”, Oral Presentation at the 12th Annual Global Plastic Environmental Conference( SPE-GPEC-2006), February 28-March 2, 2006, Atlanta, GA
553. Miloaga, D. Hosein, H. A., Misra, M. And Drzal, L. T., “Crystallization Effects of Graphite NanoPlatelets on Poly Lactic Acid”. MS & T Annual Technical Meeting, Detroit, Michigan, September 16, 2007.
554. Drzal, L. T. Hiroyuki Fukushima, Kyriaki Kalaitzidou (*keynote-invited*) “Polymer Nanocomposites from Exfoliated Graphite Nanoplatelets: Mechanical, Thermal and Electrical Properties” *NATAS East Lansing, August 25-26, 2007.*
555. Drzal, L. T. (invited) “Sustainable, Multifunctional Biobased Composite Materials”, Milliken Automotive Research Center, Greenville, SC March 26-27, 2007.
556. Drzal, L. T. (invited) Exfoliated Graphite Nanoplatelets: A New (Old) Nanomaterial with the Potential to Impart Multifunctional Properties to Polymers and Composites, Florida State University, Tallahassee, FL November 8-9, 2007.
557. Drzal, L. T. (invited) Exfoliated Graphite Nanoplatelets (xGnP) For Low Cost Polymer Property Modification Johns Manville Denver CO, May 15-16, 2007.
558. Drzal, L. T. (invited) *Engineering the Fiber-Matrix Interphase for Naval Structural Composite Systems*, September 10-12, 2007. ONR Solid Mechanics Review, Baltimore, MD.

559. Drzal, L. T., H. Fukushima and I. DO, "xGnP-Exfoliated Graphite Nanoplatelets: A Nanomaterial for Modifying Polymers and Composites" Nanotech 2007 November 14-14, 2007 Boston, MA
560. Drzal, L. T., Hiroyuki Fukushima, Kyriaki Kalaitzidou, Inhwan Do, "Multifunctional Nanocomposite Materials: Modifying Mechanical, Thermal, Electrical and Barrier Properties of Polymers and Composites." SAMPE Cincinnati, October 30-13, 2007.
561. Drzal, L. T., "Multifunctional Nanocomposite Materials: Modifying Mechanical, Thermal, Electrical and Barrier Properties of Polymers and Composites." ASM-MS&T Conference, Detroit, MI, September 16-20, 2007.
562. Huda, M. S., Drzal, L. T., and Misra, M. "Effect of fiber surface treatment on the properties of renewable resource based bio-composites", 2007 CHEMS Annual Research Forum, Lansing, MI. April 6, 2007.
563. Liu W., Do, I., Fukushima H., and Drzal L. T. (2007) "Exfoliated graphite nanoplatelets –vinyl ester nanocomposite", 7<sup>th</sup> Annual SPE Automotive Composites Conference and Exhibition, Sept. 11-13, 2007, Troy, MI,
564. Liu W., Fukushima H., Do, I., and Drzal L. T. (2007) "Coating of Glass fiber with exfoliated graphite nanoplatelets to improve conductivity" 4<sup>th</sup> Annual Chemical Engineering & materials Science Research Forum, April 5-6, 2007, Lansing, MI
565. Fukushima H., Do I., Liu W., Park H., Lu J., Biswas S., and Drzal L. T. (2007) "Carbon Nanotube alternative: graphite nanoplatelets for composite, fuel cell, biosensor and electronic applications" 4<sup>th</sup> Annual Chemical Engineering & materials Science Research Forum, April 5-6, 2007, Lansing, MI
566. Hwanman Park, Hiroyuki Fukushima, Lawrence T. Drzal, "Exfoliated Graphite Nanoplatelet (xGnP) /Polypropylene Nanocomposites", the 7<sup>th</sup>-Annual SPE "Automotive Composites Conference and Exposition", September 11-13, 2007, Detroit MI. The Automotive and Composites Divisions of the Society of Plastics Engineers (SPE) International.
567. Hwanman Park, Hiroyuki Fukushima, Lawrence T. Drzal, "Exfoliated Graphite Nanoplatelet (xGnP) /Polypropylene Nanocomposites", CHE/MS RESEARCH FORUM 07 : the Lansing Center on April 5<sup>th</sup> and 6<sup>th</sup> 2007.
568. Miloaga, D.G., Hosein, H-A., Kjoller, K., Drzal, L. T., "Kinetic and morphologic aspects of the nucleating effect of expanded graphite nanoplatelets on two bio-based polymers - poly(3-hydroxybutyrate) and poly(L-lactide)", 233<sup>rd</sup> ACS National Meeting and Exposition, Chicago, IL, United States, March 25-28, 2007, I&EC-9. \*Oral presentation
569. Hosein, H-A, Miloagă, D.G., Rich, M.J., Drzal, L.T., Kjoller, K., "Scanning Probe Thermal Analysis Characterization of Polylactic Acid and its Nanocomposites with Exfoliated Graphite Nanoplatelets (xGnP<sup>TM</sup>)", 35<sup>th</sup> Annual Conference of the North American Thermal Analysis Society, August 26-29 August 2007, East Lansing, MI. \*Oral presentation
570. Miloaga, D.G., Hosein, H-A, Misra, M, Kjoller, K., Drzal, L.T., "Nano-thermal analysis and atomic force microscopy characterization of expanded graphite nanoplatelets (xGnP<sup>TM</sup>) polymer nanocomposites", Materials Science & Technology 2007 Conference and Exposition, September 16-20, Detroit, MI. \*Oral presentation
571. Miloaga, D.G., Hosein, H-A, Misra, M., Drzal, L.T., "Conductive Green Nanocomposites from Polylactic Acid", Materials Science & Technology 2007 Conference and Exhibit, September 16-20, Detroit, MI. \*Poster presentation – poster was awarded First Prize in Graduate Student Poster Competition
572. Misra, M., Nartker, S.R., Daugherty, S., Askeland, P.A., Hosein, H-A, Drzal, L.T., Satoh, P., "Characterization Of Electrospun Nano-Fibers For Biosensor Applications", AIChE National Meeting, Salt Lake City, UT, November 3-November 9, 2007. \*Oral presentation
573. Misra, M., Nartker, S., Drzal, L.T., Askeland, P.A., Hosein, H-A, "Electrospun NanoFiber Architectures: A New Class of Nonwovens for the Transportation Sector", 7<sup>th</sup> Annual Automotives Composites Conference and Exhibition, Troy, MI, September 11-13, 2007. \*Oral presentation
574. Hosein, Hazel-Ann A., Miloagă, Dana G., Kjoller, Kevin, Drzal, Lawrence T. and Rich, Michael J. "Thermal Analysis of Polymers and Polymer Bionanocomposites" 233<sup>rd</sup>. ACS National Meeting and Exposition, Chicago, IL, United States, March 25-29, 2007, I&EC-127. Poster presentation
575. Miloaga, Dana G.; Drzal, Lawrence T.; Hosein, Hazel Ann; Kjoller, Kevin; Misra, Manjusri. "Kinetic and morphologic aspects of the nucleating effect of expanded graphite nanoplatelets on two bio-based polymers - poly(3-hydroxybutyrate) and poly(L-lactide)." Abstracts of Papers, 233<sup>rd</sup>. ACS National Meeting, Chicago, IL, United States, March 25-29, 2007, IEC-009. \*Oral presentation.
576. Fukushima, H., Drzal, L. T., Kyriaki Kalaitzidou, "Electrical and Barrier Properties of Exfoliated Graphite Nanoplatelet (xGnP) Reinforced Nanocomposites", SAMPE Cincinnati, October 30-13, 2007.
577. Do, I., Drzal, L. T., Hiroyuki Fukushima, Kyriaki Kalaitzidou, "Effect of dispersants & size of exfoliated graphite nanoplatelets (xGnP<sup>TM</sup>) on their composite properties" SAMPE Cincinnati, October 30-13, 2007.
578. Drzal, Lawrence T., Fukushima, Hiroyuki, Kalaitzidou, Kyriaki, and Do, Inhwan, Graphite Nanoplatelets: A New Nanoreinforcement For Modifying Mechanical, Thermal And Electrical Properties Of Polymer Composites, Proceedings of the 16<sup>th</sup> International Conference on Composite Materials, (2007).

579. Fukushima, Hiroyuki, Kalaitzidou, Kyriaki, and Drzal, Lawrence T., *Electrical and Barrier Properties of Exfoliated Graphite Nanoplatelet (XGNP) reinforced Nanocomposites*, Proceedings of the 16<sup>th</sup> International Conference on Composite Materials, v2, 1200 (2007).
580. Do, In-Hwan, Kamae, Toshiya, Fukushima, Hiroyuki, and Drzal, Lawrence T., *Effect Of Dispersants And Size Of Graphite Nanoplatelets On Their Composite Properties* Proceedings of the 16<sup>th</sup> International Conference on Composite Materials, v2, 1200 (2007).
581. Misra, M. and L. T. Drzal, "Biocomposite Sheet Molding Compound Processing for Production of Auto Parts to Housing Structures, Presentation at AIChE Annual Meeting 2007, November 4-9, 2007 Salt Lake City, UT.
582. Misra, M., S Nartker, T. Wang and L. T. Drzal, "Novel Nanomaterials from Cellulose and It's Derivatives," BioEnvironmental Polymer Society (BEPS) 14th Annual Meeting and International Symposium On Polymers And The Environment: Emerging Technology And Science Technology October 17-19, 2007 in Vancouver, WA.
583. Huda, M. S., L. T. Drzal, M. Misra, "Natural Fiber Reinforced Biodegradable Polymer Composites for Automotive Applications." Presentation at the Annual SPE Automotive Composite Conference (ACCE), Troy, Michigan, September 11-13, 2007 Dearborn, MI.
584. Misra, M. and L. T. Drzal, "Multifunctional nanocomposites from bioplastics" Abstracts of Papers, 233 ACS National Meeting, Chicago, IL, United States, March 25-29, 2007.
585. Huda, M. S., L. T. Drzal, S. Sahoo, H. Hamada, M. Misra, "Novel biocomposites from polylactide (PLA) and bamboo fibers." Abstracts of Papers, 233 ACS National Meeting, Chicago, IL, United States, March 25-29, 2007.
586. Nartker, S., L. T. Drzal, M. Misra. "The effect of solution and processing variables on the morphology of multifunctional electrospun nanofibers, Abstracts of Papers, 233 ACS National Meeting, Chicago, IL, United States, March 25-29, 2007.
587. Brink, A. E., Brink, M. H., Rich, M. J., and Drzal, L. T., "High Temperature Sizing for Carbon Fiber Reinforced Fluorinated Addition Polyimides" 28th Annual High Temperature Polymeric Laminate Workshop (Hitemple) 13-15 Feb 2007, Sedona, AZ. ITAR restricted publication.
588. Brink, A. E., Brink, M. H., Rich, M. J., and Drzal, L. T., "High Temperature Sizing for Carbon Fiber Reinforced Polyimide Composites" SAMPE Fall Technical Conference, 29 October-1 November, 2007, Cincinnati OH. Unpublished presentation due to ITAR restrictions.
589. Hazel-Ann A. Hosein, Dana G. Miloaga, Michael J. Rich, Lawrence T. Drzal and Kevin Kjoller, "Scanning Probe Thermal Analysis Characterization of Polylactic Acid and its Nanocomposites with Exfoliated Graphite Nanoplatelets (xGnP™)", Proceedings of the North American Thermal Analysis Society 35th Annual Conference, Aug. 2007, Michigan State University, East Lansing MI.
590. Park, J. K., Won □ Y. G., Jurek, R. and Drzal, L. T., "*Dimensional Effect Of Exfoliated Graphite Nanoplatelets On Mechanical Properties Of Carbon Fiber Reinforced Phenolic Nanocomposites*" Japan SAMPE, (2007).
591. Nartker, S., Askeland, P., Hosein, H-A., Alocilja, E. and Drzal, L.T., "Electrospun Cellulose Nitrate Nanofiber Membranes for Biosensor Applications", Michigan Microscopy and Microanalysis Society Meeting, Ann Arbor, MI, December 5, 2008. \*Oral Presentation
592. Wiederoder, S., Wiederoder, M., Nartker, S., Askeland, P., Hosein, H-A., Alocilja, E. and Drzal, L.T., "Fabrication and Evaluation of Electrospun Fibers Coated with Conducting Polymer for Chemical Sensing Applications" Michigan Microscopy and Microanalysis Society Meeting, Ann Arbor, MI, December 5, 2008. \*Poster Presentation
593. \_Wiederoder\_, M., Nartker, S., Askeland, P., Hosein, H-A., Alocilja, E. and Drzal, L.T., "Optimization of an Electrospun Nitrocellulose Capture Pad for Biosensing Applications" Michigan Microscopy and Microanalysis Society Meeting, Ann Arbor, MI, December 5, 2008. \*Poster Presentation
594. Misra, M., Nartker, S.R., Daugherty, S., Askeland, P.A., Hosein, H-A, Drzal, L.T., Satoh, P., "Characterization Of Electrospun Nano-Fibers For Biosensor Applications", AIChE National Meeting, Salt Lake City, UT, November 3-November 9, 2007. \*Oral presentation
595. Misra, M., Nartker, S., Drzal, L.T., Askeland, P.A., Hosein, H-A, "Electrospun NanoFiber Architectures: A New Class of Nonwovens for the Transportation Sector", 7<sup>th</sup> Annual Automotives Composites Conference and Exhibition, Troy, MI, September 11-13, 2007. \*Oral presentation
596. Steven R. Nartker, Lawrence T. Drzal, Manjusri Misra, Per Askeland, "The Effect of Solution and Processing Variables on the Morphology of Multifunctional Electrospun Nanofibers" American Chemical Society, Chicago, IL, March 2007 \*Poster Presentation
597. Steven R. Nartker, Lawrence T. Drzal, Manjusri Misra, Sean Dougherty, Paul Satoh "Electrospun Cellulose Nitrate Nanofibers for Biosensor Applications" Nano Science and Technology Institute (NSTI) Nanotech, Santa Clara, CA, May 2007 \*Poster Presentation
598. Steven R. Nartker, Manjusri Misra, Lawrence T. Drzal "Electrospinning Conductive Nanofibers for Sensor Applications" Society of Plastics Engineers, Troy, MI, September 2007 \*Oral presentation
599. Steven R. Nartker, Manjusri Misra, Lawrence T. Drzal "Electrospinning Conductive Nanofibers for Sensor Applications" Materials Science and Technology, Detroit, MI, September 2007 \*Oral presentation

600. "Carbon Fiber / Graphite Nano Platelet Hybrid Composites", Hiroyuki Fukushima and Lawrence T. Drzal, International Conference on Composite Materials, Edinburgh, UK (2009).
601. "High Surface Area Graphite Nanoparticles from Natural Graphite Flakes and Exfoliated Graphite Nanoplatelets" I.H. Do, W.J. Liu, L.T. Drzal, ICCM-17, 17<sup>th</sup> International Conference on Composite Materials, Edinburgh, UK, July 27-31, 2009.
602. "Influence of Processing on Morphology and Properties of Exfoliated Graphite Nanoplatelet-Polyamide Nanocomposites", W.J. Liu, I.H. Do, H. Fukushima, L.T. Drzal, SAMPE 2009, Baltimore, MD, May 18-21, 2009.
603. "Nanometal-decorated exfoliated graphite nanoplatelet based glucose biosensors with high sensitivity and fast response", J. Lu, *I.H. Do*, L.T. Drzal, RM Worden, I, Lee, ACS Nano, 2(9), p1825-1832, 2008.
604. "Electrodeposition of exfoliated graphite nanoplatelets onto carbon fibers and properties of their epoxy composites", J.K. Park, *I.H. Do*, Per Askeland, and L.T. Drzal, Composites Science and Technology, 68 (7-8), p1734-1741, 2008
605. "The effect of exfoliated graphite nanoplatelet size on the mechanical and electrical properties of vinyl ester nanocomposites", W. Liu, *I.H. Do*, H. Fukushima, L.T. Drzal, SAMPE Sep 8–11, 2008 at Memphis, Session: Nanostructured Multifunctional Materials
606. "Effect of Dispersants and Size of Graphite Nanoplatelets on Their Composite Properties", *I.H. Do*, H. Fukushima, and L.T. Drzal, 16<sup>th</sup> International conference on composite materials (ICCM-16), 2007, Tokyo, Japan.
607. "Exfoliated Graphite Nanoplatelets [2]: Surface Treatment", P.A. Askeland, H. Fukushima, *I.H. Do*, K. Kalaitzidiou, and L.T. Drzal, NSTI Nanotech 2006, NSTI Nanotechnology Conference and Trade Show, Boston, MA, United States, 2006.
608. "Effect of Surfactants, Polyelectrolytes, and Processing under Electric Field on the Properties of Exfoliated Graphite Nanoplatelet/Epoxy Composite", *I.H. Do* and L.T. Drzal, International Symposium of Carbon 2005, July 3-7 2005, KyungJu, Korea.
609. "Alignment of Conducting Carbon Particles in Epoxy by an Alternating Electric Field", I.H. Do and L.T. Drzal, 14<sup>th</sup> International conference on composite materials (ICCM-14), 2003, San Diego, CA
610. "Novel Carbon Fiber Surface Treatment With Ultraviolet Light In Ozone To Promote Composite Mechanical Properties", M. J. Rich, L. T. Drzal, B. P. Rook, and E. K. Drown, Proc. International Conference on Composite Materials No 17, Edinburgh, Scotland, July, 2009
611. "Nanostructuring of Graphene Nanoplatelets to Produce Multifunctional Polymers and Composites", Lawrence T. Drzal, Gordon Research Conference on Composites, venture, CA January, 2010.
612. PLENARY Lecture, "Engineering the Carbon Fiber-Vinyl Ester Interface for Adhesion and Manufacturability" Lawrence T. Drzal, Interfaces and Interphases in Multifunctional Materials, ICCM-2010, Sheffield UK, September 1-3, 2010.
613. "Graphene Nanoplatelet Additives for Multifunctional Composite Materials", Advanced Composites Conference and Exhibition, Lawrence T. Drzal, Troy, MI September 16, 2010.
614. "Effect of Molding and Annealing on Dispersion and Orientation of Graphene-Polyetherimide Composites by Molding and Annealing", Hunag Wu and Lawrence T. Drzal, American Society for Composites, Dayton, OH September 19, 2010.
615. "Optimizing Carbon Fiber Adhesion to Vinyl Ester Matrices through an Engineered Sizing", Frederick Vautard and Lawrence T. Drzal, American Society for Composites, Dayton, OH September 19, 2010.
616. "Thermal Conductivity of Exfoliated Graphite Nanoplatelets", Jinglei Xiang and Lawrence T. Drzal, American Society for Composites, Dayton, OH September 19, 2010.
617. "Fiber-Matrix Interphase Modification via Incorporation of Nanoparticles: Carbon Nanotubes and Graphene Nanoplatelets", Lawrence T. Drzal, PPG Industries, Shelby North Carolina, November 29, 2010.
618. "Exfoliated Graphite Nanoplatelets: A Multifunction Material for Polymers, Composites and Energy Applications", Lawrence T. Drzal, Nth Degree, February 23, 2010.
619. "Exfoliated Graphite Nanoplatelets (xGnP): A Graphene Based Alternative for Improved Structural, Energy, Power, Barrier, and Thermal Applications", Lawrence T. Drzal, Carbon Nanotubes for Space Applications, Aerospace Corporation, El Segundo, CA, March 16, 2010.
620. "Nanostructuring of Graphene Nanoplatelets to Produce Multifunctional Polymers and Composites", Lawrence T. Drzal, Boeing Corporation, Long Beach, CA, March 18, 2010.
621. "Exfoliated Graphite Nanoplatelets: A Multifunctional Material for Polymers, Composites and Energy Applications", Lawrence T. Drzal, Cabot Corporation, Billerica, MA, April 8, 2010.
622. "Composite Materials : Opportunities and Challenges", Lawrence T. Drzal, Zeeland, MI, May 27, 2010.
623. PLENARY Lecture, "Processing and Multifunctional Performance Enhancements in Polymers through the use of Graphene Nanoplatelets", Lawrence T. Drzal, Polymer Processing Society, Istanbul, Turkey, October 20, 2010.
624. "Advanced Energy Storage Materials: Multifunctional Nano-Material for Nanocomposites, Energy and Thermal Management Applications" Lawrence T. Drzal, Korea- Industrial Chemistry Conference, Daejeon, South Korea, October 29, 2010.

625. "Graphene Nanoplatelets: A Multifunctional Material for Nanocomposites, Energy and Thermal Management Applications", Lawrence T. Drzal, Hanwha LLC, Daejon, South Korea, October 29, 2010.
626. "Graphene Nanoplatelets: A Multifunctional Material for Nanocomposites, Energy and Thermal Management Applications", University of Western Ontario, November 11, 2010.
627. "Bio based Structural Composite Materials: A 'Green' Alternative To Petroleum-Based Materials", Indo-US Research in Renewable Energy Symposium on Biofuels and Wind Energy, Lawrence T. Drzal, New Delhi, India, December 7, 2010.
628. "Advanced Energy Storage Materials: Multifunctional Nano-Material for Nanocomposites, Energy and Thermal Management Applications" Indo-US Research in Renewable Energy Symposium on Biofuels and Wind Energy, Lawrence T. Drzal, New Delhi, India, December 7, 2010.
629. "Exfoliated Graphite (Graphene) Nanoplatelets: A New (Old) Nano-Material for Adding Multifunctionality to Polymers and Composites Drexel", (*Invited*) ChE Department Seminar, March 1, 2012
630. "Graphene Nanoplatelets (GnP) for Multifunctional polymers and Composites & Energy Generation and Storage Applications" (*Invited*) DARPA-MITRE meeting Wash DC March 6-7, 2012
631. "Graphene Nanoplatelets: A Multifunctional Nanomaterial for Polymers, Composites and Energy Generation and Storage Applications", (*Invited*) Nanotech 2012 Santa Clara, CA June 19-21, 2012
632. "Multifunctional Exfoliated Graphene Nanoplatelet/ HDPE and /PPS Nanocomposite PEM Fuel Cell Bipolar Plates" Nanotech 2012 Santa Clara, CA June 19-21, 2012
633. "Graphene Nanoplatelets: A Multi-functional Nanomaterial Additive for Polymers and Composites", (*Invited*) ACCE 12 Troy, MI September 11-13, 2012
634. "Graphite (Graphene) Nanoplatelets:A Multifunctional Nanomaterial for Polymers, Composites and Energy Devices", (*Invited-Plenary*) KIST Jeonju City, Korea November 7, 2012
635. "Graphite (Graphene) Nanoplatelets:A Multifunctional Nanomaterial for Polymers, Composites and Energy Devices", (*Invited*) Seoul National University, Seoul, Korea November 5, 2012
636. "Multifunctional Materials: Polymers, Composites and Energy Applications Enhanced Through Incorporation of Graphene Nanoplatelets", (*Invited-Plenary*) China Materials Research Society, Ningbo Conference November 11, 2012
637. University of Reims, Champagne, France December 11-14, 2012
638. "Exfoliated Graphite (Graphene) Nanoplatelets: A Nano-Material for Adding Multifunctionality to Polymers and Composites" (*Invited*) MSU-PKG 10-16-2012
639. Graphene Nanoplatelets: A Multifunctional Nanomaterial" (*Invited*)TARDEC Oakland University 01-19-2012
640. Graphite (Graphene) Nanoplatelets: A Nano-Material for Adding Multifunctionality to Polymers and Composites.01-25-2013. Henkel R&D, Madison Heights, MI. Presenter: Drzal, Lawrence. (*Invited presentation*)
641. Graphene Nanoplatelets: A Practical Multifunctional Nanomaterial for Polymers, Composites and Energy Devices.04-08-2013. American Society for Materials, Detroit Chapter. Presenter: Drzal, Lawrence. (*Invited presentation*)
642. The Integration of Graphene Nanoplatelets into Components of Lithium Ion Batteries to Improve Performance.04-16-2013. 2013 Battery Congress, Troy, MI. (*Invited presentation*)Coauthors: Anchita Monga - (Presenter).
643. The Future of Materials Science and Engineering: An Industry Perspective-Panelist. 05-15-2013. Georgia Tech, Atlanta, GA. (*Invited presentation*)
644. M. J. Rich, E. K. Drown, P. Askeland, and L. T. Drzal, "Surface Treatment Of Carbon Fibers By Ultraviolet Light+Ozone: Its Effect On Fiber Surface Area And Topography" The 19th International Conference On Composite Materials, Aug 2013, Montreal, Canada. Presented by M. Rich
645. Graphene Nanoplatelets: A Multifunctional Nanoparticle,. 08-05-2013. Particles 2013 - Particles in Composites and Advanced Materials, Dayton, OH. Presenter: Drzal, Lawrence. (*Invited presentation*)
646. Designing The Fiber-Matrix Interphase For Optimum Performance In Composite Materials. 09-02-2013. Risoe Symposium, Roskilde, Denmark. Presenter: Drzal, Lawrence. (*Invited presentation*)
647. Graphene Nanoplatelets: A Multi-functional Nanomaterial Additive for Polymers and Composites. 09-12-2013. Advanced Composites Conference and Exposition, Troy, MI. Presenter: Drzal, Lawrence. (*Invited presentation*)
648. Carbon Fiber Surface Treatments, Sizings and Interphase Optimization for Composite Material Applications.09-17-2013. Oak Ridge National Laboratory, Carbon Fiber Consortium, Oak Ridge, TN. Presenter: Drzal, Lawrence. (*Invited presentation*)
649. Graphene Nanoplatelets: A Nanomaterial Additive For Multifunctional Composites. 11-11-2013. Composites at Lake Louise, Banff, Canada. Presenter: Drzal, Lawrence. (*Invited presentation*)
650. Graphene Nanoplatelets: A Multifunctional Nanomaterial for Polymers, Composites and Energy Devices. 12-16-2013. TACOM, TARDEC, Warren, MI. Presenter: Drzal, Lawrence. (*Invited presentation*)
651. Graphene Nanoplatelets: A Multifunctional Nanomaterial Additive for Polymers and Composites, Ford Research and Development, Dearborn, MI, February 12, 2014 Presenter: Drzal, Lawrence. (*Invited presentation*)

652. Graphene Nanoplatelets: A Multifunctional Nanomaterial Additive for Polymers and Composites, NIST, April 3, 2014 Presenter: Drzal, Lawrence. (Invited presentation)
653. Graphene Nanoplatelets: A Multifunctional Nanomaterial for Polymers, Composites and Energy Devices, Oakland University, April 11, 2014 Presenter: Drzal, Lawrence. (Invited presentation)
654. Graphene Nanoplatelets: A Nanomaterial Additive for Multifunctional Polymers and Composites, CHEMS Research Forum, MSU, May 14, 2014 Presenter: Drzal, Lawrence.
655. xGnP-Graphene Nanoplatelets: Lightweighting and Multifunctionality for Polymers and Composites, XG Sciences, September 3, 2014 Presenter: Drzal, Lawrence. (Invited presentation)
656. Graphene Nanoplatelets: A Multifunctional Nanomaterial for Polymers and Composites, SPE Automotive Composites Conference and Exposition, ACCE, Novi, MI, September 10, 2014 Presenter: Drzal, Lawrence. (Invited presentation)
657. Graphene Nanoplatelets: A Multifunctional Nanomaterial Additive for Polymers and Composites (Keynote) SPE Polymer Nanocomposites Lehigh University, Bethlehem, PA, October 14, 2014 Presenter: Drzal, Lawrence. (Keynote presentation)
658. “Graphene Nanoplatelets: A Practical Multifunctional Nanomaterial for Polymers, Composites and Energy Devices”, University of Windsor, NanoOntario, November 6, 2014 Presenter: Drzal, Lawrence. (Invited presentation)
659. “The Next Frontier in Materials: Multifunctionality Through Nanoparticle Modification” October 24, 2014. ThermaTru Corporation, Corporate R&D Center, Edgerton, OH. Presenter: Drzal, Lawrence. (Invited presentation)
660. Bio-Based Composite Materials. 11-13-2014. Henkel Scientific Advisory Board, R&D Center, Bridgewater, New Jersey. Presenter: Drzal, Lawrence. (Invited presentation)
661. BASF, Southfield, MI November 17, 2015. (Invited presentation)
662. 50th Anniversary CAR Management Briefing Seminar, Grand Traverse Bay Resort, Traverse City, MI, August 3-6, 2015, . (Invited presentation)
663. SPE-ANTEC 2015, Orange County Convention Center, Orlando, FL March 23-25, 2015. (Invited presentation)
664. Reliance Chemical and XG Sciences, Lansing, MI, May 28, 2015. (Invited presentation)
665. Surface Treatment Of Carbon Fibers By Ultraviolet Light+Ozone . 04-16-2015. American Carbon Society, Oak Ridge, TN. Presenter: Drzal, Lawrence. (Invited presentation)
666. Optimization of Fiber-Matrix Adhesion and Composite Mechanical Properties Through Formation of an Engineered Interphase. 08-24-2015. Dow Chemical Research, Midland, MI. Presenter: Drzal, Lawrence.
667. Optimization of Fiber-Matrix Adhesion and Composite Mechanical Properties Through Formation of an Engineered Interphase, Polymer Adhesives & Adhesion by Design: Fundamentals to Applications American Chemical Society, Colloid Division, Philadelphia, PA 08-21-2016 (Invited presentation) Presenter: Drzal, Lawrence.
668. Graphene Nanoplatelets: The Making of a Multifunctional Nanomaterial for Polymers and Composites, 14 International Symposium on Bioplastics, Biocomposites and Biorefining, University of Guelph, Ontario, 05-31-2016 (Invited presentation) Presenter: Drzal, Lawrence.
669. Graphene Nanoplatelet Polymer Composites: Challenges and Opportunities SPE-ANTEC® 2016 Conference, May 23 – 25, Indianapolis, IN (Keynote Invited presentation) Presenter: Drzal, Lawrence.
670. Materials Challenges for Lightweighting Vehicles: Transforming Composites Manufacturing through IACMI, workshop on “Bringing Transformative Changes to the Defense, Aerospace and Civil Environments through Design of Advanced Materials” on 15th and 16th of November, 2016. (Keynote Invited presentation)Presenter: Drzal, Lawrence.
671. Graphene Nanoplatelet Polymer Composites: Challenges and Opportunities for Multifunctional Materials, workshop on “Bringing Transformative Changes to the Defense, Aerospace and Civil Environments through Design of Advanced Materials” on 15th and 16th of November, 2016. (Invited presentation)Presenter: Drzal, Lawrence.
672. Multimaterial Joining Opportunities Through IACMI, Adhesives and Sealants Council Annual Meeting, Marriott Marquis, Atlanta, GA, April 4, 2017. (Invited presentation) Presenter: Drzal, Lawrence
673. Multimaterial Joining Roadmapping Workshop, SAMPE National Meeting, Seattle, WA, May 22, 2017, Presenter: Drzal, Lawrence
674. Graphene Nanoplatelets: A Multifunctional Additive for Polymers, Henkel North American Advisory Board Meeting, August 30, 2017, . (Invited presentation) Presenter: Drzal, Lawrence
675. Multimaterial Joining Project Opportunities for ASC members Funded Through IACMI, Adhesives and Sealants Council Annual Meeting, Atlanta, GA, April 3-4, 2017 Presenter: Drzal, Lawrence
676. Enabling Composite-to-Metal Bonding Through the Automotive OEM Assembly Line, Adhesion Society Annual Meeting, K.T. Tan – Presenter, E. Stitt, L.P. Pagnotti, M. Haq, L.T. Drzal, B.C. Okerberg, P.L. Votruba-Drzal, San Diego, CA March 1, 2018.

## ***STUDENTS ADVISED (since 1985)***

### *Theses and Dissertations:*

31 Masters Theses  
34 Doctoral Dissertations  
44 Post-doctoral Research Associates

### *Doctoral Degree Advisees (current):*

|                            |                      |                   |
|----------------------------|----------------------|-------------------|
| Mariana Batista (ChEMS)    | Chris Cugini (ChEMS) |                   |
| Demetrios Tzelepis (ChEMS) | Erik Stitt (ChEMS)   | Zeyang Wu (ChEMS) |

### *Post-Doctoral Research Associates:*

|                             |                      |                      |
|-----------------------------|----------------------|----------------------|
| Shekar Subramoney           | Kevin Hook           | Youchiro Muraoka     |
| Madhu Madhukar              | Hassan Al Moussawi   | John DeLong          |
| Vidya Gupta                 | Pedro Herrera-Franco | Naoki Sugiura        |
| Henjen Ho                   | Cara Weitzsacker     | Narasimharao Dontula |
| Daniel Hook                 | Ming Xie             | Steve Rozeveld       |
| Richard Schalek             | Gerhard Kalinka      | Shigheru Ishihara    |
| Per Askeland                | Ahmed Al-Ostaz       | Vladimir Meshkov     |
| Mubarak Khan                | Amar Kumar Mohanty   | Seong OK Han         |
| Manju Misra                 | Hiroaki Miyagawa     | JinYong Lee          |
| Jean-Pierre Latere D'Wanisa | Hwan-Man Park        | WanJun Liu           |
| Sung Ho Lee                 | Shrojal Desai        | Masud Huda           |
| Jue Lu                      | Toshiya Kamae        | Jong Kyoo Park       |
| Jin Kuk Kim                 | Hazel-Ann Hosein     | Sumin Kim            |
| Frederick Vautard           | Xiaobing Li          | Saswata Bose         |
| Feng Huang                  | Raghu Chetty         |                      |

### ***MASTER OF SCIENCE DEGREE:***

31. Cueva Calderon, M., "Flexural Properties of Hybridized Unidirectional Composites Reinforced with Bamboo and Basalt Fibers", Dept. of Chemical Engineering and Materials Science, Michigan State University (2018)
30. Stitt, E., "Application Of High-Impact Polystyrene (Hips) As A Graphene Nanoparticle Reinforced Composite Thermoplastic Adhesive, Dept. of Chemical Engineering and Materials Science, Michigan State University (2017)
29. Pitchaiya, G., "ABA and ABC Type Thermoplastic Elastomer Toughening of Epoxy Matrices and its Effects on Carbon Fiber Reinforced Composites" Dept. of Chemical Engineering and Materials Science, Michigan State University (2016)
28. Arora, S, "Life Cycle Assessment and Biodegradability of Biobased Composites", Dept. of Chemical Engineering and Materials Science, Michigan State University (2006)
27. Mehta, G., "Biocomposites From Engineered Natural Fibers for Housing Panel Applications", Dept. of Chemical Engineering and Materials Science, Michigan State University (2004)
26. Walden, D. H., "Modification of the Surface Chemistry of Graphite Nanoplatelets and the Effect on Graphite Nanocomposites", Dept. of Chemical Engineering and Materials Science, Michigan State University (2003)
25. Helmuth, J. A., "Adhesion Between Nextel 312TM Fibers and BlackGlasTM Silicon Oxycarbide and Its Effect on Composite Properties", Dept. of Chemical Engineering and Materials Science, Michigan State University (2003)
24. Tummala, P., "Ultraviolet light Treatment of Polymer Composites for Enhancement in Surface Adhesion", Dept. of Chemical Engineering and Materials Science, Michigan State University (2002)
23. Belcher, L. "The Development Of Biocomposites From Aligned Biofiber And Biobased Epoxy Resin," Dept. of Chemical Engineering and Materials Science, Michigan State University (2002).
22. Hokens, D. D. "Design And Engineering Of Eco-Friendly Biocomposites From Hemp Fiber And Low Cost Novel Soy Protein Based Bioplastics," Dept. of Chemical Engineering and Materials Science, Michigan State University (2002).



21. Bhurke, A. "Effect of Polymer Modification on the Properties of Asphalt Concrete: the Role of the Interface," Dept. of Materials Science and Mechanics, Michigan State University (1999).
20. Cummings, T. S. "Structure and Energy Absorbing Properties of a Polypropylene and Polyethylene Terephthalate Fiber Composite Material," Dept of Materials Science and Mechanics, Michigan State University (1999).
19. Corbin, S. "Improvements in the Adhesion of Carbon Fibers to Vinyl Ester Matrices," Dept. of Chemical Engineering, Michigan State University (1998).
18. Krishnaswamy, A. "Adhesion of Vapor Grown Carbon Fibers to Epoxy Matrices and its Relation to Fiber and Composite Properties," Dept. of Chemical Engineering, Michigan State University (1998).
17. Alt, M. "Dynamic Mechanical Analysis as a Tool for Interphase Characterization," Michigan State University (1997).
16. Firmhaber, A. "Investigation of the Cyclic Microindentation Method," Michigan State University (1996).
15. Chaudhry, T. M. "Adhesion, Processing and Interfacial Properties of Preceramic Polymer Coatings on Carbon Fibers," Dept of Materials Science and Mechanics, Michigan State University (1995).
14. Fernandes, H. A Water Based Manufacturing Method for Two Phase Matrix Composite Materials," Dept. of Chemical Engineering, Michigan State University (1994).
13. Kendzioriski, M. M. "Microwave Energy Effects on Glass Fiber-Epoxy Adhesion," Dept. of Chemical Engineering, Michigan State University (1994).
12. Raghavendran, V. "Effects of Molecular Weight of Thermoplastic Matrix and Processing Conditions on Interfacial Adhesion in Carbon Fiber Composites," Dept. of Chemical Engineering, Michigan State University (1994).
11. Scott, E. B. "Polymer /Fiber Modified Asphalt Fracture Mechanisms and Microstructure Relationships to Distresses and Environmental Factors," Dept. of Chemical Engineering, Michigan State University (1993).
10. H. Asthana, "Chemical Modification of Polymer Surfaces Using Sulfonation to Improve Adhesion Properties," Dept. of Chemical Engineering, Michigan State University (1993).
9. Erickson, B. L. "On the Enhancement of Adhesive Bonding to Polymer and Composite Surfaces Through Gas Phase Sulfonation," Dept. of Materials Science and Mechanics, Michigan State University (1993).
8. Vyakarnam, M. "Development of a High Speed Powder Process to Manufacture Composite Prepreg," Dept. of Chemical Engineering, Michigan State University (1992).
7. Glasser, G. "Determination of Fiber-Matrix Interfacial Shear Strength by a Microindentation Technique Coupled with an Acoustic Emission System," Michigan State University (1992).
6. Padaki, S. "Powder Processing of Composite Prepreg Tape: Particle Size Effects," Dept. of Chemical Engineering, Michigan State University (1992).
5. Drown, E. K. "Characterization of the Interphase and Its Influence on the Behavior of Glass Reinforced Epoxy Composites," Dept. of Chemical Engineering, Michigan State University (1991).
4. Hauf, G. S. "T1000 Carbon Fiber Adhesion to Epoxy Matrices," Michigan State University (1989).
3. Larson, B. K. "Carbon Fiber-Cement Adhesion in Carbon Fiber Reinforced Cement (CFRC)," Dept. of Chemical Engineering, Michigan State University (1988).
2. Kalantar, J. "The Bonding Mechanism of Aramid Fibers to Epoxy Matrices," Dept. of Chemical Engineering, Michigan State University (1988).
1. Agrawal, R. K. "Effects of Microwave Processing on the Fiber-Matrix Interphase in Composites," Dept. of Chemical Engineering, Michigan State University (1988).

***DOCTOR OF PHILOSOPHY DEGREE:***

34. Honaker, Keith, Multifunctional Polymer Nanocomposites Through the Addition of Graphene Nanoplatelets and Their Uses in Automotive Fuel Tanks, Dept. of Chemical Engineering and Materials Science, Michigan State University (2017)
33. Yan Li, Porous Titanium Dioxide Nanomaterials For Photocatalytic And Photovoltaic Applications, Dept. of Chemical Engineering and Materials Science, Michigan State University (2016)
32. Markus Downey, Toughening Of Carbon Fiber-Reinforced Epoxy Polymer Composites Via Copolymers And Graphene Nano-Platelets, Dept. of Chemical Engineering and Materials Science, Michigan State University (2016)
31. Nicholas Kamar, "Fracture Behavior of Block Copolymer and Graphene Nanoplatelet Modified Epoxy and Fiber Reinforced/Epoxy Polymer Composites", Dept. of Chemical Engineering and Materials Science, Michigan State University (2016)

30. Diandra Rollins, Multifunctional Nanocomposite Foams For Space Applications, , Dept. of Chemical Engineering and Materials Science, Michigan State University (2016)
29. Debkumar Saha, "Structuring And Modification Of Open Surface Area Graphene Nanoplatelets To Enhance The Energy Density And Storage Capacity Of Electrodes For Electrochemical Energy Storage Applications", Dept. of Chemical Engineering and Materials Science, Michigan State University (2014)
28. Patrick Aderhold, "Graphite Nanoplatelet Assemblies For Transparent And Catalytic Electrodes In Dye-Sensitized Solar Cells", Dept. of Chemical Engineering and Materials Science, Michigan State University (2013)
27. Anchita Monga, "Nanostructured Graphene Nanoplatelets For Energy Storage Applications", Dept. of Chemical Engineering and Materials Science, Michigan State University (2013)
26. Jinglei Xiang, "Electron And Phonon Transport In Nanostructured Exfoliated Graphene Nanoplatelets And Its Application In Thermal Energy Conversion", Dept. of Chemical Engineering and Materials Science, Michigan State University (2012)
25. Xian Jiang, "Multifunctional Polymeric Nanocomposites Fabricated By Incorporation Of Exfoliated Graphene Nanoplatelets And Their Application For Bipolar Plates In Polymer Electrolyte Membrane Fuel Cells", Dept. of Chemical Engineering and Materials Science, Michigan State University (2012).
24. Tao Wang, "Cellulose Nanowhiskers and Nanofibers From Biomass For Composite Applications", Dept. of Chemical Engineering and Materials Science, Michigan State University (2011).
23. Huang Wu, "Multifunctional Nanocomposites Reinforced By Graphene Nanoplatelets", Dept. of Chemical Engineering and Materials Science, Michigan State University (2011).
22. Biswas, S., "Nanolayered Film of Graphene Nanosheets for Optoelectronics and Electrochemical Energy Storage Applications", Dept. of Chemical Engineering and Materials Science, Michigan State University (2010).
21. Nartker, S. "Electrospinning Cellulose Based Nanofibers for Sensor Application", Dept. of Chemical Engineering and Materials Science, Michigan State University (2009).
20. Milaoga, D., "Effect of Graphite Nanoparticles on the Crystallization of Poly(Hydroxybutyrate) and Polylactic Acid and Their Nanocomposite Properties", Dept. of Chemical Engineering and Materials Science, Michigan State University (2008).
19. Do, I. , "Metal Decoration of Exfoliated Graphite Nanoplatelets (xGnP) for Fuel Cell Applications", Dept. of Chemical Engineering and Materials Science, Michigan State University (2006).
18. Kalaitzidou, K., "Exfoliated Graphite Nanoplatelets as Reinforcement for Multifunctional Polypropylene Nanocomposites", Dept. of Chemical Engineering and Materials Science, Michigan State University (2006).
17. Bhurke, A. S., "Ultraviolet Radiation Surface Treatment of Polymers", Dept. of Chemical Engineering And Materials Science, Michigan State University (2003).
16. Xu, L., "Interfacial Engineering of the Interphase Between Carbon Fiber and Vinyl Ester Resin", Dept. of Chemical Engineering and Materials Science, Michigan State University (2003).
15. Fukushima, H., "Graphite Nanoreinforcement in Polymer Nanocomposites", Dept. of Chemical Engineering and Materials Science, Michigan State University (2003).
14. Shi, G., "The Effect of Surface Chemistry on the Interfacial Adhesion and Mechanical Properties of Natural Fiber Reinforced Composites Materials" ,Dept. of Chemical Engineering and Materials Science, Michigan State University (2003).
13. Raghavendran, V. K. "The Effects of Physico-chemical Interactions and Polymer Grafting on Interfacial Adhesion in Thermoplastic Composites," Dept. of Chemical Engineering, Michigan State University (1999).
12. Wilenski, S. "The Improvement of the Hygrothermal and Mechanical Properties of Bismaleimide and K3B/IM7 Carbon Fiber Composites Through a Systematic Study of the Interphase," Dept. of Materials Science and Mechanics, Michigan State University (1997).
11. terVeen, H. R. J. "The Development of a Toughening Binder for Unsaturated Polyester Matrix Resins," Dept. of Chemical Engineering, Michigan State University (1997).
10. Vyakarnam, M. N. "Processing Discontinuous Fiber Polymeric Composites: Fiber Alignment Using Electric Fields and Microstructure-Property Relationships," Dept. of Chemical Engineering, Michigan State University (1996).
9. Padaki, S. "A Process and Consolidation Model for Polymer Powder Impregnated Composite Tapes," Dept. of Chemical Engineering, Michigan State University (1995).
8. Agrawal, R. K. "Adhesion Mechanisms of Polyurethanes to Glass Surfaces," Dept. of Chemical Engineering, Michigan State University (1994).
7. Fisher, S. "The Effect of Interphase Properties on Adhesion in Polyphenylene Sulfide/Carbon Fiber Composites," Dept. of Chemical Engineering, Michigan State University (1993).
6. Larson, B. K. "Wetting and Spreading in a Liquid Composite Molding Environment, ," Dept. of Chemical Engineering, Michigan State University (1993).

5. Rao, V. "Interfacial Changes During the Processing of a Typical Carbon Fiber/Epoxy Composite Material," Dept. of Chemical Engineering, Michigan State University (1991).
4. Kalantar, J. "Structural Properties of High Performance Polymer Fibers and Their Effects on Fiber-Matrix Adhesion," Dept. of Chemical Engineering, Michigan State University (1991).
3. Waterbury, M. C. "The Influence of Processing, Chemistry, and Interphase Microstructure on the Adhesion of Carbon Fibers to Thermoset and Thermoplastic Matrices," Dept. of Metallurgy, Mechanics and Materials Science, Michigan State University (1991).
2. Iyer, S. R. "Continuous Processing of Unidirectional Prepreg," Dept. of Chemical Engineering, Michigan State University (1990).
1. Centers, P., "The Role of Bulk Additions in Solid Lubricant Compacts," Dept. of Materials Engineering, University of Dayton (1987).

***STUDENT AWARDS RECEIVED:***

50. NASA International Internship Program, Mariana Desiree Reale Batsista, NASA Ames Research Center, Moffett Field, CA 2018
49. SPE Automotive Composites Conference & Exhibition (ACCE) Mariana Desiree Reale Batsista, 1st Place, Dr. Jackie Rehkopf Award for Excellence in Technical Writing (2017)
48. MSU Federal Credit Union, 2<sup>nd</sup> Place, Research Translation Award, Mariana Desiree Reale Batsista, (2017)
47. DOW Chemical Best Student Paper Award, Nicholas Kamar, 2015, American Society of Composites (ASC) 30th Technical Conference
46. Scholarship Recipient Nicholas Kamar, Society of Plastics Engineers (SPE) Automotive Composites Conference & Exhibition (ACCE)
45. Outstanding Research Poster Award, 3rd Place, 2015 Annual University of Michigan-Michigan State University, Markus Downey, Blue-Green Seminar
44. MSUFCU Research Translation Award, Markus Downey, 2014 Michigan State University Engineering Graduate Research Symposium
43. Excellence in Research Award, Markus Downey, 2014 Michigan State University Chemical Engineering and Material Science
42. Research Forum Hargraves Fellowship, Dept of Chemical Engineering and Materials Science, Keith Honaker, (2014)
41. 1st place, "MSUFCU Research Translation Award" at the 2012 Engineering Graduate Research Symposium, Anchita Monga, "Replacement of Metal Current Collectors with Graphene Nanoplatelets in Advanced Lithium Ion Battery Electrodes", (2013).
40. NASA Space Technology Research Fellowship "Multifunctional Graphene Nanocomposite Foams for Space Applications", Diandra Rollins, (2012).
39. University Undergraduate Research and Arts Award, 2012, Albert Edwards, Composites Materials.
38. Best Paper Award, 2011 Automotive Composites Conference and Exposition, September 13, 2011, Xian Jiang and Lawrence T. Drzal, "Synthesis of Bipolar Plates for Fuel Cells based on Exfoliated Graphene Nanoplatelets filled Polymeric Nanocomposites" (2011).
37. 2nd Place Student Poster Award, 2011 Automotive Composites Conference and Exposition, September 13, 2011, Anchita Monga, "Metal Doped Nanostructured Graphite Nanoplatelets as Anode Material For Lithium Ion Batteries" (2011).
36. 1st Place Student Poster Award, MS & T Annual Meeting, Detroit, Michigan, September 16, 2007, Dana Miloaga, "Conductive Green Nanocomposites from PolyLactic Acid", (2007).
35. Fellowship, ACS Summer School on Green Chemistry, July 6-14, at McGill University in Montreal, Quebec Canada, Wang, T (2005)
34. "Best Student Research Poster", Chemical Engineering And Materials Science Research Forum, Do, I. (2005).
33. Fellowship, American Chemical Society 'Green Chemistry Workshop' at Carnegie-Mellon University, in Pittsburgh, Pennsylvania from July 30 – August 7, 2004, Arora, S. (2004).
32. Fellowship, American Chemical Society 'Green Chemistry Workshop' at Carnegie-Mellon University, in Pittsburgh, Pennsylvania from July 30 – August 7, 2004, Milaoga, D. (2004).
31. The Most Outstanding Student Award, College of Engineering, Fukushima, H., MSU (2003)
30. ANTEC Composites Division Best Paper Award First Prize Fukushima, H., (2003)
29. "Student Poster Award -2nd Place", 9th Annual Global Plastics Environmental Conf (GPEC), Wibowo, A. (2003)
28. "Student Poster Award -2nd Place", 9th Annual Global Plastics Environmental Conf (GPEC), Mehta, G. (2003)
27. "Distinguished Student Paper Award" Adhesion Society, Bhurke, A.S. (2003).
26. "Peebles Award for Graduate Research in Adhesion Science" Adhesion Society, Bhurke, A. S.(2003).
25. Most Innovative Design Award, H. Fukushima, Michigan Collegiate Entrepreneur's Conference (2002)

24. "Student Poster Award -3rd Place", American Society for Composites Conference (ASC) Wibowo, A, (2002)
23. "Student Poster Award -1st Place", 8th Annual Global Plastics Environmental Conf (GPEC) Hokens, D., (2002)
22. "Student Poster Award -2nd Place", 8th Annual Global Plastics Environmental Conf (GPEC), Belcher, L. (2002)
21. "Student Poster Award - 3rd Place", 17th American Society for Composites Meeting, Mehta, G., (2002).
20. "Hargraves Fellowship, Dept of Chemical Engineering, Michigan State University, Shi, G. (2000).
19. "Best Student Poster Paper" SAMPE-Michigan 4th Regional Meeting," Drown, E. K. (1998).
18. "Peebles Award for Graduate Research in Adhesion Science," 2nd Place, Adhesion Society, Bhurke, A. (1997).
17. "Best Graduate Student Research Project"- 3rd Place, National SAMPE Meeting," Chaudhry, T. (1996).
16. "Best Graduate Student Research Project"- 1st Place, National SAMPE Meeting," Vyakarnam, M. (1996).
15. "Best Student Poster Paper" SAMPE-Michigan Regional Meeting," Vyakarnam, M. (1995).
14. "Best Materials Paper Award," 10th ASM/ESD Advanced Composites Conference, Raghavendran, V. (1994).
13. "Best Student Paper Award," The Adhesion Society, Erickson, B. (1993).
12. Hargraves Fellowship, Dept of Chemical Engineering, Michigan State University, Larson, B. (1992).
11. DuPont ChE Teacher Fellowship, Fisher, G. (1991).
10. Michigan Polymer Consortium Fellow, Drown, E. K. (1991).
9. "Student Paper Award-Honorable Mention," American Society for Composites, Drown, E.K. (1991).
8. "Student Poster Paper - 2nd Place," MMPI Research Review, Vyakarnam, M. (1991).
7. "BFG Inventors Award," Finalist - Honorable Mention, Iyer, S. (1991).
6. "Outstanding Chemical Engineering Graduate Student," Michigan State University, Kalantar, J. (1991).
5. "Outstanding Chemical Engineering Graduate Student," Michigan State University, Iyer, S. (1990).
4. "Best Student Paper Award," The Adhesion Society, Kalantar, J. (1990).
3. "2nd Place Student Paper Award," The Great Lakes Thermal Analysis Society, Rao, V. (1989).
2. "Best Student Paper Award," The Great Lakes Thermal Analysis Society, Kalantar, J. (1988).
1. "Best Student Paper Award," The Adhesion Society, Agrawal, R. K. (1988).

### ***CONSULTING EXPERIENCE***

DOE NREL Industrial Advisory Board, Chair, Biobased Carbon Fiber Consortium  
 National Academy of Science, National Research Council, Science and Technology Subcommittee of the Army  
 Board on Science and Technology  
 National Research Council, National Materials Advisory Board Committee to Evaluate Proposals to the New  
 York State Science and Technology Foundation for Designation as Centers for Advanced Technology  
 National Research Council, National Materials Advisory Board, Committee on Structural Materials Research Advances  
 Federal Highway Administration, Adhesives Research Advisory Committee  
 National Academy of Science, National Research Council, National Materials Advisory Board (NMAB),  
 Committee on Materials Research for Defense-After-Next,  
 Naval Surface Weapons Center, Materials Board, Silver Spring, Maryland  
 Army Materials Technology Laboratory (AMTL), Watertown, MA  
 University of Michigan Biomaterials Center External Review Committee, Ann Arbor, Michigan  
 Texas Research Institute, Austin, Texas  
 University of Illinois at Carbondale, Composite Center External reviewer  
 Numerous private and public companies

## **BIOGRAPHICAL SKETCH**

Lawrence T. Drzal obtained a BChE from the University of Detroit and a PhD from Case Western Reserve University in Chemical Engineering in 1974. From 1972 until 1985 he was a military and civilian scientist at the Air Force Materials Laboratory at Wright-Patterson Air Force Base where he worked on surface and interfacial aspects of adhesively bonded joints and the fiber-matrix interphase in composite materials. Professor Drzal's research is primarily in surface and interfacial aspects of adhesively bonded joints and the fiber-matrix interphase in composite materials and their processing. This has consisted of research on carbon, glass, cellulose and aramid fiber surfaces: surface chemistry; surface energetics; chemical reactivity; fiber/matrix adhesion measurement; surface modification by plasma, sulfonation and UV light in air; adhesion to thermoset and thermoplastic polymers; the effect of processing on adhesion in microwave, electron beam, liquid and powder processing environments; and methods to detect and predict adhesion. Currently his research activities are in nanocomposites and bio-composites. The nanocomposite work consists of investigation into the intercalation, exfoliation and dispersion of graphene nano-platelets, their surface chemistry and processing into thermoset and thermoplastic matrices to improve the mechanical, thermal, and electrical and barrier properties of the resulting nanocomposites. Major research is also underway to develop biobased, sustainable, structural bio-composites that can replace petroleum based structural composites. This includes new biobased bio-fiber reinforcements from plants, biopolymers from plant chemicals, and new methods for processing bio-composites with high reinforcement contents and surface treatments for optimization of bio-composite properties. During his career Dr. Drzal and his group members have made over 600 presentations at national and international conferences, published over 430 research papers and have been awarded 41 patents. He has mentored 30 Master's, 34 Doctoral, and 44 Post-Doctoral students.

Currently Dr. Drzal is a University Distinguished Professor in the Chemical Engineering and Materials Science Department in the College of Engineering at Michigan State University. Since 1986 he has served as Director of the Composite Materials and Structures Center at Michigan State University --- an interdisciplinary research center within the College focusing on all aspects of polymeric, metallic, ceramic and cement composite materials and their processing from the molecular to the structural level. From 1991-1999 he served as co-Director (with M. C. Hawley) of the NSF State/Industry/University Center for Low-Cost, High-Speed Polymer Composites Processing. In 2015 became part of a 5 state team that was awarded the Manufacturing USA, Institute of Advanced Composite Manufacturing Innovation (IACMI) Award and serves as the Vehicle Application Director.

Dr. Drzal is a founding member of both the Adhesion Society and the American Society for Composites and has served as the President (1998-2000) of the Adhesion Society. He has chaired Gordon Conferences on Adhesion and Composites and has served in many other professional activities related to Chemical Engineering, Composite Materials and Adhesion. He serves on the editorial board of five journals in the adhesion and composite materials fields and serves on numerous government committees. In 1992 he was awarded the *Withrow Distinguished Scholar Award* for faculty research excellence by the MSU College of Engineering. Also in 1992 he received the Dow Corning sponsored *Edwin Plueddemann Award for Excellence in Composite Interface Research*. He received the MSU *Distinguished Faculty Award* in 1993; the *Adhesion Society Award for Excellence in Adhesion Science Research* in 1994; and the *American Society for Composites Technomic Award* in 1996. In 1997 he was awarded the title of *Michigan State University Distinguished Professor*. In 2002 he was designated as a *Robert Patrick Fellow of the Adhesion Society*, a *Fellow* of the American Institute of Chemists and elected to membership in the European Academy of Sciences. In 2004 he was elected a *Fellow* of the *Society of Plastics Engineers* and a *Fellow* of the *American Society for Composites* and in 2006 a *Fellow* of SAMPE. In 2015 he was elected to the National Academy of Inventors. In 2016 he was awarded the Society of Plastics Engineers Automotive Division's *2016 Lifetime Achievement Award* and in 2016 was awarded the *2016 Medal of Excellence in Composite Materials* by the U Delaware. In 2018, he was awarded the *MSU Technology Transfer Achievement Award* for his inventorship activity at MSU.

In 2007, Dr. Drzal co-founded XG Sciences, Inc, a private Michigan company that is currently the world's largest manufacturer of graphene nanoplatelets using processes and technologies developed in his lab at MSU. XG Sciences currently has 30+ employees. He serves as its Chief Scientist.