

Douglas M. Fox

Curriculum Vitae

PERSONAL INFORMATION

American University
Department of Chemistry
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EDUCATION

Ph.D. in Physical Chemistry, advisor: Professor Leslie Leifer, Michigan Technological University, December 2001.

B.S. in Chemical Engineering, Michigan Technological University, May 1995.

EMPLOYMENT HISTORY

1995-2000	Graduate Teaching Assistant, Chemistry Department, Michigan Technological University, Houghton, MI.
2001	Instructor/Laboratory Advisor, Chemistry Department, Michigan Technological University, Houghton, MI.
2002	Visiting Assistant Professor, Chemistry Department, Michigan Technological University, Houghton, MI.
2002-2004	ASEE/NRL Postdoctoral Fellow, Chemistry Division, Naval Research Laboratory, Washington, DC.
2004-2006	Assistant Research Professor, Chemistry Department, U. S. Naval Academy, Annapolis, MD.
2003-present	NIST Guest Researcher, National Institute of Standards and Technology, Gaithersburg, MD.
2006-present	Assistant Professor, Department of Chemistry, American University, Washington DC.

HONORS AND AWARDS

Outstanding Doctoral Graduate Student, Michigan Technological University, 1998-1999.

Outstanding Teaching Assistant, Michigan Technological University, 1996-1997.

PUBLICATIONS

Refereed Journal Articles & Book Chapters:

D. M. Fox, J. Lee, M. Zammarano, D. Katsoulis, D. V. Eldred, L. Haverhals, P. C. Trulove, H. C. De Long, and J. W. Gilman, "Char – Forming Behavior of Nanofibrillated Cellulose Treated with Glycidyl Phenyl POSS," *Carbohydr. Polym.*, **2011**, submitted.

D. M. Fox, R. H. Harris, Jr., S. Bellayer, J. W. Gilman, M. Y. Gelfer, B. S. Hsaio, P. H. Maupin, P. C. Trulove, and H. C. De Long, "The Pillaring Effect of the 1,2-Dimethyl-3(benzyl ethyl isobutyl POSS) Imidazolium Cation in Polymer/Montmorillonite Nanocomposites," *Polym.*, **2011**, 52, 5335-5343.

D. M. Fox, "Developments Toward Flame Resistant Poly(lactic acid) and Other Biodegradable Polyesters," in *Green Polymer Nanocomposites for Sustainable Developments*, W.H. Awad, Ed., Bentham e-Books, Bentham Science Publishers, Danvers, MA, revision in preparation. (invited review)

M. Zammarano, P. Maupin, L.-P. Sung, J. Gilman, E. McCarthy, Y. Kim, and D. M. Fox, "Revealing the Interface in Polymer Nanocomposites," *ACS Nano*, **2011**, 5, 3391-3399.

D. M. Fox, "Alternative Solvents for Green Chemistry. By Francesca M. Kerton", *J. Am. Chem. Soc.*, **2009**, 131, 12016. (invited review)

D. M. Fox, J. W. Gilman, A. B. Morgan, J. R. Shields, P. H. Maupin, R. E. Lyon, H. C. De Long, and P. C. Trulove, "Flammability and Thermal Analysis Characterization of Imidazolium Based Ionic Liquids," *Ind. Eng. Chem. Res.*, **2008**, 47, 6327-6332.

M. Modesti, S. Besco, A. Lorenzetti, M. Zammarano, V. Causin, C. Marega, J. W. Gilman, D. M. Fox, P. C. Trulove, H. C. De Long, and P. H. Maupin, "Imidazolium Modified Clay Based ABS Nanocomposites: A Comparison Between Melt-Blending and Solution Intercalation Process," *Polym. Adv. Technol.*, **2008**, 19, 1576-1583.

R. Haggmueller, S. S. Rahatekar, J. A. Fagan, J. Chun, M. L. Becker, R. R. Naik, T. Krauss, L. Carlson, J. Kadla, P. Trulove, D. Fox, Z. Fang, S. Kelley, and J. W. Gilman, "A Comparison of Quality of Dispersion of Single Wall Carbon Nanotubes Using Different Surfactants and Biomolecules," *Langmuir*, **2008**, 24, 5070-5078.

M. Modesti, S. Besco, V. Causin, C. Marega, J. W. Gilman, D. M. Fox, P. C. Trulove, H. C. De Long, and M. Zammarano, "ABS/Clay Nanocomposites Obtained by Solution Technique: Influence of Clays' Organic Modifiers," *Polym. Degrad. Stab.*, **2007**, 92, 2206-2213.

R. A. Mantz, D. M. Fox, J. M. Green III, P. A. Fylstra, S. Bellayer, J. W. Gilman, P. C. Trulove, and H. C. De Long, "Dissolution of Biopolymers Using Ionic Liquids," *Z. Naturforsch. A*, **2007**, 62, 275-280.

D. M. Fox, P. H. Maupin, S. Bellayer, M. Murariu, R. H. Harris Jr., J. W. Gilman, D. V. Eldred, D. Katsoulis, P. C. Trulove, and H. C. De Long, "Use of a polyhedral oliomeric silsesquioxane (POSS) – imidazolium cation as an organic modifier for montmorillonite," *Langmuir*, **2007**, 23, 7707-7714.

W. A. Henderson, V. G. Young, Jr., D. M. Fox, H. C. De Long, and P. C. Trulove, "Alkyl vs. Alkoxy Chains on Ionic Liquid Cations," *Chem. Comm.*, **2006**, 35, 3708-3710.

D. M. Phillips, L. F. Drummy, R. R. Naik, H. C. De Long, D. M. Fox, P. C. Trulove, and R. A. Mantz, "Regenerated silk wet spinning from an ionic liquid solution," *J. Mater. Chem.*, **2005**, 15, 4206-4208. (hot article)

K. Dahl, G. M. Sando, D. M. Fox, T. E. Sutto, and J. C. Owrutsky, "Vibrational spectroscopy and dynamics of small anions in ionic liquid solutions," *J. Chem. Phys.*, **2005**, 123, Article #084504 (11 pages).

D. M. Fox, J. W. Gilman, H. C. De Long, and P. C. Trulove, "TGA decomposition kinetics of 1-butyl-2,3-dimethylimidazolium tetrafluoroborate and the thermal effects of contaminants," *J. Chem. Thermodynamics*, **2005**, 37, 900-905. (invited paper)

S. Bellayer, J. W. Gilman, N. Eidelmen, S. Bourbigot, X. Flambard, D. M. Fox, H. C. De Long, and P. C. Trulove, "Preparation of homogeneously dispersed trialkylimidazolium compatibilized multi-walled carbon nanotube / polystyrene nanocomposites via melt extrusion," *Adv. Funct. Mater.*, **2005**, 15, 910-916.

D. M. Phillips, L. F. Drummy, D. G. Conrady, D. M. Fox, R. R. Naik, M. O. Stone, P. C. Trulove, H. C. De Long, R. A. Mantz, "Dissolution and regeneration of *Bombyx Mori* silk fibroin via ionic liquids," *J. Am. Chem. Soc.*, **2004**, 126, 14350-14351.

W. H. Awad, J. W. Gilman, M. Nyden, R. H. Harris, Jr., T. E. Sutto, J. H. Callahan, P. C. Trulove, H. C. De Long, and D. M. Fox, "Thermal degradation studies of alkyl-imidazolium salts and their application in nanocomposites," *Thermochim. Acta*, **2004**, 409, 3-11.

D. M. Fox, W. H. Awad, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "Flammability, thermal stability, and phase change characteristics of several trialkylimidazolium salts," *Green Chem.*, **2003**, 5, 724-727.

D. M. Fox and L. Leifer, "Thermodynamic treatment of complex multicomponent electrolyte solutions," *Fluid Phase Equilibria*, **2003**, 213, 1-17.

D. M. Fox and L. Leifer, "Thermodynamic studies of ternary systems: I. LiCl-(n-Bu)₄NCl-H₂O at 25°C," *J. Phys. Chem. B*, **2000**, 104, 1058-1068.

Conference Proceedings Papers:

M. Zammarano, D. M. Fox, S. Matko, T. Kashiwagi, J. W. Gilman, and R. D. Davis, "Sustainable Flame Retardants: Bio-derived Products as Intumescent Materials," in *Proc. Fire and Mater. 2011 Conf.*, Interscience Communication, Ltd., San Francisco, CA, 2011, 337-341.

D. M. Fox, J. Lee, J. Jones, M. Zammarano, and J. W. Gilman, "Microencapsulated POSS in Cellulose Using 1-Ethyl-3-Methylimidazolium Acetate," in *Proc. Int. Symp. Molten Salts and Ionic Liquids 17*, D. M. Fox, R. A. Mantz, H. C. De Long, M. Mizuhata, and P. C. Trulove, Eds., ECS Transactions, 2010, 33(7), 99-108.

D. M. Fox, J. Lee, E. Ford, E. Balsley, M. Zammarano, S. Batko, and J. W. Gilman, "POSS modified cellulose for improving flammability characteristics of polystyrene," in *Proc. 10th Int. Conf. Wood Biofiber Plastic Composites*, Forest Products Society, Madison, WI, 2010, 337-342.

D. M. Fox, P. C. Trulove, H. C. De Long, J. W. Gilman, and P. H. Maupin, "Nonaqueous Solvatochromic Behavior of Nile Blue A Perchlorate in Imidazolium – Exchanged Clays and its Implication Toward Exfoliation in Polymeric Composites," in *Proc. Int. Symp. Molten Salts and Ionic Liquids 16*, D. Fox, R. Mantz, R. Hagiwara, S. Dai, P. Trulove, and H. De Long, Eds., ECS Transactions, 2009, 16(49), 141-149.

M. Hanley, J. M. Green III, P. Fylstra, W. A. Henderson, D. M. Fox, H. C. De Long, and P. C. Trulove, "Amino Acid Based Ionic Liquids: Solvents for Improved Biopolymer Dissolution," in *Molten Salts 15: In Memory of Robert Osteryoung*, R. Mantz, H. De Long, R. Hagiwara, G. Stafford, P. Trulove, and D. Fox, Eds., ECS Transactions, 2007, 3(35), 41-48.

D. M. Fox, P. Fylstra, M. Hanley, W. Henderson, P. C. Trulove, S. Bellayer, J. W. Gilman, and H. C. De Long, "The Preparation and Characterization of *Bombyx mori* Silk Nanocomposites Using Ionic Liquids," in *Molten Salts 15: In Memory of Robert Osteryoung*, R. Mantz, H. De Long, R. Hagiwara, G. Stafford, P. Trulove, and D. Fox, Eds., ECS Transactions, 2007, 3(35), 11-20.

J. W. Gilman, D. M. Fox, A. B. Morgan, J. R. Shields, P. H. Maupin, H. C. De Long, and P. C. Trulove, "Characterization of Flammability Properties of Ionic Liquids," in *Molten Salts 15: In Memory of Robert Osteryoung*, R. Mantz, H. De Long, R. Hagiwara, G. Stafford, P. Trulove, and D. Fox, Eds., ECS Transactions, 2007, 3(35), 105-115.

P. C. Trulove, W. H. Awad, J. W. Gilman, C. Davis, R. D. Davis, T. E. Sutto, D. M. Fox, P. H. Maupin, and H. C. De Long, "The Application of Trialkylimidazolium Ionic Liquids and Salts to the Preparation of Polymer-Clay Nanocomposites," Chapter in *Ionic Liquids IV: Not Just Solvents Anymore*, R. D. Rogers and K. R. Seddon, Eds., ACS Symposium Series, No. 975, 2007, 220-233. (invited paper)

D. M. Phillips, R. A. Mantz, H. C. De Long, L. F. Drummy, D. G. Conrady, M. O. Stone, R. R. Naik, D. M. Fox, and P. C. Trulove, "Processing of *Bombyx mori* Silk Using Ionic Liquids," in *Proc. Int. Symp. Molten Salts XIV*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, R. Hagiwara, and D. A. Costa, Eds., 2004 ECS Proceedings Volume, 2006, 617-624. (invited paper)

D. M. Fox, P. H. Maupin, S. Bellayer, M. Murariu, J. W. Gilman, P. C. Trulove, and H. C. De Long, "The Use of 1,2-Dimethyl-3-(Benzyl Ethyl Iso-butyl-POSS)imidazolium Chloride as an Organic Modifier in Polymer – Layered Silicate Nanocomposites," in *Proc. Int. Symp. Molten Salts XIV*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, R. Hagiwara, and D. A. Costa, Eds., 2004 ECS Proceedings Volume, 2006, 607-616. (invited paper)

S. Bellayer, J. W. Gilman, N. Eidelman, S. Bourgibot, X. Flambard, D. M. Fox, H. C. De Long, and P. C. Trulove, "Preparation of Homogeneously Dispersed Trialkyl Imidazolium Compatibilized Muti Walled Carbon Nanotube/Polystyrene Nanocomposites Via Melt Extrusion," in *Proc. Int. Symp. Molten Salts XIV*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, R. Hagiwara, and D. A. Costa, Eds., 2004 ECS Proceedings Volume, 2006, 600-606. (invited paper)

D. M. Fox, J. W. Gilman, H. C. De Long, and P. C. Trulove, "Decomposition Kinetics of 1-Butyl-2,3-dimethylimidazolium Tetrafluoroborate and the Thermal Effects of Contaminants," in *Proc. Int. Symp. Molten Salts XIV*, R. A. Mantz, P. C. Trulove, H. C. De Long, G. R. Stafford, R. Hagiwara, and D. A. Costa, Eds., 2004 ECS Proceedings Volume, 2006, 435-443. (invited paper)

D. M. Fox, S. Bellayer, M. Murariu, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "Application of Trialkylimidazolium Liquids and Salts to the Preparation of Polymer – Layered Silicate Nanocomposites and Polymer – Carbon Nanotube Nanocomposites," Chapter in *Ionic Liquids in Polymer Systems: Solvents, Additives, and Novel Applications*, C. S. Brazel and R. D. Rogers, Eds., ACS Symposium Series, No. 913, 2005, 175-188. (invited paper)

D. M. Fox, W. H. Awad, J. W. Gilman, P. H. Maupin, T. E. Sutto, H. C. De Long, and P. C. Trulove, "Thermal and Kinetic Studies of Trialkylimidazolium Salts," Chapter in *Ionic Liquids IIIA: Fundamentals, Progress, Challenges, and Opportunities*, R. D. Rogers and K. R. Seddon, Eds., ACS Symposium Series, No. 901, 2005, 193-206. (invited paper)

H. C. De Long, T. E. Sutto, D. M. Fox, and P. C. Trulove, "Intercalation Power Structures in Ionic Liquids," in *Proceedings of the International Symposium on Ionic Liquids in Honour of Marcelle Gaune-Escard*, H. A. Øye and A. Jagtøyen, Eds., The Norwegian University of Science and Technology, Trondheim, Norway, 2003, 355-. (invited paper)

P. C. Trulove, W. H. Awad, J. W. Gilman, R. D. Davis, T. E. Sutto, D. M. Fox, P. H. Maupin, and H. C. De Long, "Application of Imidazolium based Ionic Liquids for the Preparation of Polymer-Clay Nanocomposites," in *Proceedings of the International Symposium on Ionic Liquids in Honour of Marcelle Gaune-Escard*, H. A. Øye and A. Jagtøyen, Eds., The Norwegian University of Science and Technology, Trondheim, Norway, 2003, 345-354. (invited paper)

Lectures: (Speakers are listed as first author for all lectures below)

D. M. Fox, C. Citro, J. Lee, L. Flynn, and M. Zammarano, "Modified Cellulosic Materials as Intumescent Flame Retardants for Poly(lactic acid)," 15th Annual ACS Green Chemistry and Engineering Conference, Washington, DC, 21 – 23 June 2011.

M. Zammarano, D. M. Fox, S. Matko, T. Kashiwagi, J. W. Gilman, and R. D. Davis, "Sustainable Flame Retardants: Bio-derived Products as Intumescent Materials," Fire and Materials 2011 Conference, San Francisco, CA, 31 January – 2 February 2011.

D. M. Fox, J. Lee, J. Jones, M. Zammarano, and J. W. Gilman, "Microencapsulated POSS in Cellulose Using 1-Ethyl-3-Methylimidazolium Acetate," 218th National ECS Meeting, Las Vegas, NV, 10 – 15 October 2010.

D. M. Fox, "POSS Modified Cellulose for Reduced Polymer Flammability," 2010 NIST BFRL-FRD Seminar Series, Gaithersburg, MD, 3 August 2010.

J. W. Gilman, M. Zammarano, D. Fox, and R. Kramer, "Sustainability and Polymer Nanocomposites," Gordon Conference: Towards the Development Of Sustainable & Nanotechnology Inspired Multi-Functional Composites, Ventura, CA, January 2010. (invited presentation)

E. Balsley, E. Ford, J. Lee, M. Zammarano, J. W. Gilman, and D. M. Fox, "Polystyrene and Poly(lactic acid) Nanocomposites Using Hydrophobically Modified Cellulose," 238th National ACS Conference, Washington, DC, August 2009. (MS student presentation)

J. Lee, E. Balsley, E. Ford, W. M. Reichert, M. Zammarano, J. W. Gilman, and D. M. Fox, "Hydrophobically Modified Cellulose Using 1,2-Epoxy-3-phenoxypropane and GlycidylPhenyl-POSS," 238th National ACS Conference, Washington, DC, August 2009. (undergraduate student presentation)

D. M. Fox, J. Lee, E. Ford, E. Balsley, M. Zammarano, S. Batko, and J. W. Gilman, "POSS – Modified Cellulose Nanofibrils," Cellulose Nanocomposites Symposium, 10th International Conference on Wood and Biofiber Plastic Composites, Forest Products Society, Madison, WI, 11 – 13 May 2009.

D. M. Fox, "POSS Surface Functionalization of Cellulose Nanofibrils," 2009 Annual NIST Fire Conference, Gaithersburg, MD, 28 – 30 April 2009.

D. M. Fox, P. C. Trulove, H. C. De Long, and P. H. Maupin, "Nonaqueous Solvchromatic Behavior of Nile Blue A Perchlorate in Imidazolium – Exchanged Clays and its Implication Toward Exfoliation in Polymeric Composites," 214th National ECS Meeting, Honolulu, HI, 12 – 17 October 2008.

D. M. Fox, L. Gonzales, S. Vempati, and S. Reuter, "1-Butyl-2,3-Dimethylimidazolium Dicyanamide via Metathesis Reactions: Influence of Counter-Cation Impurities on the

Properties of the Ionic Liquid,” 214th National ECS Meeting, Honolulu, HI, 12 – 17 October 2008.

M. G. Hanley, J. M. Green III, P. A. Fylstra, D. M. Fox, W. A. Henderson, H. C. De Long, and P. C. Trulove, “Amino Acid Based Ionic Liquids: Solvents for Improved Biopolymer Dissolution,” 210th National ECS Meeting, Cancun, Mexico, 29 October – 3 November 2006.

H. C. De Long, J. W. Gilman, J. R. Shields, A. B. Morgan, D. M. Fox, and P. C. Trulove, “Flammability and Thermal Analysis Characterization of Imidazolium Based Ionic Liquids,” 210th National ECS Meeting, Cancun, Mexico, 29 October – 3 November 2006.

D. M. Fox, P. A. Fylstra, W. A. Henderson, J. W. Gilman, P. C. Trulove, and H. C. De Long, “The Preparation and Characterization of Bombyx Mori Silk Nanocomposites Using Ionic Liquids,” 210th National ECS Meeting, Cancun, Mexico, 29 October – 3 November 2006.

R. A. Mantz, D. M. Fox, P. A. Fylstra, W. A. Henderson, J. W. Gilman, P. C. Trulove, and H. C. De Long, “Ionic Liquids as Solvents for Biopolymer Processing,” EUCHEM 2006 Conference on Molten Salts and Ionic Liquids, Hammamet, Tunisia, 16-22 September 2006.

J. W. Gilman, D. M. Fox, P. C. Trulove, H. C. De Long, and J. D. Stenger-Smith, “Flammability Properties of Ionic Liquids,” 231st National ACS Meeting, Atlanta, GA, 26-30 March 2006.

J. M. Green III, D. M. Fox, H. C. De Long, and P. C. Trulove, “Using Well Known Methods in Unprecedented Ways: The Dissolution/Reconstitution of Chitin and Chitosan Using Room Temperature Ionic Liquids,” 231st National ACS Meeting, Atlanta, GA, 26-30 March 2006.

D. M. Fox, J. M. Green III, S. Bellayer, J. W. Gilman, D. M. Phillips, R. A. Mantz, P. C. Trulove, and H. C. De Long, “The Preparation of *Bombyx Mori* Silk Nanocomposites Using Room Temperature Ionic Liquids,” 231st National ACS Meeting, Atlanta, GA, 26-30 March 2006.

J. W. Gilman, R. D. Davis, S. Bellayer, P. H. Maupin, D. Raghavan, J. K. Langat, S. Bourgibot, X. Flambard, D. M. Fox, P. C. Trulove, and H. C. De Long, “Use of Optical Probes and Laser Scanning Confocal Fluorescence Microscopy for High Throughput Characterization of Dispersion in Polymer Layered Silicate Nanocomposites,” 229th National ACS Meeting, San Diego, CA, 13-17 March 2005.

R. A. Mantz, H. C. De Long, L. F. Drummy, D. G. Conrady, M. O. Stone, R. R. Naik, D. M. Phillips, D. M. Fox, and P. C. Trulove, “Processing of *Bombyx mori* Silk Using Ionic Liquids,” 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

S. Bellayer, J. W. Gilman, N. Eidelman, S. Bourgibot, X. Flambard, D. M. Fox, H. C. De Long, and P. C. Trulove, “Preparation of Homogeneously Dispersed Trialkyl Imidazolium Compatibilized Muti Walled Carbon Nanotube/Polystyrene Nanocomposites Via Melt Extrusion,” 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

D. M. Fox, J. W. Gilman, H. C. De Long, and P. C. Trulove, "Decomposition Kinetics of 1-Butyl-2,3-Dimethylimidazolium Tetrafluoroborate and the Effects of Impurities Using TGA," 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

D. M. Fox, P. H. Maupin, S. Bellayer, M. Murariu, J. W. Gilman, P. C. Trulove, and H. C. De Long, "The Use of 1,2-Dimethyl-3-(Benzyl Ethyl Iso-butyl-POSS)imidazolium Chloride as an Organic Modifier in Polymer – Layered Silicate Nanocomposites," 206th National ECS Meeting, Honolulu, HI, 3-8 October 2004. (invited presentation)

P. C. Trulove, D. M. Fox, S. Bellayer, W. H. Awad, M. Murariu, J. W. Gilman, P. H. Maupin, and H. C. De Long, "The Use of Molten Salts for the Preparation of Novel Polymer Nanocomposites," EUCEM 2004 Molten Salts Conference, Piechowice, Poland, 20 - 25 June 2004. (invited presentation)

D. M. Fox, S. Bellayer, W. H. Awad, M. Murariu, R. D. Davis, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "The Use of Imidazolium Based Ionic Liquids for the Preparation of Polymer - Layered Silicate and Polymer - Carbon Nanotube Nanocomposites," EUCEM 2004 Molten Salts Conference, Piechowice, Poland, 20 - 25 June 2004. (invited presentation)

D. M. Fox, S. Bellayer, W. H. Awad, M. Murariu, R. D. Davis, J. W. Gilman, P. H. Maupin, H. C. De Long, and P. C. Trulove, "The Use of Imidazolium Based Ionic Liquids for the Preparation of Polymer – Layered Silicate Nanocomposites and Polymer – Carbon Nanotube Nanocomposites," Symposium on *Ionic Liquids in Polymer Systems*, 227th National ACS Meeting, Anaheim, CA, 28 March – 01 April 2004. (invited presentation)

P. C. Trulove, W. H. Awad, J. W. Gilman, C. Davis, R. D. Davis, T. E. Sutto, D. M. Fox, P. H. Maupin, and H. C. De Long, "Application of Trialkylimidazolium Ionic Liquids and Salts to the Preparation of Polymer-Clay Nanocomposites," Symposium on *Ionic Liquids III: Fundamentals, Progress, Challenges, and Opportunities*, 226th National ACS Meeting, New York, NY, September 2003.

D. M. Fox, W. H. Awad, J. W. Gilman, P. H. Maupin, T. E. Sutto, H. C. De Long, and P. C. Trulove, "Thermal and Kinetic Studies of Trialkylimidazolium Salts," Symposium on *Ionic Liquids III: Fundamentals, Progress, Challenges, and Opportunities*, 226th National ACS Meeting, New York, NY, September 2003.

D. M. Fox, W. H. Awad, R. D. Davis, J. W. Gilman, P. H. Maupin, T. E. Sutto, P. C. Trulove, and H. C. De Long, "Thermal Properties of Several Trialkylimidazolium Salts," Saskatchewan Green Chemistry Conference, Regina, SK, Canada, May 2003.

D. M. Fox and L. Leifer, "Thermodynamic Studies of Ternary Systems: III. Me₄NCl – Bu₄NCl – H₂O at 25°C", Paper 276, Symposium on *Equilibrium Thermodynamics and Statistical Mechanics*, 222nd National ACS Meeting, Chicago, IL, August 2001.

L. Leifer and D. M. Fox, "Treatment of Systems Which Do Not Obey Harned's Rule", Paper P1-MON-3, Symposium on *Connections Between Theory and Experiment*, 16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, August 2000.

D. M. Fox and L. Leifer, "Thermodynamics of Studies of Ternary Systems: II. LiCl - Bu₄NCl - H₂O at 25°C and High Total Ionic Strengths", Paper P7-MON-3, Symposium on *Other Aspects of Thermodynamics*, 16th IUPAC Conference on Chemical Thermodynamics, Halifax, Nova Scotia, August 2000.

Work in Progress:

D. M. Fox, J. Lee, E. Ford, E. Balsley, M. Zammarano, and J. W. Gilman, "Reduced Polymer Flammability Using POSS-Modified Cellulose," supported by the NIST – BFRL Extramural Fire Research Grant Program.

K. Tokarz, S. Reuter and D. M. Fox, "Liquid and Solvent Properties of the Mixtures, (S)-(-)-Ethyl Lactate + Ethyl Acetate and (S)-(-)-Ethyl Lactate + Ethanol."

D. M. Fox, P. C. Trulove, H. C. De Long, and P. H. Maupin, "Effects of Clay Type and Co-Absorbed Surfactant on the Solvatochromism of Nile Blue Tagged Clays."

RESEARCH

Grants Received:

I. Internal Grants

Spring 2011 Faculty Mellon Fund Competition, "Ion Exchange Equilibria and Kinetics of Lignosulfonates," funding of \$1450 for Summer Semester 2011 from American University College of Arts and Sciences, 18 April 2011.

American University Equipment Grants for the Sciences, separate proposals requesting funds for a Potentiostat/Galvanostat/Frequency Analyzer (\$31,418 - funded), Atomic Absorption Spectrometer & Ion Chromatograph (\$121,000 – not funded), October 31, 2009, Offices of the Dean of the College of Arts and Sciences and the Provost, American University.

American University Equipment Grants for the Sciences, separate proposals requesting funds for a Differential Scanning Calorimeter (\$78,820 - funded), Atomic Absorption Spectrometer & Ion Chromatograph (\$99,360 – not funded), Flashpoint Tester (\$8,370 – not funded), and Dielectric Cell (\$4,940 – not funded), December 12, 2008, Offices of the Dean of the College of Arts and Sciences and the Provost, American University.

Summer 2008 Dean's Undergraduate Research Award and funding of \$3000 from Dean's Discretionary Fund, "Transport and Interfacial Properties of an Ionic Liquid Polymer Gel Electrolyte," project supervisor for Sriram Vempati, from American University College of Arts and Sciences, 29 April 2008.

Fall 2007 Faculty Mellon Fund Competition, “Empowering Students with Alternative Energy Technology,” funding of \$1950 for Spring Semester 2008 from American University College of Arts and Sciences, 8 November 2007.

Faculty Research Award AY 2007-08, “Thermodynamic and Transport Properties of Room Temperature Ionic Liquid – Electrolyte Solutions,” funding of \$7,500 for May 1, 2007 – April 30, 2008 from American University College of Arts and Sciences, 15 March 2007.

Fall 2006 Faculty Mellon Fund Competition, “Enhancing Student Experiences in the Chemistry Department Laboratories,” funding of \$2000 for Spring Semester 2007 from American University College of Arts and Sciences, 17 October 2006.

II. External Grants

PI on “Lignocellulosic Materials as Intumescent Flame Retardants for Bio-based Polymer Composites”, NIST – BFRL Extramural Fire Research Grants Program, part of the 2011 Measurement, Science, and Engineering Research Grants Program, funding of \$410,580 awarded for 2011 – 2014. Research conducted at the National Institute for Standards and Technology.

PI for Symposium Organizational Grants for Molten Salts and Ionic Liquids 17, funding of \$25,000 from the Air Force Office of Scientific Research and \$5,000 from the Army Research Office. Funds transferred directly to the Electrochemical Society for costs associated with the MSIL 17 Symposium to be held at the ECS 2010 National Meeting in Las Vegas, NV, October 10 – 15, 2010.

Air Force Office of Scientific Research, “POSS-Modified Cellulose for Improved Biopolymer Performance,” Defense University Research Instrumentation Program (AFOSR – DURIP), funding of \$300,000 awarded for July 2010 – June 2011.

PI on “Reduced Polymer Flammability Using POSS-Modified Cellulose”, NIST – BFRL Extramural Fire Research Grants Program, part of the 2008 Measurement, Science, and Engineering Research Grants Program, funding of \$271,838 awarded for 2008 - 2011. One year no-cost extension granted through August 2012. Research conducted at the National Institute for Standards and Technology.

PI for Symposium Organizational Grants for Molten Salts and Ionic Liquids 16, funding of \$20,000 from the Air Force Office of Scientific Research and \$5,000 from the Army Research Office. Funds transferred directly to the Electrochemical Society for costs associated with the MSIL 16 Symposium to be held at the ECS 2008 Joint International Meeting in Honolulu, HI, October 12 – 17, 2008.

Co-PI with Dr. Richard Colton (NRL, PI) on “Examination of Non-enzymatic Synthesis of Peptides and Polypeptides in Ionic Liquids,” funding of \$42,000 for CY03 from Air Force Office of Scientific Research. Funds transferred to the Naval Research Laboratory. Work carried out at the Naval Research Laboratory.

Proposals Submitted:

None.

Proposals in Preparation:

None.

EDITORIAL ACTIVITIES

Co-organizer for the 2012 ECS – 18th International Symposium on Molten Salts and Ionic Liquids.

Lead organizer and lead editor for the 2010 ECS – 17th International Symposium on Molten Salts and Ionic Liquids.

Lead editor and co-organizer for the 2008 ECS – 16th International Symposium on Molten Salts and Ionic Liquids. “Molten Salts and Ionic Liquids 16,” D. Fox, R. Mantz, R. Hagiwara, S. Dai, P. Trulove, and H. De Long, Eds., The Electrochemical Society: Pennington, NJ, *ECS Transactions*, 16(49), 2009, 599 pp.

Co-editor of *Molten Salts 15: In Memory of Robert Osteryoung*, R. Mantz, H. De Long, R. Hagiwara, G. Stafford, P. Trulove, and D. Fox, Eds., *ECS Transactions*, 3(35), 2007.

Book reviewer for JACS “Book Reviews” section (see publications list) and University Science Books.

Manuscript reviewer for Journal of the American Chemical Society, Journal of the Electrochemical Society, Applied Clay Science, Journal of Chemical Thermodynamics, Journal of Polymer Science, Journal of Materials Science, Polymer Degradation and Stability, Advanced Functional Materials, and Macromolecules.

Proposal reviewer for NIST small grants, CUNY small grants programs, and NSF Experimental Physical Chemistry Division.

TEACHING RESPONSIBILITIES

Courses taught at AU:

CHEM510 – Advanced Physical Chemistry

CHEM511 – Advanced Physical Chemistry Laboratory

CHEM410 – Biophysical Chemistry

CHEM411 – Biophysical Chemistry Laboratory

PHYS440 – Experimental Physics

CHEM110 – General Chemistry I

CHEM490 – Independent Study Project in Chemistry

CHEM360/660 – Topics in Environmental Chemistry

CHEM560 – Biochemistry I

Internships, Co-ops, and Independent Studies Supervised:

Independent Study Projects

AY2011-12

Laura Flynn, “Reduced Flammability of Poly(lactic acid) Using Modified Lignocellulosics.”

Srilatha Temburni, “Phosphorylation of Cellulose Nanofibrils in PLA Composites.”

Amina Bendoukha, “Comparison of Techniques for Trace Ion Concentration Determination.”

AY2010-11

Jieun Lee, “Preparation of Modified Cellulose Using Ionic Liquids”

Laura Flynn, “Cationic Cellulose Synthesis for Improved Flame Resistance”

David Wong, “Conductivities of Ionic Liquid – Polymer Gel Electrolytes”

Chris Citro, “Thermal Properties of Cellulose – Poly(lactic acid) Composites”

Amina Bendoukha, “Thermodynamics of Ion Exchanged Sodium Lignosulfonate”

Babak Kamyab, “Polymer Composites Using Cellulose Encapsulated POSS”

AY2009-10

Jieun Lee, “Preparation of Modified Cellulose Using Ionic Liquids”

Kira Tokarz, “Heat Capacities of Ethyl Lactate – Ethyl Acetate Mixtures Using DSC”

Stephen Kos, "Temperature Dependence of the Solvatochromic Behavior of Ethyl Lactate – Ethyl Acetate Mixtures"

Bill Lustig, "The Chemistry of Colors: Inorganic Complexes"

Jennifer Jones, "POSS – Glucoside Block Co-Polymers as Surfactants for Cellulose – PLA Composites"

AY2008-09

Seth Reuter, "Physical Properties of Ethyl Lactate Mixtures."

Laetitia N'dri, "Biodiesel Synthesis Using Clay- and Polymer- Bound Catalysts"

Erica Ford, "Characterization of Flame Retardant – Polystyrene Nanocomposites"

Jieun Lee, "Preparation of Modified Cellulose for the Preparation of Polystyrene Nanocomposites"

Eric Balsley, "Ionic Liquid – Polymer Gel Electrolytes: Conductivity Effects of Polymer Hydrophobicity and Molecular Weight"

AY2007-08

Leah Gonzales, "Physicochemical Properties of Environmentally Benign Solutions."

Laetitia N'dri, "Biodiesel Synthesis: Comparison of Catalysts." (aka "Biodiesel Synthesis Using Cation Exchanged Clay Catalysts")

Brian Kelleher, "Optimization of a Homemade Electromagnet."

Sriram Vempati, "Transport and Interfacial Properties of an Ionic Liquid Polymer Gel Electrolyte."

AY2006-07

Joseph Balinas, "Solvent Effects on the Spectral Characteristics of Dyes and Dyed Clays."

Samantha Shterengarts, "Effects of Hydrophobic Additives on Bioplastic Properties." (aka "Preparation and Characterization of Biofiber – Gelatin Nanocomposites Using Hydrophobic Plasticizers.")

Supervision of Thesis & Dissertations:

Victor Schultz, MS Candidate, Committee Member (2011)

Dina Lloyd, MS Candidate, Committee Member (2011)

Rostislav Kuskovsky, MS Candidate, Committee Member (2011)

Jake Chae, PhD Candidate, Committee Member (2009)

Alyssa Ashley, MS Candidate, Committee Member (2008)

CURRICULUM DEVELOPMENT

Fall 2010-2011, CHEM470,471,570,571 – Co-developed new laboratory courses to replace current advanced chemistry labs.

Spring 2010, CHEM360/660 – Developed a course on the “Chemistry of the Environmental Cycles” for the Topics in Environmental Chemistry Course.

Fall 2006, CHEM511 – Designed 8 new laboratory experiments to increase hands-on experience of quantum chemistry effects for students taking the course.

Fall 2007 & Fall 2008, CHEM602 – Developed two new lectures for the graduate Research Method Design course: “Laboratory Safety and Experimental Design” and “Styles and Formatting.”

Spring 2006-2010, CHEM411 – Designed 11 new laboratory experiments to provide students with hands-on experience with topics relevant to biochemical and environmental applications of physical chemistry.

Spring 2006, PHYS440 – Integrated 7 new laboratory experiments with 3 existing ones to provide students with hands-on experience relevant to advanced physics concepts.

In Progress, HNRS-301 – Developing a course on the “History of Global Warming Science” for the Honors Colloquium in Natural and Mathematical Sciences.

DEPARTMENT AND UNIVERSITY SERVICE

Chemistry Department Faculty Search Committees, F07 – present.

Pro bono lectures for CHEM602 on “Laboratory Safety and Measurement Techniques” and “Styles and Formatting” every fall semester, F08 – present.

Departmental Manager for the Chemistry Department’s University Curriculum Assessment Plan, S09 - present.

Chemistry Department Graduate Program Coordinator, F11 - present.

Acting Chair of the Department of Chemistry, X11.

Ad-hoc committee on the development of advanced chemistry laboratories focusing on research based approach to experimental chemistry, F10 – S12.

Research Grants Reporting Project, S11 – X11.

Beeghly Renovation Committee, F06 - present.

Environmental Science PhD Program Exploratory Committee, F06 – present.

Environmental Issues Project Team, F06 – S10.

Chemistry Department Chair Search Committee, S07.

Environmental Science Undergraduate Curriculum Committee, F07 – S08.

Chemistry Department Representative for Educational Policy Committee, F07 – S09.

Faculty advisor for Habitat for Humanity student group, F07 – S09.

Faculty profile in CAS Connections, September 2007 issue.

Pro bono lecture for CHEM602 on Laboratory Safety and Measurement Techniques (09/04/07).

Guest Lectures for Environmental Science Courses, “Green Chemistry” and “Bioplastics”, F07 & S08.

Chemistry Department Representative at AU Recruiters seminar (01/11/07) and AU Science Graduate Open House (02/19/07).

Guest Speaker and Panelist at AU’s on-campus conference, Focus the Nation on Climate Change, “Alternative Energy: The Winds of Change,” (01/31/08).

Initiated development of new Chemistry Department Brochure, S07 – F08.

Chair of Undergraduate Chemistry Textbook Adoption Committee, S08, S09, & S11.

Interview with Communications graduate students on “The fate of plastics in the environment”, (04/02/08).

Guest Speaker at 2nd Year Faculty Luncheon, “Recommendations for Securing External Funding,” (10/08/08).

Faculty interviews for recently awarded research grant in CAS Connections (November 2008 issue) & Catalyst (Spring 2009 issue).

Panelist at the 20th Anniversary Ann Ferren Teaching Conference, “Show Me the Money! – Strategies for Effective Grant Writing,” (01/09/09).

Judge for poster sessions at 19th Robin Mattius Student Research Conference, April 4, 2009.

PROFESSIONAL SERVICE

Professional Organization Memberships:

American Chemical Society

Clay Minerals Society

Electrochemical Society

Sigma Xi

Professional Activities:

Co-organizer for “18th International Symposium on Molten Salts and Ionic Liquids,” to held at the PRiME 2012 Joint International Meeting of the ECS, October 2012.

Lead organizer for “17th International Symposium on Molten Salts and Ionic Liquids,” 218th National ECS Meeting, Las Vegas, NV, 10 – 15 October 2010.

Co-organizer for “16th International Symposium on Molten Salts and Ionic Liquids,” held at the PRiME 2008 Joint International Meeting of the ECS, 12 October – 17 October, 2008.

Chairman of “Symposium Session I5: Molten Salts & Ionic Liquids 16,” 214th National ECS Meeting, Honolulu, HI, 12 – 17 October 2008.

Chairman of “Symposium Session I1: Physical and Electrochemistry General Session”, 210th National ECS Meeting, Cancun, Mexico, 29 October – 3 November 2006.

Chairman of “Symposium Session I4: Molten Salt 15, In Memory of Robert Osteryoung”, 210th National ECS Meeting, Cancun, Mexico, 29 October – 3 November 2006.

COMMUNITY AND CIVIC ACTIVITIES

Interview with High School students as a part of National Council for Science and the Environment, EnvironMentors Program, December 2006.

Participant in Annual Environmental Science Department Hike at Great Falls National Park, August 31, 2008.

Laboratory project supervisor for middle school student, Jimmy Park, Spring 2009.