

Center for Membrane Applied Science and Technology

Twentieth Update, July 31, 2010

Publication and Presentation List, from Inception of MUC (2001)

to the end of the 4th year, 2nd award

Publications are listed in chronological order

most recent year first.

MAST Center Peer-Reviewed Publications Entries	Year
Krantz, W.B.; Greenberg, A.R.; and Hellman, D.J.; "Dry-casting" Computer Simulation, Sensitivity Analysis, Experimental and Phenomenological Model Studies", <i>Journal of Membrane Science</i> , 354, 178-188 (2010)	2010
Hudiono, Y.C.; Carlisle, T.K.; Bara, J.E.; Zhang, Y.; Gin, D.L. and Noble, R.D.; "A Three--Component Mixed-Matrix Membrane with Enhanced CO <sub>2</sub> Separation Properties Based on Zeolites and Ionic Liquid Materials", <i>Journal of Membrane Science</i> , 350 (1-2), 117-123 (2010).	2010
Gibbons, W.T.; Zhang, Y.; Falconer, J.L.; and Noble, R.D.; "Inhibiting Crystal Swelling in MFI Zeolite Membranes", <i>Journal of Membrane Science</i> , 357, 54-61 (2010).	2010
Yu, M.; Funke, H.H.; Noble, R.D.; and Falconer, J.L.; "Gated Ion Transport through Dense Carbon Nanotube Membranes", <i>Journal of the American Chemistry Society</i> , 132, 8285-8290 (2010).	2010
Zhang, Y.; Avila, A.M.; Tokay, B.; Funke, H.H.; Falconer, J.L.; and Noble, R.D.; "Blocking Defects in SAPO-34 Membranes with Cyclodextrin", <i>Journal of Membrane Science</i> , 358 (1-2)	2010
"Sorenson, S.G.; Payzant, E.A.; Noble, R.D.; and Falconer, J.L.; "Influence of Crystal Expansion/Contraction on Zeolite Membrane Permeation", " <i>Journal of Membrane Science</i> 357, 98-104 (2010).	2010
Hatakeyama, E.S.; Wiesenauer, B.R.; Gabriel, Noble, R.D.; and Gin, D.L.; "Nanoporous, Bicontinuous Cubic Lyotropic Liquid Crystal Networks via Polymerizable Gemini Ammonium Surfactants", <i>Chemistry of Materials</i> , 22, 4525-4527 (2010).	2010
Smith, G.D.; Borodin, OI; Magda, J.J.; Boyd, R.H.; Wang, Y.S.; Bara, J.E.; Miller, S.; Gin, D.L. and Noble, R.D.; "A comparison of Fluoro-derivatized Imidazolium: Tfsi and Alkyl-derivatized Imidazolium: TFSI Ionic Liquids: A Case Study", <i>Physical Chemistry Chemical Physics</i> , 12(26), 7064-7076 (2010).	2010
Bara, J.E.; Gabriel, C.J.; Carlisle, T.K.; Camper, D.E.; Finotello, A.; Gin, D.L. and Noble, R.D.; "A Guide to CO <sub>2</sub> Separations in Imidazolium-based Room-Temperature Ionic Liquids", <i>Industrial and Engineering Chemistry Research</i> , 48(6) 2739-2751 (2009).	2009
Bara, J.E.; Gabriel, C.J.; Carlisle, T.K.; Camper, D.E.; Finotello, A.; Gin, D.L. and Noble, R.D.; "Gas Separations in Fluoroalkyl-functionalized Room-Temperature Ionic Liquids Using Supported Liquid Membranes", <i>Chemical Engineering Journal</i> , 147, 43-50 (2009).	2009
Bara, J.E.; Noble, R.D. and Gin, D.L.; "Effect of 'Free' Cation Substituent on Gas Separation Performance of Polymer--Room-Temperature Ionic Liquid Composite Membranes", <i>Industrial and Engineering Chemistry Research</i> , 48(9) 4607-4610 (2009).	2009
LaFrate, A.L.; Bara, J.E.; Gin, D.L.; and Noble, R.D.; "Synthesis of Diol-functionalized Imidazolium-based Room-Temperature Ionic Liquids with Bis(trifluoromethanesulfonimide) Anions that Exhibit Switchable Water Miscibility", <i>Industrial and Engineering Chemistry Research</i> , 48(18) 8757-8759 (2009)	2009
Lin, L.; Peterson, M.L.; Greenberg, A.R.; and McCool, B.A.; "In Situ Measurement of Permeability, <i>JASA Express Letters, Journal of the Acoustics Society of America</i> , 125 (4), April 2009, EL 123-125 (2009).	2009
Lin, L.; Wang, Z.; Peterson, M.L.; "Conditions for Bifurcation of the Longitudinal Wave in a Porous Medium." <i>Acta Acustica United with Acustica</i> , Volume 95, No. 2., March April 2009, pp 373-378.	2009
Loh, S.; Buescher, U.; Poddar, T.K.; Porter, A.G.; Wingard, J.M.; Wickramasinghe, S.R.; and Husson S.M.; "Interplay Among Membrane Properties, Protein Properties and Operating Conditions on Protein Fouling During Normal Flow Microfiltration." <i>Journal of Membrane Science</i> , 332 (1-2), 93-103. (2009)	2009

<b>MAST Center Non-Peer Reviewed Journal Articles</b>	<b>Year</b>
Anim-Mensah, A.; Franklin, J; Salazar, L; Mast, D; Mark, J; Clarson, S; and Krantz, W.B.; "Use of Ultrasound to Determine Selected Mechanical Properties of Silicone Films", submitted for publication in Science and Technology of Silicone and Silicone Modified Materials, Oxford University Press, 2006.	2006

<b>MAST Center Masters Thesis Entries</b>	<b>Year</b>
Loh, Shytyug, "The Influence of Membrane Hydrophilicity and Microstructure on Flux Decline During Protein Microfiltration," M.S. Thesis, Colorado State University, 2008 (Wickramasinghe, R.)	2008
Mukherjee, Abhik, "Characterization of Ultrafiltration Membranes", M.S. Thesis, Colorado State University, 2008 (Wickramasinghe, R.)	2008
Evans, Emily, "'Ultrasonic Reflectometry for Monitoring Biofilm Growth on Water Treatment Membranes", M.S. Thesis, University of Colorado (M.T. Hernandez and A.R. Greenberg), 2005.	2005
Franklin, J.; "Implantation of Biocompatible Fibers for the Coupling of Muscle Groups", M.S. Thesis, University of Cincinnati, July, 2005 (Clarson, S.)	2005
Jain, Abhishek, "Development of Membranes Using Liquid Crystal Polymers", M.S. Thesis, University of Cincinnati, January 2005 (Govind, R.).	2005
Sarang, Sanjay, "Methacrylate and Ca-alginate polymers as barrier coatings for protection and controlled release of Vitamin C", M.S. Thesis, University of Cincinnati, 2004 (Guliant, V., and Lin, Y.S.)	2004
Shah, Mitesh, "An Analysis of Membrane-Based Hybrid Processes", M.S. Thesis, University of Colorado, 2004 (Noble, R.D., and Clough, D.)	2004
Gupta, Vineet, "Experimental and Theoretical Studies in Reverse Osmosis and Nanofiltration", M.S. Thesis, University of Cincinnati, 2003 (Krantz, W.B. , and Hwang, S.-T.).	2003
Hartmann, R.L., "Studying Sample-Membrane Interactions Using Flow Field-Flow Fractionation", M.S. Thesis, Colorado School of Mines, Golden, 2002 (Williams, K.).	2002

MAST Center Ph.D Thesis Entries	Year
Bhut, Bharat; "Design of Advanced Ion-Exchange Membranes and Their Performance Assessment for Downstream Chromatographic Bioseparations," Ph.D. Thesis, Clemson University, August 2010	2010
Li, Weiyi; "Fouling Models for Optimizing Asymmetry of Microfiltration Membranes", Ph.D. Thesis, University of Cincinnati, Cincinnati, 2009 (Ho, C.C.)	2009
Anim-Mensah, A.; "Evaluation of Solvent Resistant NanoFiltration (SRNF) Membranes for Small-Molecule Purification and Recovery of Polar Aprotic Solvents for Re-Use," Ph.D. Thesis, University of Cincinnati, August 2007 (Clarson, S.)	2007
Camper III, Dean E., "Gas Solubility and Diffusion in Room Temperature Ionic Liquids with an Emphasis on Gas Separations", Ph.D. Thesis, University of Colorado, 2006 (Noble, R.D., and Koval, C.)	2006
Kim, T.-U., "Transport of Organic Micropollutants through Nanofiltration (NF) and Reverse Osmosis (RO) Membranes: Mechanisms, Modeling, and Applications", Ph.D. Thesis, University of Colorado, May 2006. (Amy, G.; Summers, R.S.; Drewes, J.)	2006
Zhang, Zhongxia, "Development of Sensors for Real-time Characterization of Concentration, Polarization and Membrane Fouling", Ph.D. Thesis, University of Colorado, Boulder, 2005 (Greenberg, A.R., and Bright, V.M.).	2005
Lee, N., "Natural Organic Matter (NOM) Fouling of Low-Pressure (MF and UF) Membranes: Identification of Foulants, Fouling Mechanisms, and Evaluation of Pretreatment", Ph.D. Thesis, University of Colorado, 2004. (Amy, G.)	2004
Bowen, T., "Fundamentals and Applications of Pervaporation Through Zeolite Membranes," Ph.D. Thesis, University of Colorado, Boulder, December 2003, (Falconer, J. and Noble, R.D.).	2003
Hu, Naiping, "Molecular simulation of Polyphosphazenes as Gas Separation and Direct Methanol Fuel Cell (DMFC) Membranes", Ph.D. Thesis, University of Cincinnati, December 2003 (Fried, J.).	2003
Matsuno, N., "Theoretical and Experimental Studies of Ion Transport Through Biological Membrane Channels", Ph.D. Thesis, University of Cincinnati, August, 2003 (Beck, T.)	2003
Her, N., "Identification and Characterization of Foulants and Scalants on an NF Membrane", Ph.D. Thesis, University of Colorado, 2002. (Amy, G.)	2002
Jarusutthirak, C., "Fouling and Flux Decline of Reverse Osmosis, Nanofiltration, and Ultrafiltration Membranes Associated with Effluent Organic Matter during Wastewater Reclamation/Reuse", Ph.D. Thesis, University of Colorado, 2002. (Amy, G.)	2002
Ramaswamy, Senthilkumar, "Development of an Ultrasonic Technique for the Non-Invasive Characterization of Membrane Morphology", Ph.D. Thesis, University of Colorado, Boulder, 2002 (Greenberg, A.R., Peterson, M.).	2002
Soice, Neil P., "Organic and Inorganic Polyamides: Studies of Their Synthesis and Reactivity," Ph.D. Thesis, University of Colorado, Boulder, 2001, (Norman, A.D. and Greenberg, A.R.).	2001

MAST Center Presentations - Entry	Year
"Role of polymer molecular architecture on trace impurity removal using membranes prepared by surface-initiated polymerization", B. Bhut, J. Weaver, S.R. Wickramasinghe, S. Husson, American Chemical Society Meeting, San Francisco, CA March 21-25, 2010	2010
"Polymeric Membrane Formation", W. Krantz, Chuan Yuan University, Taipei Taiwan, April 2, 2010	2010
"Use of Ultrasound for Membrane and Membrane Process Characterization", W. Krantz, Chang Gung University, Taipei Taiwan, April 7, 2010	2010
"Use of Ultrasound for Membrane and Membrane Process Characterization", W. Krantz, National Taiwan University, Taipei Taiwan, April 8, 2010	2010
"Polymeric Membrane Formation", W. Krantz, Istanbul Technical University, Istanbul, Turkey, April 16, 2010	2010
"CO2 Separations in Ionic Liquids and Polymers", R.D. Noble, COIL Meeting, Cairns Australia, May 31-June 4, 2009	2009
"CO2 Separations using Ionic Liquids and Polymers", R.D. Noble, Korean Institute of Chemical Engineers, Seoul, Korea, October 22, 2009.	2009
"CO2 Separations using room temperature ionic liquid-inorganic nanoparticle based membranes", Y. Hudiono, T. Carlisle, J. Bara, A. LaFrate, R.D. Noble, and D. Gin, 2009 AIChE Annual Conference, Nashville, TN Nov 8-13, 2009.	2009
"CO2 Solubility and Selectivity in Room-Temperature Ionic Liquids and Metal Organic Framework Composites", Y. Hudiono, O. Farha, J. Bara, J. Hupp, R.D. Noble and D. Gin, 17th Symposium on Thermophysical Properties, Boulder, CO 6/23/09.	2009
"Comprehensive Experimental Studies of Early-Stage Membrane Scaling During Nanofiltration", K. Cobry, A. Greenberg and V. Bright, North American Membrane Society Annual Meeting, Charleston, SC, June 2009	2009
"Effect of Aryl and Alkyl-chain substituents on CO2 solubility in Imidazolium Based Temperature Ionic liquids", A. Finotello, J. Bara, B. Wiesenauer, S. Narayan, and R.D. Noble, COIL Meeting, Cairns Australia May 31-June 4, 2009	2009
"Enhanced CO2 Solubility in Aromatic and Alkyl Chain Substituted Imidazolium-based Room Temperature Ionic Liquids", A. Finotello, J. Bara, S. Narayan, D. Gin and R.D. Noble, 17th Symposium on Thermophysical Properties, Boulder, CO 6/23/09.	2009
"Gas separations using ionic liquid polymers", R.D. Noble, Euromembrane 2009 Conference, Montpellier, France, September 6-10, 2009.	2009
"Ionic Liquid Polymers for Highly Selective CO2 Separations", R.D. Noble, EPRI Workshop on CO2 Capture, Chicago, IL May 13, 2009	2009

"Ionic Liquid-based Solutions to CO <sub>2</sub> Capture and Separation", J. Bara, D. Camper, R.D. Noble and D. Gin, 17th Symposium on Thermophysical Properties, Boulder, CO 6/23/09	2009
"Ionic Liquids: Synthesis through Applications", R.D. Noble, Plenary Lecture, Regional Ionic Liquids Conference, University of Malaysia, November 24, 2009.	2009
"MAST Center Membrane Desalination Research", A.R. Greenberg, New Mexico State University, July 2009, Los Cruces, NM.	2009
"MAST Center Membrane Research", A.R. Greenberg, Donaldson Membranes, June 2009, Philadelphia, PA.	2009
"MAST Center Membrane Research", A.R. Greenberg, MWH Global Inc. Research Partnership Workshop Follow-up Meeting, December 2009, Broomfield, CO	2009
"Membrane Applications for Ultrasonic Reflectometry (UR): Current Work and Future Prospects", A.R. Greenberg, Beijing University of Chemical Technology, April 2009, Beijing China. Invited Presentation.	2009
"New ionic liquid-based materials for toxic chemical vapor and CWA simulant separation and sorption", R.D. Noble, invited lecture, 2009 Polymers and Ionic Liquids conference, Arlington VA Oct. 5-7, 2009.	2009
"New Lyotropic Liquid Crystals and Nanostructured Polymers Based on Imidazolium Ionic Liquid Platforms", D. Gin, J. Bara, B. Wiesenaus, C. Gabriel, T. Carlisle, M. Reynolds, E. Hatakeyama, and R.D. Noble, COIL Meeting, Cairns Australia, May 31-June 4, 2009	2009
"Newly developed composite membranes based on room temperature ionic liquid for barrier films", Y. Hudiono, A. LaFrate, R.D. Noble, and D. Gin, 2009 Chemical and Biological Defense Science and Technology, Dallas, TX, November 16-20, 2009.	2009
"Novel High-Recovery Desalination Process for Brackish Groundwater", A.R. Greenberg, MWH Inc. Research Partnership Workshop Follow-up Meeting, December 2009, Broomfield, CO.	2009
"Novel Membrane Materials", R.D.Noble, D. Gin, and J. Falconer, North American Membrane Society Annual Meeting, Charleston, SC June 20-24, 2009.	2009
"Novel Multilayer mixed matrix zeolite polymerized room-temperature ionic liquid membrane for CO <sub>2</sub> /N <sub>2</sub> and CO <sub>2</sub> /CH <sub>4</sub> gas separation", Y. Hudiono, R.D. Noble, D. Gin, Poster Presentation, North American Membrane Society Meeting, Charleston, SC June 20-24, 2009	2009
"Novel New membrane materials", R.D. Noble, New Young Membrane Researchers Conference, Meze, France, September 4, 2009	2009
"Research Planning and Decision Making", A.R. Greenberg, NSF I/U CRC Director's Meeting, January 2009, Washington, DC	2009

"Testing of ionic liquid transport properties, P. Uchytíl, R. Noble, Wu, Petrychkovych, Suen, Poster presentation, North American Membrane Society Annual Meeting, Charleston, SC June 20-24, 2009	2009
"The Impact of Crossflow Velocity on MF Membrane Fouling Associated with Microbial Broth and its Components", E. Kujundzic, A.R. Greenberg, M.T. Hernandez and R. Fong, North American Membrane Society Annual Meeting, Charleston, SC June 2009	2009
"Use of Ultraonic Sensors in Membrane Applications", A.R. Greenberg, National University of Singapore, June 2009, Singapore. Invited Presentation.	2009
"Acoustic Sensing of Membranes and Membrane Fouling", W.B. Krantz, presented at the Sensors and Monitoring Systems in Water & Membranes Workshop, WaterHub Auditorium, Singapore, August 13, 2009.	2009
"Comprehensive Experimental Studies of Early-Stage Membrane Scaling During Nanofiltration." K. Cobry, A.R. Greenberg, and V.M. Bright, North American Membrane Society Annual Meeting, Charleston, SC, June 2009.	2009
"Designing Virus Surrogates", E. Stump, G. Gutierrez, S.M. Husson, J. Pellegrino, and S.R. Wickramasinghe, Poster Presentation, North American Membrane Society Annual Meeting, Charleston, SC, June 2009.	2009
"Evaluation of Anion Exchange Membranes for the Removal of Trace Impurities from Mammalian Cell Culture Derived Protein Solutions", J.R. Weaver, S.M. Husson, and S.R. Wickramasinghe, North American Membrane Society Annual Meeting, Charleston, SC, June 2009.	2009
"Interplay Among Membrane Properties, Protein Properties and Operating Conditions on Protein Fouling During Normal Flow Microfiltration", S. Loh, U. Beuscher, T.K. Poddar, A.G. Porter, J. Wingard, S.M. Husson, and S.R. Wickramasinghe, Oral presentation, North American Membrane Society Annual Meeting, Charleston, SC, June 2009.	2009
"Membrane Applications for Ultrasonic Reflectometry (UR): Current Work and Future Prospects." A.R. Greenberg, Beijing University of Chemical Technology, Beijing, China, April 2009.	2009
"The Impact of Crossflow Velocity on MF Membrane Fouling Associated with Microbial Broth and its Components." E. Kujundzic, A.R. Greenberg, M.T.Hernandez and R. Fong, North American Membrane Society Annual Meeting, Charleston, SC, June 2009.	2009
"Use of Ultrasonic Sensors in Membrane Applications." A.R. Greenberg, National University of Singapore, June 2009.	2009
"A Novel Method to Fabricate Ultrafiltration Membranes", C.C. Ho, C. Co, ICOM, Honolulu, HI, July 2008.	2008
"Effects of Asymmetric Structure on Membrane Fouling", C.C. Ho, C. Co, and W. Li; Recovery of Biological Products, Quebec Canada, June 2008.	2008

<p>"Evaluation of Anion Exchange Membranes for the Removal of Trace Impurities from Mammalian Cell Culture Derived Protein Solutions", J.R. Weaver, S.M. Husson, and S.R. Wickramasinghe, AIChE Annual Meeting, Philadelphia PA, 16-21 November, 2008.</p>	2008
<p>"Evaluation of Anion Exchange Membranes for the Removal of Trace Impurities from Mammalian Cell Culture Derived Protein Solutions", Weaver, J., Wickramasinghe, R., Husson, S.M., Bailey, M., Iowa State University 2008 Biochemical Engineering Symposium, 2008.</p>	2008
<p>"Monitoring Protein Fouling on Polymeric Membranes Using Ultrasonic Frequency-Domain Reflectometry." E. Kujundzic, A.R. Greenberg, M. T. Hernandez, C.C. Ho, and W. Li; Keynote Presentation, ICOM, Honolulu, HI, July 2008.</p>	2008
<p>"Scaleable membrane separations for the lignocellulosic-to- ethanol biorefinery", J. Pellegrino, K. Colyar, M. G. D. Gutierrez-Padilla, J. Hettenhaus, and D. Schell; ICOM, Honolulu, HI, 2008.</p>	2008
<p>"Smart Membranes for Flavor Delivery", K. Heitfeld and D.W. Schaefer, Annual Meeting of the American Crystallographic Association, Invited Presentation, Salt Lake City, UT, 2008.</p>	2008
<p>"The Impact of Pharmaceutical Broth Components on Microfiltration Membrane Flux-Decline", E. Kujundzic, A. R. Greenberg, M.T. Hernandez, and R. Fong; ICOM, Honolulu, HI, July 2008.</p>	2008
<p>"Theoretical Analysis of the Effects of Asymmetric Structure on Fouling during Microfiltration", C.C. Ho, C. Duclos-Orsello, and W. Li; ICOM, Honolulu, HI, July 2008.</p>	2008
<p>"Detection of Protein Fouling on Membrane Surfaces Using Ultrasonic Reflectometry", E. Kujundzic, C.C. Ho., W. Li, A.R. Greenberg, and M.T. Hernandez, North American Membrane Society Annual Meeting, Orlando, FL, May 2007.</p>	2007
<p>"Development of a Methodology for Distinguishing Fouling Mechanisms in Cross-Flow Membrane Modules," E. Kujundzic, K. Cobry, A.R. Greenberg, and M.T. Hernandez, North American Membrane Society Annual Meeting, Orlando FL, May 2007.</p>	2007
<p>"Monitoring Early-Stage Biofilm Growth on Surface Modified Thin Film Composite Polyamide RO Membranes", E. Kujundzic, A.R. Greenberg, M.T. Hernandez, and W. Mickols, North American Membrane Society Annual Meeting, Orlando FL, May 2007.</p>	2007
<p>"Modification of ultrafiltration membranes by atom transfer radical polymerization", S. Husson and R. Wickramasinghe, AIChE Annual Meeting, San Francisco, CA, November, 2006.</p>	2006
<p>"Evaluation of Solvent-Resistant Nanofiltration (SRNM) Membranes for Purification and Recovery in Polar Aprotic Solvents", A. Anim-Mensah, W.B. Krantz, J. Mark, and D. Mast; North American Membrane Society Annual Meeting, May 2006.</p>	2006

“A MAST Site for NUS”, A.R. Greenberg, National University of Singapore, September 2006.	2006
“Building an NSF MAST Center Site”, A.R. Greenberg, R. Noble, and S. Clarson, University of Southern California, Los Angeles, CA, March 2006.	2006
“Controlling Ultrafiltration Performance Through Chemical Modification”, N. Singh, B. Han, S. Husson, R. Wickramasinghe, North American Membrane Society Annual Meeting, Chicago, IL, May 2006.	2006
“Controlling Ultrafiltration Performance through Chemical Modification”, S. Husson, S. Wickramasinghe, Millipore Corporation, Billerica, MA April 14, 2006.	2006
“Critical Frequency Measurement of Slow Wave in Porous Materials”, L.Lin, M. Peterson, and A.R. Greenberg, ASME International Mechanical Engineering Congress and Exposition, Chicago, IL, November 5-10, 2006.	2006
“Design and Characterization of Novel Materials from Imidazolium-Based Room Temperature Ionic Liquids”, J.E. Bara, D. Camper, X. Zeng, A. Finotello, S. Lessmann, D.L. Gin, and R.D. Noble, AIChE 2006 Annual Meeting, San Francisco, CA November 2006.	2006
“Design and Characterization of Novel Materials from Imidazolium-Based Room Temperature Ionic Liquids,” R.D. Noble, North American Membrane Society Annual Meeting, Chicago, IL, May 2006.	2006
“Design and characterization of novel membrane materials from imidazolium-based room temperature ionic liquids and liquid crystal structures”, R.D. Noble, D. Gin, C. Koval, D. Camper, J. Bara, and A. Finotello, ACS Meeting, San Francisco, CA, September 2006.	2006
“Design and characterization of novel membrane materials from imidazolium-based room temperature ionic liquids and liquid crystal structures”, R.D. Noble, University of Wyoming, September 2006.	2006
“Development of a Methodology for Distinguishing Fouling Mechanisms in Cross-Flow Membrane Modules”, E. Kujundzic, K. Cobry, A.R. Greenberg, and M. Hernandez; North American Membrane Society Meeting, Chicago, IL, May 2006.	2006
“Early-Stage Biofilm Detection on Surface-Modified Hollow-Fiber Membranes”, E. Kujundzic, P. Nikrad, A.R. Greenberg, and M. Hernandez; North American Membrane Society Annual Meeting, Chicago, IL, May 2006.	2006
“Early-Stage Biofilm Formation on Surface-Modified Polyamide RO Membranes”, E. Kujundzic, P. Nikrad, A.R. Greenberg, D. Finch, M. Hernandez, and W. Mickols, North American Membrane Society Annual Meeting, Chicago, IL, May 2006.	2006
“Elevated-Temperature Mechanical and Gas Transport Behavior of Polybenzimidazole (PBI) Dense Films”, S. Brahmandam, V. Khare, and A.R. Greenberg; North American Membrane Society Meeting, Chicago IL, May 2006.	2006

<p>“Evaluation of Solvent Resistant NanoFiltration(SRNF) for Small Molecule Purification and Solvent Recovery for Re-Use, A. Anim-Mensah, D. Mast, J. Mark, S. Clarson and W.Krantz, North American Membrane Society (NAMS) Conference, Chicago, IL May 2006.</p>	2006
<p>“MAST Center Research Program Perspective, I/U CRC Directors Meeting”, A.R. Greenberg, R. Noble, and S. Clarson, Washington, DC, January 2006.</p>	2006
<p>“Mechanical and Transport Behavior of Polybenzimidazole (PBI) Dense Films Used for Elevated-Temperature Gas Separation.” A.R. Greenberg and S. Brahmandam, Fifth Annual Conference on Carbon Capture and Sequestration, Alexandria, VA, May 2006.</p>	2006
<p>“Membrane Applications: Current Work and Future Opportunities”, A.R. Greenberg, M. Hernandez, W.B. Krantz, and M.L. Peterson, Annual Meeting of the American Institute of Chemical Engineers, San Francisco, November 2006 (invited Presentation).</p>	2006
<p>“Membrane Applied Science and Technology Center”, A.R. Greenberg, R. Noble, and S. Clarson, North American Membrane Society Meeting, Chicago, IL, May 2006.</p>	2006
<p>“Membrane Science and Technology in the 21st Century”, W.B. Krantz, College of Engineering, National University of Singapore, September 2006.</p>	2006
<p>“Model the Biofouling Process”, C.C. Ho., Recovery of Biological Products, Phoenix, AZ, April 2006.</p>	2006
<p>Solubility and Selectivity for CO<sub>2</sub>/N<sub>2</sub> and CO<sub>2</sub>/CH<sub>4</sub> Gas Separations: Applied Toward Making Stable Membranes that Involve Room Temperature Ionic Liquids”, R.D. Noble, North American Membrane Society Annual Meeting, Chicago, IL, May 2006.</p>	2006
<p>“Recruitment and Retention, I/U CRC Directors’ Meeting”, A.R. Greenberg, R. Noble, and S. Clarson, Washington, DC, January 2006.</p>	2006
<p>“Transient permeation for measurement of sorption and diffusion in polymer membranes”, M.R. Shah, R.D. Noble, North American Membrane Society Annual Meeting, Chicago, IL May 2006.</p>	2006
<p>“Ultrasonic Reflectometry for Membrane Applications: Current Work and Future Opportunities”, W.B. Krantz, A.R. Greenberg, M. Hernandez, and M. Peterson, AIChE Meeting, San Francisco, November 2006.</p>	2006
<p>“Use of Ultrasonic Reflectometry (UR) to Monitor Membrane Fouling in Aqueous Environments”, A.R. Greenberg, E. Kujundzic, M. Hernandez, and W.B. Krantz; Membrane Science and Tehcnology 2006, Nanyang Technological University, Singapore (June 2006).</p>	2006
<p>“Use of Ultrasonic Reflectometry for Fouling Detection:”, A.R. Greenberg, E. Kujundzic; M. Hernandez, W.B. Krantz, and G.-Y Chai, Membrane Science and Technology 2006, April 2006, Singapore.</p>	2006

<p>"Use of Ultrasonic Reflectometry to Monitor Membrane Fouling in Aqueous Environments," A.R. Greenberg, E. Kujundzic, M. Hernandez, W.B. Krantz, and G.-Y. Chai, Membrane Science and Technology 2006, April 2006, Singapore. Invited Presentation.</p>	2006
<p>"Overview of Current Research in Membrane Science and Technology", W.B. Krantz, Institute of Environmental Science and Engineering, Nanyang Technological University, Singapore, February 16, 2005.</p>	2005
<p>"A Model for wet-casting of polymeric membranes incorporating advective transport", A.R. Greenberg, S-T. Hwang, W.B. Krantz, North American Membrane Society Meeting, Providence, RI, June 11-15, 2005.</p>	2005
<p>"Leveraging Acoustic Reflectometry to determine biofouling mechanisms and the biofouling resistance of modified membrane materials", A.R. Greenberg, M.T. Hernandez, E.A. Evans, D. Abadzic, North American Membrane Society Meeting, Providence, RI, June 11-15, 2005.</p>	2005
<p>"NSF-REU Site Program in Membrane Applied Science and Technology", W.B. Krantz, Annual Meeting of the American Society for Engineering Education, Portland, OR, June 12-15, 2005.</p>	2005
<p>"Solubility and Diffusion of Gases in Ionic Liquids", R.D. Noble, and D. Camper, Poster at 1<sup>st</sup> International Congress on Ionic Liquids (COIL), Salzburg, Austria, June 19-22, 2005.</p>	2005
<p>"Use of Room Temperature Ionic Liquids for Chemical Separations", R.D. Noble, ANVOC Conference Keynote Lecture, Istanbul Technical University, June 1, 2005.</p>	2005
<p>"A three mechanism model to describe fouling during microfiltration", C. Duclos-Orsello, W. Li, and C.C. Ho, North American Membrane Society Annual Meeting, Providence, RI, June 11-15, 2005.</p>	2005
<p>"Assessment of SRNF Membranes for the Purification of Small Molecules", A. Anim-Mensah, J. Mark, D. Mast, and W.B. Krantz, North American Membrane Society Annual Meeting, Providence, RI, June 2005.</p>	2005
<p>"Concentration of flavor distillates and extracts by pervaporation: multicomponent and real flavor permeation", M.J. She and S-T. Hwang, North American Membrane Society Annual Meeting, Providence, RI, June 11-15, 2005.</p>	2005
<p>"Controlled Synthesis of Thin Oriented MFI Zeolite Membranes by Microwave Assisted Secondary Growth", A. Julbe, J. Motuzas, R.D. Noble and Z.J. Beresnevicius, EUROCHEM Meeting, Nancy, France, August 28-30, 2005.</p>	2005
<p>"Development of Capacitive Microsensors to Characterize Concentration Polarization", Z. Zhang, A.R. Greenberg and V. Bright, International Congress on Membranes and Membrane Processes, Seoul, South Korea, August 2005.</p>	2005
<p>"Early-Stage Biofilm Detection Using Acoustic Methods", E. Evans, A.R. Greenberg, M.T. Hernandez and M. Peterson, International Congress on Membranes and Membrane Processes, Seoul, South Korea August 2005.</p>	2005

<p>“Elevated Temperature Compaction Behavior of Dense Polymethyl Methacrylate Films”, A.R. Greenberg, A. Balakrishnan, V. Khare, J. Diani, North American Membrane Society Meeting, Providence, RI, June 11-15, 2005.</p>	2005
<p>“Identification of Low Pressure Membrane Fouling Mechanisms by Application of fouling Models to Drinking Water Sources”, N. Lee, G. Amy and J. Pellegrino, presented at AWWA Membrane Technology Conference and published in Conference Proceedings, 2005.</p>	2005
<p>“Low Pressure Solubility, Diffusion, and Permeability of Room Temperature Ionic Liquids Containing Imidazolium Rings”, D. Camper, C. Becker, C.A. Koval, and R.D. Noble, North American Membrane Society Annual Meeting, Providence, RI, June 12-16, 2005.</p>	2005
<p>“Mathematical Modeling and Corroboration of the Humid Air Exposure Step in the Vapor Induced Phase Separation (VIPS) Process”, V. Khare and A.R. Greenberg, International Congress on Membranes and Membrane Processes, Seoul, South Korea, August 2005.</p>	2005
<p>“NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology (MAST): Overview and Perspective”, A.R. Greenberg, R.D. Noble, and S.J. Clarson, North American Membrane Society Meeting, Providence, RI, June 11-15, 2005.</p>	2005
<p>“Preparation and Characterization of Mixed Matrix Composite Membranes Containing Room Temperature Ionic Liquids and Zeolites for Gas Separation Applications”, R.D. Noble, ICOM, Seoul, Korea, Aug. 22-26, 2005.</p>	2005
<p>“Rejection of trace organic compounds by reverse osmosis and Nanofiltration membranes”, T. Kim, G. Amy, and J. Drewes, Membrane Technology Conference and Expolsition, Ref. Number Tue. 11-3, Phoenix, AZ, March 6-9, 2005.</p>	2005
<p>“Removal of Micropollutants by NF/RO Membranes”, G. Amy, T. Kim, J. Yoon, ,C. Bellona, J. Drewes, J. Pellegrino and T. Heberer, 3rd IWA Leading-Edge Conference and Exhibition on Water and Wastewater Treatment Technologies (LET), Ref no. DW1-1, Sapporo, Japan, June 6-8, 2005</p>	2005
<p>“Separations Research Needs for the 21<sup>st</sup> Century”, R.D. Noble, American Chemical Society Meeting, San Diego, CA, March 15, 2005 (Invited presenter).</p>	2005
<p>“Separations Research Needs for the 21<sup>st</sup> Century”, R.D. Noble, American Institute of Chemical Engineering, Atlanta, GA, April 14, 2005 (Invited presenter).</p>	2005
<p>“Separations Research Needs for the 21<sup>st</sup> Century”, R.D. Noble, Case Western University, invited speaker, February 9, 2005.</p>	2005
<p>“Smart Membranes for Flavor Delivery”, K. Heitfeld and D.W. Schaefer, North American Membrane Society Annual Meeting, Providence, RI, June 11-15, 2005.</p>	2005

“Smart Membranes for Flavor Delivery”, K. Heitfeld and D.W. Schaefer,, American Institute of Chemical Engineering Advances in Food Engineering Meeting, Cincinnati, OH, 2005.	2005
“Stable Membranes Involving Ionic Liquids”, C.A. Koval, R.D. Noble, D. Camper, J. Bara and C. Oral, North American Membrane Society Annual Meeting, Providence, RI, June 12-16, 2005.	2005
“Stable Membranes Involving Ionic Liquids”, R.D. Noble and C. Oral, 1 <sup>st</sup> International Congress on Ionic Liquids (COIL), Salzburg, Austria, June 19-22, 2005.	2005
“Stable Nanostructures with Lyotropic Liquid Crystals and Ionic Liquids for Gas Separations”, R.D. Noble and J. Bara, Poster, 1 <sup>st</sup> International Congress on Ionic Liquids (COIL), Salzburg, Austria, June 19-22, 2005.	2005
“The NSF Center for Membrane Applied Science and Technology”, W.B. Krantz, Procter and Gamble Co., Cincinnati, OH, January 10, 2005.	2005
“Theoretical Analysis of the Effect of Membrane Morphology on Fouling”, C.C. Ho, Oral Presentation at the AIChE 2005 Annual Meeting, Cincinnati, OH, November 2005.	2005
“Use of Room Temperature Ionic Liquids for Chemical Separations”, R.D. Noble, Case Western University, invited speaker, February 10, 2005.	2005
“Use of Room Temperature Ionic Liquids for Chemical Separations”, R.D. Noble, Georgia Institute of Technology, invited speaker, April 12, 2005.	2005
Session Chair, “University-Industry Interactions”, R.D. Noble and A.R. Greenberg, North American Membrane Society Meeting, Providence, RI, June 12-16, 2005.	2005
“The NSF Center for Membrane Applied Science and Technology (MAST) – A Forum for Industry, University, and Government Laboratory Collaboration”, W.B. Krantz, 25th Annual Meeting of the Council for Chemical Research, Miami, FL, April 18, 2004.	2004
“A Historical Perspective of Facilitated Transport”, R.D. Noble, North American Membrane Society Annual Meeting, Honolulu, HI, June 28, 2004.	2004
“Assessment of SRNF Membranes for the Purification of Small Molecules”, A. Anim-Mensah, J. Mark, D. Mast, and W.B. Krantz, Presented at Eli Lilly and Company, Indianapolis, IN, Dec. 2004.	2004
“Development of a New Ternary Diffusion Model for Macrovoid Formation,” H. Lee, S-T Hwang, W.B. Krantz, A.R. Greenberg, and P. Todd, North American Membrane Society Annual Meeting, Honolulu, HI, June 2004.	2004
“Elevated Temperature Compaction and Transport Behavior of Dense Cellulose Acetate Films,” V.P. Khare and A.R. Greenberg, North American Membrane Society Annual Meeting, Honolulu, HI, June 2004.	2004
“Extending Acoustic Reflectometry for Real-Time Monitoring of Biofilm Growth on Water Treatment Membranes of Different Geometries,” J. Li, E.A. Evans, A.R. Greenberg, M. Peterson and M.T. Hernandez, North American Membrane Society Annual Meeting, Honolulu, HI, June 2004.	2004

“Facilitated Membrane Transport in Ionic Liquids and Electrolyte Solutions”, R.D. Noble, North American Membrane Society Annual Meeting, Honolulu, HI, June 28, 2004.	2004
“Gas Solubilities in Room Temperature Ionic Liquids”, R.D. Noble , North American Membrane Society Annual Meeting, Honolulu, HI, June 30, 2004.	2004
“Gas Solubilities in Room Temperature Ionic Liquids”, R.D. Noble, American Institute of Chemical Engineers Meeting, Austin Texas, November 9, 2004.	2004
“Gas Solubility and Permeation in Ionic Liquid Membranes”, R.D. Noble, ExxonMobil Research Center, Annandale, N.J., April 2, 2004.	2004
“Identification of Organic Foulants and Fouling Mechanisms in Low Pressure Membrane (MF/UF) Filtration”, N. Lee, G. Amy, J-P. Croue, presented at International Water Association Water Environment Membrane Technology Meeting, Korea, and published in Conference Proceedings, 2004.	2004
“Low Pressure membrane (MF/UF) Fouling associated with allochthonous versus autochthonous natural organic matter (NOM)”, N. Lee, G. Amy, J-P. Croue presented at AWWA Annual Conference and Exposition, published in conference proceedings, 2004.	2004
“Mass transfer modeling for dilute flavor organic pervaporation process”, M.J. She and S-T. Hwang, AIChE Annual Meeting, Austin TX, November 2004.	2004
“Membrane Science and Technology in the 21st Century”, W.B. Krantz, Biodefense-Related Research Symposium, University of Cincinnati, Cincinnati, OH, June 25, 2004.	2004
“Membrane Science and Technology in the 21st Century”, W.B. Krantz, Dupont Corporation visit to the University of Cincinnati, Cincinnati, OH, July 29, 2004.	2004
“Membrane Technology in the 21st Century”, W.B. Krantz, Cydex Corporation, Kansas City, Missouri, June 22, 2004.	2004
“Membrane Technology: Past, Present, and Future”, W.B. Krantz, Genencor International, Inc., Palo Alto, CA, May 17, 2004.	2004
“Modeling and Experimental Studies of the Effect of Casting Thickness on Macrovoid Formation,” H. Lee, S-T Hwang, W.B. Krantz, A.R. Greenberg and P. Todd, American Institute of Chemical Engineering Annual Meeting, Austin, TX, November, 2004.	2004
“New Developments in Polymeric Membrane Formation and Characterization”, W.B. Krantz, National University of Singapore, February 28, 2004.	2004
“Rejection of trace organic compounds by high-pressure membranes”, T. Kim, G. Amy, and J. Drewes, Water Environment-Membrane Technology (WEMT) Conference, Ref#704, Seoul, Korea, June 7-10, 2004.	2004
“Role of the Humid Air Exposure Step in the Vapor-Induced Phase Separation (VIPS) Process,” V.P. Khare, A.R. Greenberg, and W.B. Krantz, North American Membrane Society Annual Meeting, Honolulu, HI, June 2004.	2004

“Separation Using Ionic Liquid Membranes”, R.D. Noble, Advanced Membrane II Eng. Found. Conference, Irsee, Germany, May 25, 2004.	2004
“Smart Membranes for Flavor Delivery”, K. Heitfeld and D.W. Schaefer, American Chemical Society PRF Summer School in Nanomaterials, 2004.	2004
“Smart Membranes for Flavor Delivery”, K. Heitfeld and D.W. Schaefer, Invited American Chemical Society Regional Meeting, Flavor and Fragrances Division, Indianapolis, IN 2004.	2004
“Smart Membranes for Flavor Delivery”, K. Heitfeld and D.W. Schaefer, Materials Science Graduate Student Poster Session, 2004.	2004
“Synthesis and Testing of Dense and Porous Films Obtained from the Cellulose Polymer,” V.P. Khare, A.R. Greenberg, H. Pilath and S. Kelley, North American Membrane Society Annual Meeting, Honolulu, HI, June 2004.	2004
“The Membrane Applied Science and Technology (MAST) Center: Organization, Operation and Research Program”, R.D. Noble, ExxonMobil Research Center, Annandale, NJ, April 2, 2004.	2004
“The NSF Center for Membrane Applied Science and Technology”, W.B. Krantz, International Conference on Inorganic Membranes, Cincinnati, OH, July 18, 2004.	2004
“The NSF Center for Membrane Applied Science and Technology”, W.B. Krantz, Wild Flavors, Inc., Cincinnati, OH, August 4, 2004.	2004
“The NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology”, W.B. Krantz, Annual Meeting of the AIChE, Austin, TX, November 7-12, 2004.	2004
“The NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology”, W.B. Krantz, Cintas Corporation, Cincinnati, OH, September 28, 2004.	2004
“The NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology”, W.B. Krantz, Institute of Environmental Science and Engineering, Nanyang Technological University, Singapore, February 6, 2004.	2004
“The NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology”, W.B. Krantz, Matrix Membranes, Inc., Singapore, February 17, 2004.	2004
“Use of Capacitive Microsensors to Study Concentration Polarization and Fouling in a Flat Sheet Cross-flow NF Membrane Module,” Z. Zhang, A.R. Greenberg, and V. Bright, North American Membrane Society Annual Meeting, Honolulu, HI, June 2004.	2004
“Use of Room Temperature Ionic Liquids for Chemical Separations”, R.D. Noble, Institut European du Membranes, Montpellier, France, December 6, 2004.	2004

<p>"Use of Room Temperature Ionic Liquids for Chemical Separations", R.D. Noble, Universidade Nova de Lisboa, Lisbon, Portugal, December 9, 2004.</p>	2004
<p>"Application of Task Specific Ionic Liquids in the Acid Gas Separation Processes of Supported Ionic Liquid Membranes and Electrochemical Modulated Complexation", R.D. Noble, 226<sup>th</sup> ACS National Meeting, New York, NY, September 9, 2003.</p>	2003
<p>"Biofouling of Nanofiltration Membranes: Detection Using Ultrasonic Frequency-Domain Reflectometry," A.C. Fonseca, A.R. Greenberg, and M.T. Hernandez, AWWA Annual Conference, Anaheim, June 2003.</p>	2003
<p>"Carbon Dioxide/Methane Separation Using SAPO-34 Zeolite Membranes", R.D. Noble, University Hassan II, Mohammedia, Morocco, December 2, 2003.</p>	2003
<p>"Center for Membrane Applied Science and Technology Research at the University of Colorado", R.D. Noble, ATMA Annual Meeting, Westminster, CO, August 4, 2003.</p>	2003
<p>"Center for Membrane Applied Science and Technology Research at the University of Colorado", R.D. Noble, ChevronTexaco, Richmond, CA, April, 2003.</p>	2003
<p>"Center for Membrane Applied Science and Technology Research at the University of Colorado", R.D. Noble, University Hassan II, Mohammedia, Morocco, December 9, 2003.</p>	2003
<p>"Characterization of RO and NF Membranes Using Nonequilibrium Thermodynamics," V. Gupta, S.-T Hwang, W.B. Krantz, and A.R. Greenberg, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>"CO2 Separations Using High-Temperature Polymeric-Metallic Composite Membranes," V.P. Khare, J. Young, and A.R. Greenberg, 28<sup>th</sup> International Technical Conference on Coal Utilization and Fuel Systems, Clearwater, FL, March 2003.</p>	2003
<p>"CO2 Separations Using Ionic Liquid Membranes", R.D. Noble, ACS Meeting, New Orleans, LA, March 23, 2003.</p>	2003
<p>"Concentration of dilute flavor compounds by Pervaporation: optimization of operating conditions and model development," M. She, S-T Hwang, AIChE Meeting, San Francisco, CA, November 2003.</p>	2003
<p>"Concentration of dilute flavor compounds by pervaporation: permeate pressure influence and boundary layer resistance modeling", M.J. She and S-T. Hwang, North American Membrane Society annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>"Critical Factors Governing Biofouling of Nanofiltration Membranes", R. S. Summers, A.R. Greenberg, M.T. Hernandez, and A.C. Fonseca, AWWA Membrane Technology Conference, Atlanta, GA, March 2003.</p>	2003

<p>“Detection of Membrane Biofouling Using Ultrasonic Sensors,” A.R. Greenberg, J.-X. Li, M.T. Hernandez and E.A. Evans, 2003 Twentieth Annual Membrane Separations Technology Planning Conference, Newton, MA., December 2003.</p>	2003
<p>“Edible barrier coatings for protection of food additives,” S. Sarang, V. Guliants, Y.S. Lin, AIChE Meeting, San Francisco, CA, November 2003.</p>	2003
<p>“Effect of Humid Air Exposure on the Structure of Immersion-Cast Membranes,” I.J. Roh, A.R. Greenberg and W.B. Krantz, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“Elevated Temperature Compaction and Transport Behavior of Asymmetric Cellulose Acetate Membranes,” V.P. Khare and A.R. Greenberg, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“Fouling of High Pressure (NF and RO) Membranes by Soluble Microbial Products (SMP) Associated with Wastewater Effluent Organic Matter (EfOM)”, C. Jarusutthirak and G. Amy, presented at AWWA MTC Conference, Atlanta, GA, and published in Conference Proceedings, 2003.</p>	2003
<p>“Future of Membrane Technologies – Where are We Heading?” R.D. Noble, ATMA Annual Meeting, Westminster, CO, August 5, 2003.</p>	2003
<p>“Gas Separations by Electrochemically Modulated Complexation”, R.D. Noble, AIChE Meeting, San Francisco, CA, November 2003.</p>	2003
<p>“Gas Separations Using Non-Hexafluorophosphate [PF6] Anion Supported Ionic Liquid Membranes”, R.D. Noble, NAMS Annual Meeting, Jackson Hole, WY, May 19-21, 2003.</p>	2003
<p>“Macrovoid Formation During the Dry-Casting of Cellulose Acetate Membranes,” V.P. Khare and A.R. Greenberg, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“Membrane Science and Technology in the 21st Century”, W.B. Krantz, Annual Meeting of the American Society for Engineering Education, Nashville, TN, June 23, 2003.</p>	2003
<p>“Modeling the Transport Behavior of Nanofiltration Membranes”, V. Gupta, W.B. Krantz and A.R. Greenberg, Workshop and Presentation at the International Conference on Inorganic Membranes (ICIM8), Cincinnati, OH, July 17-20, 2003.</p>	2003
<p>“Morphological analyses of low-pressure membranes (MF/UF) fouled by natural organic matter (NOM)”, N. Lee, G. Makdissy, G. Amy, J-P. Croue, H. Buisson, and J-C Schrotter, AWWA Membrane Technology Conference, and published in Conference Proceedings, 2003.</p>	2003
<p>“New Development in Membrane Formation and Characterization”, W.B. Krantz, Research School of Chemistry, Australian National University, February 28, 2003.</p>	2003
<p>“New developments in Polymeric Membrane Formation and Characterization”, W.B. Krantz, Department of Chemical Engineering, University of Melbourne, Melbourne, Australia, March 11, 2003.</p>	2003

<p>“New Developments in Polymeric Membrane Formation and Characterization”, W.B. Krantz, Department of Chemical Engineering, University of West Virginia, August 29, 2003.</p>	2003
<p>“New Developments in Polymeric Membrane Formation and Characterization”, W.B. Krantz, University of New South Wales, Sydney, Australia, February 11, 2003.</p>	2003
<p>“New Developments, Challenges and Directions in Membrane Science”, W.B. Krantz, International Conference on Advanced Materials, Symposium on Materials for Membrane Separation, Tokyo, Japan, October 12, 2003.</p>	2003
<p>“New Developments, Challenges and Directions in Membrane Science”, W.B. Krantz, Wright-Patterson Air Force Laboratory, Cleveland, OH, October 3, 2003.</p>	2003
<p>“Noninvasive Monitoring of Membrane Fouling, Cleaning, and Compaction”, W.B. Krantz, Fonterra Research Center, Palmerston North, New Zealand, February 14, 2003.</p>	2003
<p>“Operation and Research Highlights of the NSF Center for Membrane Applied Science and Technology”, W.B. Krantz, U.S. Environmental Protection Agency, Cincinnati, OH, July 21, 2003.</p>	2003
<p>“Operation and Research Highlights of the NSF Center for Membrane Science and Technology”, W.B. Krantz, Procter and Gamble Co., Cincinnati, OH, August 20, 2003.</p>	2003
<p>“Pervaporation/Air Stripping Hybrid Process”, M.R. Shah, R.D. Noble and D.E. Clough, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“Pervaporation-Air Stripping Hybrid Process for Removal of VOCs from Groundwater”, R.D. Noble, NAMS Annual Meeting, Jackson Hole, WY, May 19-21, 2003.</p>	2003
<p>“Real-Time Detection and Quantification of Biological Polymers Immobilized on Water-Treatment Membranes using Ultrasonic Reflectometry,” J. Li, A.R. Greenberg, S. Nelson, and M.T. Hernandez, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“Real-Time Detection of Protein Fouling on Tubular Ultrafiltration Using a Non-Destructive Ultrasonic Technique,” J. Li, G.-Y. Chai, R. Sanderson, and A.R. Greenberg, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“Removal of Viral Pathogens from Drinking Water at the Point-of-Use”, W.B. Krantz, Procter and Gamble Co., Cincinnati, OH, August 20, 2003.</p>	2003
<p>“Separations Using Ionic Liquids”, R.D. Noble, Institut European du Membrane, Montpellier, France, October 23, 2003.</p>	2003
<p>“Studies on Transport Mechanisms in Liquid Crystal Nanocomposite Membranes,” Y. Wu, A. Jain, and R. Govind, AIChE Meeting, San Francisco, CA, November 2003.</p>	2003

<p>“Study of the Thermally Induced Phase Separation (TIPS) Membrane Formation Process: Comparison of Model Predictions and Experimental Results,” D. Li, R.L. Sani, A.R. Greenberg, and W.B. Krantz, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“The Industry/University Cooperative Research Center for Membrane Applied Science and Technology”, W.B. Krantz, Annual Meeting of the AIChE, San Francisco, CA, November 19, 2003.</p>	2003
<p>“The Industry/University Cooperative Research Center for Membrane Applied Science and Technology”, W.B. Krantz, Ethicon-Endosurgery, December 9, 2003.</p>	2003
<p>“The Institute for Cooperative Research, Education, and Teaching Excellence in Membrane Science”, W.B. Krantz, College of Engineering Strategic Planning Meeting, University of Cincinnati, Cincinnati, OH, December 11, 2003.</p>	2003
<p>“Transport Property Needs Related to Chemical Separation Processes”, R.D. Noble, Invited Presentation, 15<sup>th</sup> NIST Symposium on Thermophysical Properties, Boulder CO, June 25, 2003.</p>	2003
<p>“Transport Property Needs Related to Chemical Separation Processes”, R.D. Noble, University Hassan II, Mohammedia, Morocco, December 8, 2003.</p>	2003
<p>“Use of Capacitive Microsensors to Study the Concentration Polarization Boundary Layer in a Flat-Sheet NF Membrane Module,” Zh.-X Zhang, V.M. Bright, and A.R. Greenberg, North American Membrane Society Annual Meeting, Jackson Hole, WY, May 2003.</p>	2003
<p>“Use of In-Situ Ultrasonic Measurements in Membrane Separations,” A.R. Greenberg, G.-Y Chai, W.B. Krantz and G.Y. Zhao, China Conference on Membrane Science and Technology, Beijing, China, September 2003.</p>	2003
<p>“Uses of Ionic Liquids in Electrochemical Processes”, R.D. Noble, 204<sup>th</sup> Meeting of Electrochemical Society, Orlando FL, October 13, 2003.</p>	2003
<p>"Controlling Pore Structure in Polymeric Membranes Using Non-uniform Electric Fields," A.R. Greenberg and W.B. Krantz, The 2002 Twentieth Annual Membrane Separations Technology Planning Conference, Boston, November 2002. <i>Invited Presentation</i></p>	2002
<p>“Applications of Isomorphously Substituted Zeolite Membranes”, R.D. Noble, Gordon Research Conference, Membranes: Materials and Processes, New London, N.H., August 4-9, 2002.</p>	2002
<p>“Biofouling of Nanofiltration Membranes and In-situ Biofilm Detection Using Acoustic Reflectometry”, A.C. Fonseca, A.R. Greenberg and M.T. Hernandez, International Conference on Membranes and Membrane Processes, Toulouse, France, July 2002.</p>	2002
<p>“Carbon Dioxide Separation Using Thermally Optimized membranes, J. Young, V.P. Khare, and A.R. Greenberg, American Geophysical Union Meeting, Washington, D.C., May 2002.</p>	2002

“Center for Membrane Applied Science and Technology”, W.B. Krantz, Baldwin Hall Rededication Program, University of Cincinnati, Cincinnati, OH, April 19, 2002.	2002
“Center for Membrane Applied Science and Technology”, W.B. Krantz, Dow FilmTech, St. Paul, MN, August 20, 2002.	2002
“Center for Membrane Applied Science and Technology”, W.B. Krantz, Minneapolis, MN, August 21, 2002.	2002
“Choosing Ionic Liquids for Support Ionic Liquid Membranes”, R. Rogers, A.E. Visser, J.H. Davis, C.A. Koval, D.L. Dubois, P. Scovazzo and R.D. Noble, ACS National Meeting, Orlando, April 8, 2002.	2002
“Designing or Choosing Ionic Liquids for Utilization in Supported Ionic Liquid Membranes and Facilitated Ionic Liquid Membranes”, R.D. Rogers, A.E. Visser, J.H. Davis, C.A. Koval, D.L. DuBois, P. Scovazzo and R.D. Noble, AIChE National Meeting, New Orleans, March 11-13, 2002.	2002
“Development of New Approaches to Carbon Dioxide Separation and Recovery”, D.L. DuBois, R.D. Noble, C.A. Koval, J. Poshusta, M. DuBois and P. Scovazzo, AIChE National Meeting, New Orleans, March 11-13, 2002.	2002
“Driving Force for Pervaporation Through Zeolite Membranes”, T.C. Bowen, S. Li, J.L. Falconer and R.D. Noble, Gordon Research Conference on Membranes: Materials and Processes, New London, N.H., August 4-9, 2002.	2002
“Elevated Temperature Compaction and Transport Behavior of Cellulose Acetate Dense Films,” V.P. Khare and A.R. Greenberg, North American Membrane Society Annual Meeting, Los Angeles, May 2002.	2002
“Fabrication of Poly (ethylene chlorotrifluoroethylene) Membranes via Thermally Induced Phase Separation (TIPS)”, I.J. Roh, S. Ramaswamy, A.R. Greenberg and W.B. Krantz, North American Membrane Society Annual Meeting, Los Angeles, May 2002.	2002
“Gas Separations Using Supported Ionic Liquid Membranes”, P. Scovazzo, C.A. Koval, D. DuBois, J. Kieft and R.D. Noble. Gordon Research Conference on Membranes: Materials and Processes, New London, N.H., August 4-9, 2002.	2002
“Highly Selective Separation of Hydrocarbons Using Isomorphously-Substituted ZSM-5 Zeolite Membranes”, R.D. Noble, V.A. Tuan, S.K. Gade, J. Gump, and J.L. Falconer, ICOM, Toulouse, France, July 7-12, 2002.	2002
“Humidity Effects on Facilitated Gas Separations Using Supported Ionic Liquid Membranes”, P. Scovazzo, D. Finan, D.L. Dubois, C.A. Koval and R.D. Noble, North American Membrane Society Annual Meeting, Long Beach, CA, May 11-15, 2002.	2002
W.B. Krantz, A.R. Greenberg, G.-Y. Chai, and G.Y. Zhao, Plenary Lecture, 2nd International Conference on the Application of Membrane Technology, Beijing, China, September 2002.	2002

<p>“Isomorphously Substituted Zeolite Membranes: Preparation and Separation Performance in Pervaporation:”, R.D. Noble, IEM, Montpellier, France, July 4-5, 2002.</p>	2002
<p>“Macrovoid Defect Growth During Evaporative Casting of Polymeric Membranes,” A.R. Greenberg, V.P. Khare, J. Zartman, W.B. Krantz and P. Todd, NASA Microgravity Materials Science Conference, Huntsville, AL, June 2002.</p>	2002
<p>“Macrovoid Formation During Polymer Membrane Casting, A.R. Greenberg, V. Khare, W.B. Krantz, H. Lee, and P. Todd, International Conference on Membranes and Membrane Processes, Toulouse, France, July 2002.</p>	2002
<p>“Nanofiltration and Ultrafiltration of Wastewater Effluent (EfOM)”, C. Jarusutthirak, G. Amy, J.P. Croue, and P. Fox, presented at IWA Conference, Melbourne, Sydney, and published in Conference Proceedings, 2002.</p>	2002
<p>“New Development in Membrane Formation and Characterization”, W.B. Krantz, Department of Chemical Engineering, University of Connecticut, October 22, 2002.</p>	2002
<p>“Novel Isomorphously Substituted B-beta Membrane: Synthesis and Permeation Properties”, M. Ouammou, V. Tuan, L. Weber, R.D. Noble and J.L. Falconer, Gordon Research Conference on Membranes: Materials and Processes, New London, New Hampshire, August 4-9, 2002.</p>	2002
<p>“Novel Methods for Characterizing Algogenic Organic Matter (AOM) and Associated Membrane Fouling”, N. Her, G. Amy, H. Park, J. Yoon, and M. Song, presented at IWA MDIW Conference in Mulheim, Germany, and published in Conference Proceedings, 2002.</p>	2002
<p>“Novel Ultrasonic Technique for Defect Detection in Polymeric Membranes”, S. Ramaswamy, A.R. Greenberg, M. Peterson and R.A. Peterson, North American Membrane Society Annual Meeting, Los Angeles, May 2002.</p>	2002
<p>“Organics Recovery by Pervaporation Using Isomorphously-Substituted MFI Zeolite Membranes”, T.C. Bowen, V.A. Tuan, S. Li, R.D. Noble and J.L. Falconer, North American Membrane Society Annual Meeting, Long Beach, California, May 11-15, 2002.</p>	2002
<p>“Pervaporation of Aqueous Organic Mixtures Through Ge-ZSM-5 Zeolite Membranes”, “T.C. Bowen, S. Li, V.A. Tuan, J.L. Falconer and R.D. Noble, North American Membrane Society Annual Meeting, Long Beach, CA, May 11-15, 2002.</p>	2002
<p>“Pervaporation of Aqueous Organic Mixtures Through Ge-ZSM-5 Zeolite Membranes”, T.C. Bowen, V.A. Tuan, J.L. Falconer, and R.D. Noble, ICOM, Toulouse, France, July 7-12, 2002.</p>	2002
<p>“Pervaporation of Aqueous Organic Mixtures Through Ge-ZSM-5 Zeolite Membranes”, T.C. Bowen, V.A. Tuan, J.L. Falconer, and R.D. Noble, Materials Research Society Meeting, Boston, December 2-6, 2002.</p>	2002

<p>"Real-Time Biofilm Detection with Ultrasonic Frequency Domain Reflectometry (UFDR)," A.C. Fonseca, A.R. Greenberg and M.T. Hernandez, International Specialized Conference on Biofilm Monitoring, Porto, Portugal, March 2002.</p>	2002
<p>"Research at the Center for Membrane Applied Science and Technology", W.B. Krantz, Kyoto Institute of Technology, Kyoto, Japan, September 17, 2002.</p>	2002
<p>"Smart Membranes for Protection and controlled release of food additives," S. Sarang, V. Guliants, Y.S. Lin, AIChE Meeting, Indianapolis, IN, November 2002.</p>	2002
<p>"Synthesis and Characterization of B-ZSM-5 Zeolite Membranes on Monolith Supports", T.C. Bowen, H. Kalipcilar, J.L. Falconer and R.D. Noble, "North American Membrane Society Annual Meeting, May 11-15, 2002, Long Beach, CA.</p>	2002
<p>"The Use of UDTR-Based Sensors for the Real-Time Quantification of Membrane Module Fouling and Cleaning," A.R. Greenberg and W.B. Krantz, The 2002 Twentieth Annual Membrane Separations Technology Planning Conference, Boston, November 2002. Invited Presentation.</p>	2002
<p>"Ultrasonic Characterization of Polymeric Thin Films", A.R. Greenberg, S. Ramaswamy and M.L. Peterson, Materials Research Society Meeting, Boston, December 2002. <i>Invited Presentation</i> .</p>	2002
<p>"Ultrasonic Technique for the Characterization of Membrane Morphology", S. Ramaswamy, A.R. Greenberg and M.L. Peterson, International Conference on Membranes and Membrane Processes, Toulouse, France, July 2002.</p>	2002
<p>"Ultrasonics for Membrane Applications", A.R. Greenberg, Gordon Conference on Membranes: Materials and Processes, New London, New Hampshire, August 2002. <i>Invited Presentation</i> .</p>	2002
<p>"Ultrasonics Techniques for the Evaluation of Membrane Fouling and Membrane Morphology", A.R. Greenberg, Dow FilmTec, August 2002. <i>Invited Presentation</i> .</p>	2002
<p>"Isomorphously Substituted Zeolite Membranes: Preparation and Separation Performance", R.D. Noble and J.L. Falconer, Presentation and Poster Session, 13<sup>th</sup> International Zeolite Conference, Montpellier, France, July 8-13, 2001.</p>	2001
<p>"Boundary Condition Effects On Polymeric Membrane Formation Via Evaporative Casting," D.J. Hellman, A.R. Greenberg, and W.B. Krantz, Annual Meeting of the North American Membrane Society, Lexington, May 2001.</p>	2001
<p>"Center for Membrane Applied Science and Technology", W.B. Krantz, P&amp;G Pharmaceuticals and Second Joint Scientific Colloquium, Cincinnati, OH, November 1, 2001.</p>	2001

“Center for Membrane Science and Technology”, W.B. Krantz, International Paper Company, Miami, OH, January 22, 2001.	2001
“Center for Membrane Science and Technology”, W.B. Krantz, Millipore Corporation, Medfore, MA, February 7, 2001.	2001
“Characteristics of DOM as a Function of MW by HPLC-SEC using UBA, Fluorescence, and DOC,” N. Her, G. Amy, H. Park, J. Yoon, and M. Song, presented at AWWA WQTC Conference, San Antonio, Texas, and published in Conference Proceedings, 2001.	2001
“Effect of Microbial Cells and Exocellular Polysaccharides on Nanofiltration Membrane Flux Decline”, A.C. Fonseca, M.T. Hernandez, R. S. Summers and A.R. Greenberg, Annual Meeting of the North American Membrane Society, Lexington, May 2001.	2001
“Effect of Microbial Cells and Polysaccharide Exudate on Nanofiltration Membrane Flux Decline,” A.C. Fonseca, M.T. Hernandez, R.S. Summers and A.R. Greenberg, Annual Meeting of the North American Membrane Society, Lexington, May 2001.	2001
“Exploring plasma modification of porous materials: From molecules to thin films,” M. L. Steen and E. R. Fisher, American Chemical Society National Meeting, Symposium on Membrane Science; San Diego, CA: April, 1-5, 2001 (student presentation).	2001
“Isomorphously Substituted Zeolite Membranes: Preparation and Separation Performance”, R.D. Noble and J.L. Falconer, Presentation and Poster Session, International Workshop on Zeolite and Microporous Membranes, Purmend, The Netherlands, July 1-4, 2001.	2001
“Isomorphously Substituted Zeolite Membranes: Preparation and Separation Performance”, R.D. Noble, University of California at Riverside Chemical/Environmental Engineering Department, Riverside, CA September 28, 2001.	2001
“Measurement of Membrane Fouling in Spiral-Wound Modules”, Chai, G.-Y, Krantz, W.B., and Greenberg, A.R., 6 <sup>th</sup> World Congress of Chemical Engineering, Melbourne, Australia, September 23-27, 2001.	2001
“Membrane Applied Science and Technology Center”, A.R. Greenberg, R.D. Noble and W.B. Krantz, Annual Meeting of the North American Membrane Society, Lexington, May 2001.	2001
“Membrane Fouling and Cleaning The Need for Effective Measurement,” A.R. Greenberg, University of Maine, Orono, April 2001. <i>Invited lecture</i> .	2001
“Membrane Fouling: Measurement and Correlation with Surface Properties”, K.R. Williams, R. Hartman, G. Kessalain, American Chemical Society National Meeting, Sand Diego, April 2001, and FFF 2001, Golden, CO, June 2001.	2001

<p>"Microstructure of Asymmetric Membranes Prepared by Various Methods," Dale W. Schaefer, Tingtai Guo, William Krantz, Alan Greenberg, Diana Hellman, and Steve Kelley, Annual Meeting of the North American Membrane Society, Lexington, May 2001.</p>	2001
<p>"New Developments in the Methodology, Characterization, and Modeling of Polymeric Membrane Formation", W.B. Krantz, EMCC Conference, Ankara, Turkey, May 23, 2001.</p>	2001
<p>"Observation of Solutocapillary Flow During Polymer Membrane Casting," W.B. Krantz, J. Zartman, V. Khare, A.R. Greenberg and P. Todd, AIAA Paper 2001-5022, Conference and Exhibit on International Space Station Utilization, Cape Canaveral FL, October 15-17, 2001.</p>	2001
<p>"Overview of NSF I/U CRC MAST Center", United Technologies Research Center, R.D. Noble, Windsor, CT, June 6, 2001.</p>	2001
<p>Transport Properties Upon Chlorination," N.P. Soice, A.R. Greenberg, W.B. Krantz and A.D. Norman, Annual Meeting of the North American Membrane Society, Lexington, May 2001.</p>	2001
<p>"Polymer Thin Film Formation on Low-Gravity Aircraft and on ISS," V.P. Khare, A.R. Greenberg, W.B. Krantz, H. Lee, P. Todd, and S. Dunn, AIAA Paper 2001-5024, Conference &amp; Exhibit on International Space Station Utilization, Cape Canaveral, FL, October 15-17, 2001.</p>	2001
<p>"Polymeric-Metallic Composite Membranes for High-Temperature Applications," J.S. Young, S. Jorgensen, B.F. Espinoza, M.W. Weimer, G.D. Jarvinen, C.J. Orme, A.K. Wertsching, E.S. Peterson, V. Khare and A.R. Greenberg, AIChE Annual Meeting, Reno, November 2001.</p>	2001
<p>"Real-time Measurement of Fouling and Cleaning of Membrane Modules," Z. Zhang, G. Chai, A.R. Greenberg, and W.B. Krantz, Annual Meeting of the North American Membrane Society, Lexington, May 2001.</p>	2001
<p>"Research and Operation of MAST Center," R.D. Noble, ChevronTexaco, Richmond, CA, December 13, 2001.</p>	2001
<p>"Separations/Engineering Needs", Ionic Liquids Technology Review, R.D. Noble, ACS Meeting, San Diego, CA, April 2-4, 2001.</p>	2001
<p>"Study of the Thermally Induced Phase Separation (TIPS)," D. Li, A.R. Greenberg, R.L. Sani, and W.B. Krantz, Annual Meeting of the North American Membrane Society, Lexington, May 2001.</p>	2001
<p>"Studying Interactions between Humic Acids and Filtration Membranes", R. Hartman &amp; K.R. Williams, American Chemical Society National Meeting, San Diego, April 2001, and FFF 2001, Golden, CO, June 2001.</p>	2001
<p>"Supported Ionic Liquid Membranes and Facilitated Ionic Liquid Membranes", P. Scovazzo, A.E. Vissar, J.H. Davis Jr., R.D. Rogers, R.D. Noble and C.A. Koval; ACS Meeting, San Diego, CA, April 2-4, 2001.</p>	2001
<p>"Synthesis and Characterization of Network Polyamide Thin Films," I.J. Roh, S.Y. Park, J. Kim, and A.R. Greenberg, Annual Meeting of the North American Membrane Society, Lexington, May 2001.</p>	2001

"The MAST Center Research Program: Update on Five Current Research Projects,"  
A.R. Greenberg, Millipore Corporation, Boston, June 2001. *Invited Presentation.*

2001

## MAST Center Publication Statistics

### Publication Category Totals from start of MUC in 2001 to July 2010:

	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001	Totals
Peer Reviewed Publications	8	9	10	9	9	6	12	15	11	9	<b>90</b>
Non-Peer Reviewed Publications	0	0	0	0	1	0	0	0	0	0	<b>1</b>
MS Theses	0	0	2	0	0	3	2	1	1	0	<b>9</b>
Ph.D. Theses	1	1	0	1	2	1	1	3	3	2	<b>14</b>
Presentations	5	34	9	3	29	33	36	49	38	30	<b>261</b>

### Publication Totals for Archived Pub List, CSTF, 1991 - 2001:

	Totals
Peer Reviewed Publications	83
Non-Peer Reviewed Publications	16
MS Theses	17
Ph.D. Theses	21
Presentations	218

### Publication Totals from start of Center in 1991 to Febuary 2010:

MAST

	Totals
Peer Reviewed Publications	173
Non-Peer Reviewed Publications	17
MS Theses	26
Ph.D. Theses	35
Presentations	479