

CURRICULUM VITAE
Professor Alan R. Greenberg
Spring 2014

EDUCATION

1978 Ph.D. Biomedical Engineering, Drexel University, Philadelphia, PA.
1972 M.S. Environmental Engineering, Drexel University, Philadelphia, PA.
1969 B.S. Metallurgical Engineering, Drexel University, Philadelphia, PA.

PROFESSIONAL EXPERIENCE

2011-pres Director, NSF Industry/University Cooperative Research Center for Membrane Science, Engineering and Technology at the University of Colorado.
2009-2013 Associate Chair, Department of Mechanical Engineering, University of Colorado, Boulder, CO.
2002-2010 Executive Director, Multi-Site Industry/University Cooperative Research Center for Membrane Applied Science and Technology.
1999-2002 Site Co-Director NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology at the University of Colorado.
Spring 1998 Visiting Scientist, Corporate Research Division, 3M Corporation, St. Paul, MN.
Fall 1997 Visiting Professor, Chemical Technology Department, University of Twente, the Netherlands.
1997-pres Professor, Department of Mechanical Engineering, University of Colorado, Boulder, CO.
1995-1997 Co-Director NSF I/UCRC for Separations Using Thin Films at the University of Colorado.
Spring 1991 Visiting Professor, Department of Chemical Engineering, University of Texas, Austin, TX.
1988-1997 Associate Professor, Department of Mechanical Engineering, University of Colorado, Boulder, CO.
1982-1988 Assistant Professor, Department of Mechanical Engineering, University of Colorado, Boulder, CO.
1981-1982 Research Assistant Professor, Dental Research Center, University of North Carolina, Chapel Hill, NC.
1980-1981 Research Scientist, Dental Research Center, University of North Carolina, Chapel Hill, NC.
1977-1980 Post-doctoral Fellow, Dental Research Center, University of North Carolina, Chapel Hill, NC.
1974-1977 Research Assistant, Biomedical Engineering Institute, Drexel University, Philadelphia, PA.
1969-1974 Materials Engineer, Naval Ship Engineering Center, Philadelphia, PA.

RECOGNITION

2011 Keynote speaker at the International Congress on Membranes, Amsterdam
2010 Department of Mechanical Engineering Distinguished Achievement Award
2008 University of Colorado Faculty Service Award
2007 AY08-09 BFA Faculty Fellowship Award
2007 College of Engineering, Max Peters Service Award
2007 Department of Mechanical Engineering Service Award
2006 Selected as Technical Expert for the Singapore Environment and Water Industry Development Council
2005 Woodward Outstanding Mechanical Engineering Faculty Award
2002 Plenary presentation at the 2nd International Conference on the Application of Membrane Technology, Beijing, China.
1998 Elected as a Fellow of the American Association for the Advancement of Science
1997 Keynote presentation at the Euromembrane '97, Third International Symposium, University of Twente, The Netherlands.
1996-1997 Research Award Recommendation by the Council for International Exchange of Scholars for the 1997-98 Fulbright Program with the Netherlands.
1994-95 Department of Mechanical Engineering Service Award
1977-1980 Recipient of a National Institutes of Health Post-doctoral Fellowship.

1974-1977 Recipient of a National Institutes of Health Research Assistantship.
1973-1974 Recipient of a University Fellowship, Drexel University.

SELECTED UNIVERSITY SERVICE

2010-2011 Chair, Department Self-Study Committee
2009-2010 Chair, Department Search Committee
2007-2008 Member, University Committee on Research Misconduct
2006-2008 Chair, Department Search Committee
2005-2006 Chair, Department Search Committee
2004-2005 Chair, Department Search Committee
2001-2002 Chair, Department Self-Study Committee
2001-2002 Chair, College First-Level Review Committee
1993-1997 Chair, Department Undergraduate Committee
1992-1993 Chair, Ad-Hoc Committee for Materials Science Initiative
1991-1992 Chair, Inquiry Subcommittee, University Committee on Research Misconduct
1990-1991 Chair, University Committee on Research Misconduct
1989-1990 Chair, Internal Review Team, Program Review Panel
1989-1990 Chair, Inquiry Subcommittee, University Committee on Research Misconduct
1989-1992 Member, University Faculty Council
1988-1989 Member, System-wide Task Force on Libraries and Associated Systems
1988-1989 Chair, Boulder Faculty Assembly Library Committee
1983-1988 Member, Boulder Faculty Assembly Library Committee

SELECTED PROFESSIONAL SERVICE

June 2013 Organizing & Planning Committee, 2013 NSF I/UCRC Center Directors Meeting, Washington, DC.
October 2012` Session Chair & Organizer, AIChE National Meeting, Pittsburgh.
Jan 2012 Session Chair, 2012 NSF I/UCRC Center Directors Meeting, Washington, DC.
July 2011 Session Chair, International Congress on Membranes, Amsterdam.
June 2011 Session Chair, North American Membrane Society, Membrane Formation, Las Vegas.
July 2011 Overall Meeting Co-Chair, First Joint Meeting of the North American Membrane Society and International Conferences on Inorganic Membranes, Washington, DC.
Jan 2011 Session Chair, 2011 NSF I/UCRC Center Directors Meeting, Washington, DC.
Jan 2010 Session Chair, 2010 NSF I/UCRC Center Directors Meeting, Washington, DC.
2008-2010 Meeting Co-Chair, Annual Meeting of the North American Membrane Society, Washington, DC.
Jan 2008 Session Chair, NSF I/UCRC Center Directors Meeting, Washington, DC.
June 2007 Organizing & Planning Committee, 2008 NSF I/UCRC Center Directors Meeting, Washington, DC.
Jan 2007 Session Chair, 2007 NSF I/UCRC Center Directors Meeting, Washington, DC.
May 2006 Session Chair, North American Membrane Society, Membrane Formation, Chicago.
April 2006 Session Chair, Membrane Science & Technology 2006, Singapore.
June 2005 Organizing & Planning Committee, 2006 NSF I/UCRC Center Directors Meeting, Washington, DC.
June 2005 Session Chair, North American Membrane Society, Membrane Formation and Characterization, Providence, RI.
Jan 2005 Session Chair, NSF I/UCRC Center Directors Meeting, Washington, DC.
Jan 2004 Session Chair, NSF I/UCRC Center Directors Meeting, Washington, DC.
May 2003 Session Chair, North American Membrane Society, Membrane Formation and Characterization, Jackson, WY.
Sept 2002 International Scientific Advisory Committee, 2nd International Conference on the Application of Membrane Technology, Beijing, China.
July 2002 Session Chair, International Conference on Membranes and Membrane Processes, Toulouse, France.
June 2002 Organizing & Planning Committee, 2003 NSF I/UCRC Center Directors Meeting.
Nov 2001 Session Chair, AIChE Annual Meeting, Separations Symposium, Advances in Membrane Materials, Reno, NV.

- Sept 1999 Session Chair, Euromembrane '99, Fourth International Symposium, Univ. Leuven, Belgium.
June 1997 Session Chair, Euromembrane '97, Third International Symposium, Univ. Twente, The Netherlands.
May 1995 Session Chair, Seventh Annual Meeting of the North American Membrane Society, Portland, OR.
1993-1994 Overall Program Chair, Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO.
May 1994 Co-chair, Morphology Properties and Performance Technical Session at the Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO.
April 1993 Co-chair, Advances in Membrane Materials Symposium at the AIChE Spring National Meeting, Houston, TX.
Sept 1986 Co-chair, Transition and Relaxation Phenomena in Amorphous Polymers, Special Symposium Session, 15th Annual Conference of the North American Thermal Analysis Society, Cincinnati, Ohio.
June 1986 Co-chair, "Thermal Analysis in the Characterization of Material Behavior", Special Symposium Session, 8th Rocky Mountain Regional Meeting of the American Chemical Society, Denver, CO.
1983-1986 Co-founder and Board Member of the Rocky Mountain Thermal Analysis Forum.

Continuing Professional Service: Reviewer: Scientific Publications and Research Grant Applications:

American Chemical Society	Journal of Membrane Science
American Society for Testing Materials	Journal of Materials Science
Annals of Botany	Journal of Polymer Science
Applied Physics Letters	Macromolecular Materials & Engineering
Biorheology	Macromolecules
Chemical Engineering Education	National Institute of Standards & Technology
Colloids and Surfaces A: Physicochemical and Engineering Aspects	National Institutes of Health
Department of Agriculture	National Science Foundation
Department of Energy	National University of Singapore
Desalination	Petroleum Research Fund
Finland Research Council for Natural Sciences and Engineering	Polymer
Israel Science Foundation	Polymer Engineering and Science
Journal of Applied Polymer Science	Separation Science and Technology
	Water Resources

CONSULTING

Experience in consulting for large and small companies and in providing expert witness testimony.

SCIENTIFIC SOCIETY MEMBERSHIP

American Chemical Society	Materials Research Society
American Association for the Advancement of Science	North American Membrane Society
American Association for Engineering Education	

SELECTED SPONSORED RESEARCH AND GRANTS

- 2010-2015 National Science Foundation, "CU-NJIT Membrane Science, Engineering and Technology (MAST) Center, A Multi-University I/U CRC." \$400,000 (PI with R.D. Noble).
2008-2010 ROTEC Ltd, Israel: "New Desalination Process for Enhanced Recovery from Brackish Water: Smart System Utilizing Ultrasonic Reflectometry (UR) and Flow Reversal (FR)." \$180,137.
2008-2010 Middle East Desalination Center: "New Desalination Process for Enhanced Recovery from Brackish Water: Smart System Utilizing Ultrasonic Reflectometry (UR) and Flow Reversal (FR)." \$100,383 (PI with J. Gilron, Ben Gurion University, and M. Mohsen, Hashemite University, Jordan).
2008-2011 NATO Science for Peace Program: "Demonstration of a Novel High Recovery Desalination Process for Brackish Groundwater." \$410,000 (PI with J. Gilron, Ben Gurion University, and M. Mohsen, Hashemite University, Jordan).

- 2008-2013 National Research Foundation (NRF) of Singapore: Molecular Engineering of Membrane Materials Research and Technology for Energy Development: Hydrogen, Natural Gas and Syngas. PI: Neal Chung, National University of Singapore; (International Collaborator: A.R. Greenberg); \$6,000,000.
- 2006-2011 National Science Foundation, "CU-UC Membrane Applied Science and Technology (MAST) Center, A Multi-University I/U CRC: A Five-Year Renewal." \$265,000 (PI with R.D. Noble).
- 2006-2007 NATO Science for Peace Program: Preproposal, "Demonstration of a Novel High Recovery Desalination Process for Brackish Groundwater." \$9,000 (PI with J. Gilron, Ben Gurion University).
- 2006-2007 NSF I/UCR Center for Membrane Applied Science and Technology, "Acoustic Detection of Gel Layers: Modeling & Experimental Studies." \$50,000 (PI with M. Peterson, University of Maine).
- 2006-2009 NSF I/UCR Center for Membrane Applied Science and Technology, "Integrity Testing of Porous Membranes and Filters." \$120,000 (PI with W. Krantz and M. Peterson, University of Maine).
- 2005-2008 NSF I/UCR Center for Membrane Applied Science and Technology, "Monitoring Cake Formation During Microfiltration." \$120,000 (Co-PI with M. Hernandez and C.C. Ho, University of Cincinnati).
- 2005-2007 National Science Foundation, "Ultrasonic Microsensors for In-situ Monitoring of Membrane Biofouling." \$150,000 (Co-PI with V. Bright and M. Hernandez).
- 2004-2005 Colorado Institute of Technology; "Support for MAST Center." \$150,000 (PI with R.D. Noble).
- 2004-2006 DOE/LANL, "Carbon Dioxide Separation using Thermally Optimized Membranes." \$225,000, (PI).
- 2004-2008 National Science Foundation, "MAST Center Participation in the EU Membrane Network." \$400,000 (PI with R.D. Noble).
- 2003-2005 NSF I/UCR Center for Membrane Applied Science and Technology, "Modeling Biofouling of Microfiltration membranes: Effect of Pore Structure." \$120,000 (co-PI with C.C. Ho, University of Cincinnati, and M. Hernandez).
- 2003-2005 NSF I/UCR Center for Membrane Applied Science and Technology, "Membrane Surface Modification by Grafting." \$120,000 (Co-PI with D. Finch and M. Hernandez).
- 2003-2005 NSF I/UCR Center for Membrane Applied Science and Technology, "Tethered Uncharged Biocides for Use in Membrane Applications." \$120,000 (Co-PI with D. Finch and M. Hernandez).
- 2003-2005 NSF I/UCR Center for Membrane Applied Science and Technology, "Use of Electric Fields to Control Pore Structure in Membrane Manufacture." \$120,000 (Co-PI with W.B. Krantz and T. Beck, University of Cincinnati).
- 2001-2004 NSF I/UCR Center for Membrane Applied Science and Technology, "Use of Microsensors for the *In situ* quantification of Membrane Fouling and Cleaning." \$105,000, (PI with Victor Bright).
- 2001-2005 University of Missouri/DOE, "Microporous and Thin Film Membranes for Solid Oxide Fuel Cells." \$320,000 (PI).
- 2002-2004 NSF I/UCR Center for Membrane Applied Science and Technology, "Effect of Humid Air Exposure on the Structure of Immersion Cast Membranes." \$105,000 (PI with W.B. Krantz).
- 2001-2002 Colorado Commission on Higher Education, "MAST Center Research Program." \$100,000 (PI with R. Noble).
- 2001-2006 National Science Foundation, "CU-UC Membrane Applied Science and Technology (MAST) Center: A Multi-University I/UCRC." \$400,000 (Co-PI with R. Noble).
- 2000-2003 NASA, "Microscopic Flow Visualization in Demixing Fluids During Polymeric Membrane Formation in Low-g." \$350,000, (PI with W.B. Krantz and P. Todd).
- 2000-2002 Los Alamos National Laboratory, "Carbon Dioxide Separation using Thermally Optimized Membranes." \$320,000 (PI).
- 2000-2005 NSF I/UCR Center for Membrane Applied Science and Technology, "Novel and Integrated approach to Biofouling Detection and Control." \$180,000 (Co-PI with M. Hernandez).
- 1999-2001 Aker Industries, "Characterization of Microporous Membranes from Cellulose Derivatives with a Low Degree of Substitution." \$45,000 (PI).
- 1999-2001 NSF I/UCR Center for Membrane Applied Science and Technology, "Development of Acoustic Technique for Quantification of Polymeric Membrane Morphology." \$105,000 (Co-PI with W.B. Krantz).
- 1999-2003 NSF I/UCR Center for Membrane Applied Science and Technology, "Understanding Transport and Modeling Nanofiltration Membranes." \$105,000 (Co-PI with V. Barocas and W.B. Krantz).
- 1999-2001 National Science Foundation – SGER, "Design and Characterization of Novel Metallic MF and UF Membranes." \$38,811 (Co-PI with W.B. Krantz).

- 1998-2002 NASA, "Influence of Solutocapillary Convection on Macrovoid Defect Formation in Polymeric Membranes." \$274,000 (PI with W.B. Krantz and P. Todd).
- 1998-2000 National Science Foundation, "Experimental and Modeling Studies of the TIPS Membrane Formation Process." \$5000-REU supplement, (Co-PI with W.B. Krantz).
- 1998-2000 NSF I/UCR Center for Separations Using Thin Films, "Develop Methods to Detect the Onset of Oxidative Degradation of Polyamide Membranes and Explore Possible Ways to Inhibit Degradation." \$105,000. (Co-PI with W.B. Krantz).
- 1998-2002 NSF I/UCR Center for Separations Using Thin Films, "Synthesis of an ECTFE Membrane by a TIPS Process." \$12,022-supplement (PI with W.B. Krantz).
- 1998-1999 3M Specialty Chemicals Division, "Membrane Preparation Under Microgravity Conditions." \$2,500 (PI with W.B. Krantz, and P. Todd).
- 1997-2000 National Science Foundation, "Experimental and Modeling Studies of the TIPS Membrane Formation Process." \$300,000 (co-PI with W.B. Krantz).
- 1997-1999 NSF I/UCR Center for Separations Using Thin Films, "Real-Time Acoustic Measurement of Fouling and Cleaning in Fiber Membrane Modules." \$105,000 (PI with W.B. Krantz and L.J. Bond)
- 1997-1999 NSF I/UCR Center for Separations Using Thin Films, "Dry-Cast Membranes From Oxidation and UV-Resistant Polymers." \$105,000 (Co-PI with W.B. Krantz).
- 1997-1999 NSF I/UCR Center for Separations Using Thin Films, "Simultaneous Real-Time Measurement of Compaction & Performance During Gas Separation." \$105,000 (PI with L.J. Bond).
- 1997-1998 Colorado Advanced Materials Institute, "Effect of High-Pressure Gases on the Compaction and Transport Properties of Cellulose Ester Membranes and Thin Films." \$10,000 (PI with L.J. Bond).
- 1997-1998 National Science Foundation, "Experimental Studies of Polymeric Film Formation." \$21,944 (PI).
- 1996-2001 National Science Foundation, "University/Industry Cooperative Research Center for Separations Using Thin Films: A Five-Year Renewal." \$185,000 (Co-PI with W.B.Krantz and R. D. Noble).
- 1996-1997 Colorado Advanced Materials Institute, "Characterization of Fouling Behavior of Unique Stainless-Steel Novel Microfiltration Membranes for Separation of Hazardous Waste Streams." \$100,000 (Co-PI with W.B.Krantz and L.J. Bond).
- 1995-1997 NSF I/UCR Center for Separations Using Thin Films, "Adaptation of Acoustic Time-Domain Reflectometry for the Development of Smart Sensors." \$50,000 (PI with L.J. Bond, W.B. Krantz, L.W. Burgess, and A.M. Brodsky).
- 1995-1997 National Science Foundation Division of International Programs, "Center-to-Center International Cooperative Research in Membrane Science." \$47,780 (Co-PI with W.B.Krantz and R. D. Noble).
- 1995-1997 NSF I/UCR Center for Separations Using Thin Films, "Crosslinked CA Membranes for Gas Separations." \$105,000 (PI with W.B. Krantz and L.J. Bond).
- 1995-1996 Coalition to Increase Minority Degrees (CIMD), "Analysis of Membrane Fouling Using Energy Dispersive Spectroscopy." \$1756 (PI).
- 1995-1996 Colorado Advanced Materials Institute, "Characterization of Novel Micro- and Ultrafiltration Membranes for Use in Hostile Environments." \$75,000 (Co-PI with W.B. Krantz, R. Hermann, and L.J. Bond).
- 1994-1996 NSF I/UCR Center for Separations Using Thin Films, "Membrane Fouling in Desalination Systems." \$105,000 (PI with W.B. Krantz and L.J. Bond).
- 1993-1996 NSF I/UCR Center for Separations Using Thin Films, "Membrane Formation Via Interfacial Polymerization." \$90,000 (PI with W.B. Krantz).
- 1992-1995 NSF I/UCR Center for Separations Using Thin Films, "Comprehensive Study of the Thermally Induced Phase Separation (TIPS) Process." \$90,000 (PI with W.B. Krantz).
- 1990-1992 Proctor and Gamble Company, "Mechanical Behavior of Structures Containing Water-Absorbent Polymeric Materials." \$100,500 (PI).
- 1990-1992 CU Council on Research and Creative Work, "Experimental Studies of the Drying of Ink Films." \$2,500 (PI).
- 1990-1992 NSF I/UCR Center for Separations Using Thin Films, "Modeling and Laboratory Studies for Control of Solvent-Cast Membrane Morphology." \$90,000 (Co-PI with W.B. Krantz).
- 1990-1992 Bioserve Space Technologies: Center for the Commercial Development of Space, NASA Office of Commercial Programs, "Space-Made Thin Films and Membranes." \$360,375 (Co-PI with W.B. Krantz).

- 1989-1990 National Science Foundation, "Modeling and Laboratory Studies of Solvent-Cast and Thin Film Composite Membrane Morphology", REU Supplement, \$5,000 (PI with W.B. Krantz).
- 1989-1990 National Science Foundation, "Engineering Research Equipment Grant: Evaporator/Sputter-Coating Apparatus for SEM Analysis Supporting Membrane, Thin Film and Biotechnology Research." \$56,950 (Co-PI with W.B. Krantz and R.H. Davis).
- 1988-1989 National Science Foundation, "REU Supplement: Modeling and Laboratory Studies of Solvent-Cast and Thin Film Composite Membrane Morphology." \$5,000 (Co-PI with W.B. Krantz and R.L. Sani).
- 1987-1989 National Science Foundation, "Modeling and Laboratory Studies of Solvent-Cast and Thin Film Composite Membrane Morphology." \$117,450 (Co-PI with W.B. Krantz and R.L. Sani).
- 1987-1988 National Science Foundation, "Engineering Research Equipment Grant: EDX/WDX X-Ray Spectrometer System for Membrane, Catalysis and Materials Research." \$100,000 (Co-PI with W.B. Krantz and J.L. Falconer).
- 1987-1988 University of Colorado (CRCW), "Polymeric Membrane Morphology Studies." \$6,900 (Co-PI with W.B. Krantz).
- 1986-1991 Colorado Advanced Materials Institute, "Polymeric Materials Research." \$60,000 (PI).
- 1986-1987 University of Colorado (CRCW), "Influence of Ozone on the Biomechanical Properties of Plant Tissue." \$5,500 (PI with Jane Bock).
- 1985-1988 University of Colorado President's Enrichment Program, "Enrichment Funds for Membrane Research." \$128,500 (Co-PI with W.B. Krantz et al).
- 1985-1988 The Gates Corporation, Denver, CO, "Influence of Interfacial Adhesion on the Fatigue Properties of a Filled Elastomeric Composite Material." \$184,611 (PI).
- 1985-1986 National Science Foundation, "A Cryostage and Digital Image Processor for an SEM." \$32,650 (co-PI with W.B. Krantz et al).
- 1985-1986 IBM Corporation, Armonk, NY, "Laboratory and Computing Equipment for Improved Education and Research in Mechanical Engineering." \$265,195 (Co-PI with T.L. Geers and M.C. Branch).
- 1982-1986 Exxon Research Foundation, "Polymeric Materials Research." \$50,000 (PI).
- 1982-1983 National Institutes of Health, Biomedical Research Support Program, Division of Research Resources, "Influence of Molecular Weight on the Fatigue Properties of PMMA Bone Cements." \$6,995 (PI).
- 1978-1980 National Institutes of Health, National Research Service Award, "Use of Composite Coatings on Orthodontic Appliances." \$36,000 (PI).

INSTRUCTIONAL RESPONSIBILITIES

MCEN3024	Introduction to Materials Science	MCEN4124	Mechanical Behavior of Materials
MCEN3027	Engineering Measurements Laboratory	MCEN5024	Materials Science I
MCEN4027	Mechanical Engineering Laboratory	MCEN5044	Materials Science II
MCEN4120	Engineering Statistics	MCEN6184	Structure and Properties of Polymers
MCEN4228	Mechanical Behavior of Biological Materials		

PATENTS

1. Method and Apparatus for Determining the State of Fouling/Cleaning of Membrane Modules, L.J. Bond, G.Y. Chai, A.R. Greenberg, and W.B. Krantz, U.S. Patent 6,161,435 on December 19, 2000.
2. Apparatus and Method for Controlling Pore Size in Polymeric Membranes and Thin Film, issued on November 12, 2002, U.S. Patent Number 6,479,007 B1, A. Greenberg, W.B. Krantz, A. Niece, and P. Todd.
3. Michael L. Peterson, Anthony DiLeo, Zong Mu Wang and Alan R. Greenberg, "Ultrasonic Detection of Porous Medium Characteristics." U.S. Patent 6,959,602, November 1, 2005.
4. Determination of Pore Size in Porous Materials by Evaporative Mass Loss, Alan R. Greenberg, Seyed S. Hosseini, William B. Krantz, Elmira Kujundzic, and Adrian Yeo, International Patent Application P201972, WO01, April 30, 2011.
5. Analyzing Ultrasonic Signals Using a Dynamic Window for an Early Detection of Scaling in Water Processing Equipment, Greenberg, A., Gilron, J., Cobry, K., Kujundzic, E., Lu, X., G. Mizrahi, and Peterson, M., International Patent Application, PCT/IB2011/053115, July 12, 2011.

6. Filtration Membranes with Nanoscale Patterns, Ding, Y., Maruf, S., Pellegrino, J. and Greenberg, A., PCT application based on Provisional Application No. 61/697,599, CU TTO No. CU3096B-PPA1; September 2013.
7. Nano-Patterned Thin Film Composite Membrane, Ding, Y., Maruf, S., Pellegrino, J. and Greenberg, A., PCT application based on Provisional Application No. 61/882,928, CU TTO No. CU3434B-PPA1; September 2013.

POST-DOCTORAL AND GRADUATE STUDENT SUPERVISION

2009-2011	Xiaoyun Lu, Research Associate, Mechanical Engineering, Membrane Desalination.
2005-pres	Elmira Kujundzic, Research Associate, Mechanical Engineering, Membrane Characterization.
2007-2008	Adrian Yeo, Research Associate, Mechanical Engineering, Membrane Characterization
2007	Atousa Plaseied, Research Associate, Mechanical Engineering, Membrane Characterization
2005-pres	Keith Cobry, Ph.D. Student, Mechanical Engineering, Membrane Microsensors (with Victor Bright).
2005-2007	Sudhir Brahmamdam, Research Associate, Mechanical Engineering, Coupling Mechanical and Transport Behavior in Polymeric Dense Films.
2004-2010	Alicia Ortega, Ph.D. Student, Mechanical Engineering, Shape Memory Polymers (with Ken Gall).
2004-2005	Anandh Balakrishnan, M.S. Student, Mechanical Engineering, Mechanical-Transport Behavior of PMMA Thin Films.
2003-2005	Emily Evans, M.S. Student, Civil Engineering, Detection and Control of Biofouling, (with M. Hernandez).
2002-2003	Jianxin Li, Research Associate, Membrane Fouling.
2001-2006	Robert Buchwald, Ph.D. Student, EPO Biology, Bee Wax Biomechanics (with M. Breed).
2000-2005	Vivek Khare, Research Associate, Mechanical Engineering, Macrovoid Defect Growth and Membrane Compaction.
2000-2002	Cristina Fonseca, Ph.D. student, Civil Engineering, Detection and Control of Biofouling, (with M. Hernandez).
2000-2005	Zhongxia Zhang, Ph.D. Student, Chemical Engineering, Microsensors for Membrane Applications (with V. Bright).
2000-2002	Il Juhn Roh, Research Associate, Mechanical Engineering, ECTFE Membrane Fabrication and Cellulosic Film Formation.
1999-2000	Christopher Staab, combined B.S./M.S. student, Chemical Engineering, Design and Characterization of Novel Metallic MF and UF Membranes. (with W.B. Krantz).
1998-2000	Michael W. Weber, M.S student, Chemical Engineering, Experimental and Modeling Studies of Nanofiltration. (with V. Borocas and W.B. Krantz).
1998-2003	Dongmei Li, M.S./Ph.D. student, Chemical Engineering, Experimental and Modeling Studies of the TIPS Membrane Formation Process. (with W.B. Krantz).
1998-1999	Matthew Pekny, M.S, Chemical Engineering. Influence of Solutocapillary Convection on Macrovoid Defect Formation in Polymeric Membranes. (with W.B. Krantz and P. Todd).
1998-2002	Senthil Ramaswamy, Ph.D. student, Chemical Engineering, Membrane Characterization Using Ultrasonic Techniques.
1998-2001	Neil Soice, Ph.D. student, Chemistry and Biochemistry, Develop Methods to Detect the Onset of Oxidative Degradation of Polyamide Membranes and Explore Possible Ways to Inhibit Degradation. (with W.B. Krantz and A. Norman).
1997-1999	Veronika Reinsch, Research Associate, Mechanical Engineering, Real-Time Measurement of Compaction & Performance During Gas Separation. (with W.B. Krantz).
1996-2000	Diana Hellman, M.S./Ph.D. student, Mechanical Engineering, Dry-Cast Membranes From Oxidation and UV-Resistant Polymers. (with W.B. Krantz).
1996-2000	Virginia Ferguson, M.S./Ph.D. student, Mechanical Engineering, The Effects of Age and Dietary Restriction on Whole Bone Structural Properties in Mice. (with S. Simske).
1996-1998	Sanjay Konagurthu, Ph.D., Chemical Engineering, Behavior of Macrovoids During Compaction. (with W.B. Krantz).
1995-1996	Andrew Metters, M.S., Chemical Engineering, Comprehensive Study of the Thermally Induced Phase Separation (TIPS) Process. (with W.B. Krantz and L.J. Bond).

- 1995-1996 Gina LaFontaine, M.S. candidate, Chemical Engineering, Characterization of Novel Micro- and Ultrafiltration Membranes for Use in Hostile Environments. (with W.B. Krantz).
- 1995-1996 Rorik Peterson, M.S., Chemical Engineering, Crosslinked CA Membranes. (with L.J. Bond and W.B. Krantz.)
- 1994-1998 Anurag Mairal, Ph.D., Chemical Engineering, Acoustic Techniques for Measurement of Membrane Fouling. (with W.B. Krantz and L.J. Bond).
- 1993-1996 Vivek Khare, Ph.D., Chemical Engineering, Mechanical Behavior of Interfacially Polymerized Thin Films. (with W.B. Krantz.)
- 1992- 1993 Li Tan., M.S., Chemical Engineering, Development of a Laser Interferometric Technique for Instantaneous Film Thickness Measurements of Polymer Films and Membranes. (with W.B. Krantz).
- 1990-1994 J. Broz, Ph.D., Mechanical Engineering, Site-Specific Biomechanical Behavior of Bone.
- 1989-1990 S. Simske, Ph.D., Electrical Engineering, Field Effects on the Behavior of Bone. (with Howard Wachtel).
- 1988-1992 S.S. Shojaie, Ph.D., Chemical Engineering, Modeling and Laboratory Studies of the Dry-Cast Membrane Formation Process. (with W.B. Krantz).
- 1987-1990 B.S. Tantekin, Ph.D., Chemical Engineering, Evaporative Casting of Asymmetric Polymeric Membranes. (with W.B. Krantz).
- 1987-1990 K.J. Gleason, Ph.D., Chemical Engineering, Modeling and Experimental Studies of the Precipitation Step in Asymmetric Polymeric Membrane Casting. (with W.B. Krantz).
- 1987-1988 D. Paul Foward, M.S., Mechanical Engineering, Deflection-Controlled Bending Fatigue in Glassy Polymers.
- 1985-1986 Robert Stoddard, M.S., Mechanical Engineering, Dynamic Mechanical Spectroscopy of Particulate Filled Acrylic Composites.
- 1984-1989: Charles Reid, Ph.D. Mechanical Engineering, Interfacial Adhesion in Filled Polymeric Composites.
- 1982-1984 Mohammed Malekmdani, M.S., Mechanical Engineering, Fatigue Behavior of Filled Elastomers.

STUDENT MENTORING

- 2006 Faculty Advisor to Robert Buchwald who received a NSF post-doctoral fellowship.
- 2005 Faculty Advisor to Emily Evans who won a first-place North American Membrane Society Outstanding Student Paper Award.
- 2003 Faculty Advisor to Jeremy Zartman who received a University of Colorado Astronaut Scholarship.
- 2003 Faculty Advisor to Dongmei Li who won a first-place North American Membrane Society Outstanding Student Paper Award.
- 2002 Faculty Advisor to Senthil Ramaswamy who won a first-place North American Membrane Society Outstanding Student Paper Award.
- 2002 Faculty Advisor to Jeremy Zartman who received a Goldwater Scholarship.
- 2000 Faculty Advisor to Jeremy Zartman who received a Honorable Mention Award in the Undergraduate Materials Research Initiative, Materials Research Society.
- 2000 Faculty Advisor to Dongmei Li who won a North American Membrane Society Outstanding Student Paper Award.
- 2000 Faculty Advisor to Neil Soice who won a North American Membrane Society Outstanding Student Paper Award.
- 1999 Faculty Advisor to Peter Aerts who won a North American Membrane Society Outstanding Student Paper Award.
- 1999 Faculty Advisor to Senthil Ramaswamy who won 2nd place in the outstanding technical presentation competition at the AAAS meeting.
- 1999 Faculty Advisor to V.L. Ferguson who won 1st place in the outstanding technical presentation competition at the Rocky Mountain Biomedical Society.
- 1999 Faculty Advisor to Christopher Staub who won 1st place in the outstanding technical presentation competition at the AAAS meeting.
- 1999 Faculty Advisor to Virginia Ferguson who won 1st place in the poster presentation competition at the Rocky Mountain Biomedical Society meeting.
- 1998 Faculty Advisor to Christopher Staub who won 3rd place in the outstanding technical presentation competition at the American Institute of Chemical Engineers meeting.

- 1996 Faculty Advisor to Sanjay Konagurthu who won a North American Membrane Society Outstanding Student Paper Award.
- 1995-1996 Faculty Advisor to Jason Padilla who won a Coalition to Increase Minority Degrees Fellowship.
- 1995-1996 Faculty Advisor to Anuarg Mairal who won a North American Membrane Society Fellowship.
- 1995 Faculty Advisor to Sanjay Konagurthu who won 1st place in the outstanding technical presentation competition at the AAAS meeting.
- 1994-1995 Faculty Advisor to Vivek Khare who won a North American Membrane Society Fellowship.
- 1994 Faculty Advisor to Anuarg Mairal who won 3rd place in the outstanding technical presentation competition at the American Institute of Chemical Engineers meeting.
- 1994 Faculty Advisor to Gregory Loest who won 1st place in the outstanding technical presentation competition at the AAAS meeting.
- 1993 Faculty Advisor to Li Tan who won 5h place in the outstanding technical presentation competition at the AAAS meeting.
- 1990 Faculty Advisor to Saeed Shojaie who won 6h place in the outstanding technical presentation competition at the AAAS meeting.
- 1989 Faculty Advisor to Birgul Tantekin-Ersolmaz who won a North American Membrane Society Outstanding Student Paper Award.
- 1987 Faculty Advisor to Birgul Tantekin-Ersolmaz who won 6h place in the outstanding technical presentation competition at the AAAS meeting.
- 1977-1978 Faculty Advisor to Charles Reid who won a Majorie Roy Rothermel Scholarship for graduate studies from the American Society of Mechanical Engineers Auxiliary.

VISITORS HOSTED

- 2013 Mads Jorgensen, Aalborg University, Denmark
- 2009 Mousa Mohsen, Hashemite University, Jordan
- 2007 Neal Chung, National University of Singapore
- 2006 Jack Gilron, Ben Gurion University
- 2004-2006 Julie Diani, Visiting Scientist, CNRS-Paris, France.
- 1999 Louis Koens, Graduate Student, University of Stellenboch, South Africa.
- 1998-1999 Guoyong Chai, Research Scientist, Peoples Republic of China.
- 1998 Peter Aerts, Graduate Student, University of Leuven, Belgium.
- 1997 Douglas Lloyd, Professor, University of Texas at Austin
- 1996-1997 David L. Braun, Corporate Scientist, 3M Corporation.
- 1996 Willem Kools, Graduate Student, University of Twente, The Netherlands.
- 1995-1996 Y.S. Kang, Research Scientist, Korean Institute of Science and Technology.

PEER-REVIEWED SCIENTIFIC PUBLICATIONS

1. A.R. Greenberg and I.L. Kamel, "PAA Composite for Tooth Root Implant," *Journal Dental Research*, **54**, 112 (1975).
2. A.R. Greenberg and I.L. Kamel, "Polymer-Ceramic Composite for Tooth Root Implant," *Journal of Biomedical Materials Research*, **10**, 777-788 (1976).
3. A.R. Greenberg and I.L. Kamel, "Kinetics of Anhydride Formation in Poly(acrylic acid) and Its Effect on the Properties of a PAA-Alumina Composite," *Journal of Polymer Science*, **15**, 2137-2149 (1977).
4. A.R. Greenberg, I.L. Kamel, S. Dubin and A. Miller, "Stimulation of Bone Formation by a Swelling Endosseous Implant," *Journal of Biomedical Materials Research*, **12**, 929-933 (1978).
5. R.P. Kusy and A.R. Greenberg, "Determination of Radiation Damage in Isotactic Poly(methyl methacrylate) by X-Ray Diffraction," *Macromolecules*, **11**, 1051-1053 (1978).
6. R.P. Kusy and A.R. Greenberg, "An X-Ray Diffraction Technique to Assess Radiation Damage in Semi-Crystalline Polymers: I. Isotactic Poly(methyl methacrylate)," *Journal of Polymer Science*, **17**, 3969-3978 (1979).
7. R.P. Kusy and A.R. Greenberg, "On the Use of DSC to Assess Radiation Damage in Isotactic Poly(methyl methacrylate)," *Thermochimica Acta*, **34**, 339-356 (1979).
8. A.R. Greenberg and R.P. Kusy, "Survey of Specialty Coatings for Orthodontic Wires," *Journal of Dental Research*, **58**, 98 (1979).
9. R.P. Kusy, A.R. Greenberg and D.F. Taylor, "Dynamic Mechanical Analysis of the Setting of Amalgam," *Journal of Dental Research*, **59**, 1070 (1980).
10. R.P. Kusy and A.R. Greenberg, "Influence of Molecular Weight on the Dynamic Mechanical Properties of Poly(methyl methacrylate)," *Journal of Thermal Analysis*, **18**, 117-126 (1980).
11. R.P. Kusy and A.R. Greenberg, "The Use of Composite Beams to Measure the Dynamic Mechanical Properties of Semi-Rigid Solids," *Thermochimica Acta*, **37**, 53-64 (1980).
12. A.R. Greenberg and R.P. Kusy, "The Influence of Crosslinking on the Glass Transition of Poly(acrylic acid)," *Journal of Applied Polymer Science*, **25**, 1785-1788 (1980).
13. A.R. Greenberg and R.P. Kusy, "The Viscoelastic Behavior of Highly Crosslinked Poly(acrylic Acid)," *Journal of Applied Polymer Science*, **25**, 2795-2805 (1980).
14. A.R. Greenberg and R.P. Kusy, "Dynamic Mechanical Properties of Crosslinked Poly(acrylic acid)-Aluminum Oxide Composites," *Journal of Materials Science*, **15**, 3159-3162 (1980).
15. S. Dubin and A.R. Greenberg, "Effect of Replicated Autoclaving on the Breaking Strength of Synthetic Polyamide Suture Material," *Journal of the American Veterinary Medical Association*, 1162 (1981).
16. R.P. Kusy and A.R. Greenberg, "Dynamic Mechanical Properties of Amalgams," *Journal of Biomedical Materials Research*, **15**, 47-59 (1981).
17. R.P. Kusy, W.F. Simmons and A.R. Greenberg, "Glass Transition Temperature of Poly(methyl methacrylate) Blends," *Polymer*, **22**, 268-270 (1981).
18. R.P. Kusy and A.R. Greenberg, "Influence of Compositional and Configurational Changes on the Elastic Property Ratios of Orthodontic Archwires," *Angle Orthodontics*, **51**, 325-341 (1981).
19. R.P. Kusy and A.R. Greenberg, "Statistical Mechanical Theories of the Glass Transition - A New Perspective." *Polymer*, **23**, 36-38 (1982).
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22. A.R. Greenberg and R.P. Kusy, "Influence of Free Volume Fraction, Inter-Intramolecular Energy Ratio, and Chain Segment Density on the Gibbs-DiMarzio Theory of the Glass Transition," *Polymer*, **24**, 513-518 (1983).
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CONFERENCE PRESENTATIONS AND INVITED LECTURES

1. A.R. Greenberg and I.L. Kamel, "Polymer-Ceramic Composites for Tooth-Root Implants," 7th International Biomaterials Symposium, Clemson, SC, April 1975.
2. A.R. Greenberg and I.L. Kamel, "PAA Composite for Tooth Root Implant," National Meeting of the American Association for Dental Research, New York, NY, April 1975.
3. A.R. Greenberg, "Composite Materials for Biomedical Applications," 3rd Annual Drexel Polymer Conference," Philadelphia, PA, May 1975.
4. A.R. Greenberg and I.L. Kamel, "Development of a Composite Material for Implant Applications," 8th International Biomaterials Symposium, Philadelphia, PA, April 1976.
5. I.L. Kamel and A.R. Greenberg, "Crosslinked PAA Composites for Endosseous Implants," National Meeting of the American Association for Dental Research, New Orleans, LA, April 1976.
6. A.R. Greenberg, I. Kamel, S. Dubin and A. Miller, "Histological Evaluation of a Composite Material for Dental Implant Applications," National Meeting of the American Association for Dental Research, Chicago, IL, April 1977.
7. A.R. Greenberg, I. Kamel, S. Dubin and A. Miller, "Histological Evaluation of an Implantable Composite Material," Transactions 9th International Biomaterials Symposium, New Orleans, LA, April 1977.
8. A.R. Greenberg and R.P. Kusy, "Comparative Analyses of Radiation Induced Damage in Semi-Crystalline Isotactic Poly(methyl methacrylate)," Meeting in Miniature of the American Chemical Society, Durham, NC, April 1978.
9. R.P. Kusy and A.R. Greenberg, "On the Use of DSC to Assess Radiation Damage in Isotactic Poly(methyl methacrylate)," 8th North American Thermal Analysis Society Conference, Atlanta, GA, October 1978.
10. A.R. Greenberg and R.P. Kusy, "Survey of Specialty Coatings for Orthodontic Wires," International Meeting of the American Association for Dental Research, Chicago, IL, April 1979.
11. A.R. Greenberg and R.P. Kusy, "The Viscoelastic Behavior of a Composite Implant Material by Dynamic Mechanical Analysis," 11th International Biomaterials Symposium, Clemson, SC, April 1979.
12. R.P. Kusy, A.R. Greenberg and D.F. Taylor, "Dynamic Mechanical Analysis of Amalgam Setting Rates," International Meeting of the American Association for Dental Research, Chicago, IL, April 1979.
13. D.F. Taylor, R.P. Kusy and A.R. Greenberg, "Physical Properties as Indicators of the Setting of Dental Amalgam," International Meeting of the American Association for Dental Research, Chicago, IL, April 1979.
14. R.P. Kusy and A.R. Greenberg, "The Use of Composite Beams to Measure the Dynamic Mechanical Properties of Semi-Rigid Solids," 9th North American Thermal Analysis Society Conference," Chicago, IL, September 1979.
15. A.R. Greenberg, "The Viscoelastic Behavior of Acrylic Polymers - Some Recent Observations," Pennsylvania State University, University Park, PA, January, 1981.
16. A.R. Greenberg, "Viscoelastic Behavior of a Crosslinked Poly(acrylic acid)-Al₂O₃ Composite Material," Dartmouth College, Hanover, NH, February, 1981.
17. A.R. Greenberg and J.P. Eylers, "Evidence for Ion Dependent Viscoelastic Properties in an Invertebrate Connective Tissue," 13th International Biomaterials Symposium, Troy, NY, May 1981.
18. A.R. Greenberg, "Viscoelastic Behavior of Highly Crosslinked Systems," University of Colorado, Boulder, CO, June 1981.
19. A.R. Greenberg, "Aspects of the Viscoelastic Behavior of Biomedical Materials," Tulane University, New Orleans, LA, July, 1981.
20. A.R. Greenberg, "Structure-Property Relationships in Acrylic Polymers," University of Iowa, Iowa City, IA, September, 1981.
21. R.P. Kusy and A.R. Greenberg, "Statistical Mechanical Theories of the Glass Transition - A New Perspective," 11th North American Thermal Analysis Society Conference, New Orleans, LA, October 1981.
22. A.R. Greenberg and R.P. Kusy, "Influence of Inter-Intramolecular Energy Ratio, and Chain Segment Density on the Gibbs-DiMarzio Theory of the Glass Transition," 7th International Conference on Thermal Analysis, Kingston, Ontario, August 1982.
23. J.P. Eylers and A.R. Greenberg, "Ionic Regulation of Tissue Modulus: Electrostatic or Chemical?," American Society of Biomechanics Meetings, Seattle, WA, October 1982.

24. A.R. Greenberg and R.P. Kusy, "Significance of Structural Parameters on the Gibbs-DiMarzio Theory of the Glass Transition," with R.P. Kusy, 5th International Symposium on Analytical Calorimetry, Seattle, WA, March 1983.
25. A.R. Greenberg, "Engineering Applications in Dental Materials," Colorado Scientific Review, Denver, CO, September 1983.
26. A.R. Greenberg, M.D. Rehr and D. Letendre, "Influence of Geometric and Structural Parameters on the Glass Transition Behavior of Polymer Matrix Composite Materials," 12th Annual North American Thermal Analysis Society, Williamsburg, VA, September 1983.
27. A.R. Greenberg, "Influence of Filler on the Glass Transition Behavior of Polymer Matrix Composite Materials," Polymer Laboratories DMTA Users Meeting, Philadelphia, PA, September 1984.
28. A.R. Greenberg, J. Issac and I.L. Kamel, "Influence of Filler Surface Chemistry on the Dynamic Mechanical Properties of a Particulate Filled Composite Material," 13th Annual North American Thermal Analysis Society, Philadelphia, PA, September 1984.
29. J.P. Eylers, A.R. Greenberg and A.J. Kenis, "Relationship Between Connective Tissue Swelling and Ionic Environment," Transactions: 17th International Biomaterials Symposium, San Diego, CA, April 1985.
30. A.R. Greenberg, "Studies of the Matrix-Filler Interface in Model Composite Materials by Thermal Analysis Techniques," Advanced Materials Institute Symposium, Golden, CO, April 1985.
31. A.R. Greenberg, M. Messaros and I.L. Kamel, "Characterization of the Matrix-Filler Interaction in a Composite Material by Thermal Analysis Techniques," National Meeting of the American Chemical Society, Miami, FL, April 1985.
32. W.B. Krantz and A.R. Greenberg, "Morphology of Polymeric Membranes," Advanced Materials Institute Symposium, Golden, CO, April 1985.
33. A.R. Greenberg, "Dynamic Mechanical Analysis of Filled Acrylic Polymers," University of Washington, Seattle, WA, June 1985.
34. A.R. Greenberg and R.P. Kusy, "Relationship Between Tg and Molecular Weight: Applicability of Free Volume and Thermodynamic Models for the Case of Polyisobutylene," 14th North American Thermal Analysis Society Conference, San Francisco, CA, September 1985.
35. C.G. Reid and A.R. Greenberg, "Tg Behavior of a Particulate Filled Rubber," 14th North American Thermal Analysis Society Conference, San Francisco, CA, September 1985.
36. A.R. Greenberg, "Basic Principles and Applications of Dynamic Mechanical Spectroscopy," Rocky Mountain Thermal Analysis Forum, Boulder, CO, February 1986.
37. C.G. Reid and A.R. Greenberg, "Glass Transition Behavior of a Model Elastomeric Composite Material," 62nd Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Boulder, CO, April 1986.
38. C.G. Reid and A.R. Greenberg, "Aspects of Glass Transition Behavior of Particulate Filled Composites," 8th Rocky Mountain Regional Meeting of the American Chemical Society, Denver, CO, June 1986.
39. A.R. Greenberg, W.B. Krantz, S.W. McFarland and M.D. Wray, "Experimental and Theoretical Studies of Polymeric Membrane Morphology," Colorado Advanced Materials Conference - Annual Meeting of the Metallurgical Society, Denver, CO, February 1987.
40. C.G. Reid and A.R. Greenberg, "Matrix-Filler Interactions in Model Elastomeric Composite Materials," Colorado Advanced Materials Conference - Annual Meeting of the Metallurgical Society, Denver, CO, February 1987.
41. P. Foward, A.R. Greenberg and M.D. Wray, "Influence of Frequency on the Fatigue Behavior of PMMA," 63rd Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Austin, TX, April 1987.
42. K.J. Gleason, A.R. Greenberg and W.B. Krantz, "Asymmetric Polymeric Membrane Morphology - A Fractal Geometry?," 63rd Annual Meeting of the Southwestern Rocky Mountain Division of the American Association for the Advancement of Science, Austin, TX, April 1987.
43. M. Lee, A. Mehling, A.R. Greenberg and J. Bock, "Changes in Anatomical Characteristics and Mechanical Properties in Ozone Treated Plants," 63rd Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Austin, TX, April 1987.

44. S. McFarland, M.D. Wray and A.R. Greenberg, "Preparation of Thin Film Composite Membranes," 63rd Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Austin, TX, April 1987.
45. Mehling, A.R. Greenberg, M. Lee and J. Bock, "Effects of Ozone on the Biomechanical Behavior of Plant Tissue," 63rd Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Austin, TX, April 1987.
46. M.D. Wray, A.R. Greenberg and W.B. Krantz, "Morphological Studies of Polymeric Membranes," 63rd Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Austin, TX, April 1987.
47. J.P. Eylers and A.R. Greenberg, "Mechano-Chemistry of the Cation Sensitive Crosslinks in the Catch Connective Tissue of Holthurian Body Wall," 6th International Echinoderm Conference, Victoria, B.C., August 1987.
48. C.G. Reid and A.R. Greenberg, "Viscoelastic Behavior of Crosslinked Ethyl Acrylate," National Meeting of the American Chemical Society, Denver, CO, April 1987.
49. C.G. Reid and A.R. Greenberg, "Comparison of the Effects of Filler Additions and Crosslinking on the Viscoelastic Behavior of Acrylic Polymers," 16th North American Thermal Analysis Society Conference, Washington, DC, September 1987.
50. A.R. Greenberg, "Ultrastructural Studies of Cellulose Acetate and Cellulose Triacetate Thin Films," W.R. Grace & Co., Columbia, Maryland, March 4, 1988.
51. A.R. Greenberg, A. Mehling, M. Lee and J. Bock, "Effect of Ozone on the Mechanical Behavior of Ryegrass," National Meeting of the American Chemical Society, Toronto, Canada, June 1988.
52. A.R. Greenberg, "Morphological Studies of Membranes and Thin Films," Dow Chemical Company, Walnut Creek, California, July 20, 1988.
53. A.R. Greenberg, K.J. Gleason, M.D. Wray and W.B. Krantz, "Influence of Processing on the Morphology of Cellulose Acetate Thin Films," National Meeting of the American Chemical Society, Toronto, Canada, June 1988.
54. A.R. Greenberg, K.J. Gleason, M.D. Wray and W.B. Krantz, "Thermal Behavior of Secondary (CA) and Tertiary (CTA) Cellulose Acetates," 17th North American Thermal Analysis Society Conference, Orlando, FL, October 1988.
55. C.G. Reid and A.R. Greenberg, "Glass Transition Temperature Shift of Silica Filled Acrylic Composites," Polymeric Materials Science and Engineering, National Meeting of the American Chemical Society, Toronto, Canada, June 1988.
56. K.J. Gleason, A.R. Greenberg, M.D. Wray and W.B. Krantz, "Study of Polymeric Membrane Materials by Combined DSC, SAED, and XRD Methods," Industry-University Advanced Materials Conference, March 1989, Denver, Colorado.
57. C.G. Reid and A.R. Greenberg, "Matrix-Filler and Filler-Filler Interactions within Particulate Filled Acrylic Elastomers," Industry-University Advanced Materials Conference, March 1989, Denver, Colorado.
58. S.S. Shojaie, W.B. Krantz and A.R. Greenberg, "Influence of Electric Fields on Interfacial Stability During Polymeric Membrane Formation," Industry-University Advanced Materials Conference, March 1989, Denver, Colorado.
59. S.B. Tantekin, W.B. Krantz and A.R. Greenberg, "Theoretical and Experimental Aspects of the Evaporation Step in the Preparation of Solvent-Cast Asymmetric Polymeric Membranes," Industry-University Advanced Materials Conference, March 1989, Denver, Colorado.
60. S.B. Tantekin, W.B. Krantz and A.R. Greenberg, "The Dynamics of Evaporation in Polymer/Solvent Films - Importance in Asymmetric Polymeric Membrane Formation," National Meeting of the American Chemical Society, Dallas, TX, April 1989.
61. S.B. Tantekin, W.B. Krantz and A.R. Greenberg, "Dynamics of the Evaporation Step in the Preparation of Solvent-Cast Asymmetric Polymeric Membranes," 3rd Annual Meeting of the North American Membrane Society, Austin, TX, May 1989.
62. C.G. Reid and A.R. Greenberg, "Copolymer Contributions to the Viscoelastic Properties of Crosslinked Poly(ethyl acrylate)," 18th North American Thermal Analysis Society Conference, San Diego, CA, September 1989.
63. S.S. Shojaie, A.R. Greenberg and W.B. Krantz, "Influence of Electric Fields on Large Scale Structures in Non-Solvent Precipitated Polymeric Membranes," National Meeting of the American Chemical Society, Boston, MA, April 1990.

64. A.R. Greenberg, "Structural Basis of Biomechanical Behavior," University of North Carolina, Chapel Hill, NC, April, 1990.
65. S. Simske, A.R. Greenberg and M. Luttges, "Tail-Suspension Induced Osteopenia in Mouse Femora: An Animal Model for Microgravity Exposure," 22nd International Biomaterials Symposium, Charleston, SC, April 1990.
66. S.S. Shojaie, A.R. Greenberg and W.B. Krantz, "Influence of Electric Fields on Polymeric Membrane Morphology," 66th Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, 7, 25 (1990).; Colorado Springs, CO, May 16-19, 1990.
67. S.B. Tantekin, W.B. Krantz and A.R. Greenberg, "Dynamics of the Evaporation Step in the Preparation of Solvent-Cast Asymmetric Polymeric Membranes," International Conference on Membranes and Membrane Processes, Chicago, IL, August 1990.
68. K.M. Guerra, S.J. Simske, A.R. Greenberg and M.W. Luttges, "Effects of Suspension-Induced Osteopenia on the Cross-sectional Geometry of Mouse Femora," Annual Meeting of the American Society for Gravitational and Space Biology, Louisville, KY, November 1990.
69. Tantekin, S.B., W.B. Krantz and A.R. Greenberg, "The Influence of the Evaporation Step on Asymmetric Membrane Morphology," Annual Meeting of the American Institute of Chemical Engineers, Chicago, IL, November 1990.
70. J.J. Broz, S.J. Simske, A.R. Greenberg and M.W. Luttges, "Dehydration and Rehydration Effects on the Whole Bone Material Properties of Mouse Femora," 23rd International Biomaterials Symposium, Scottsdale, AZ, May 1991.
71. M.N. Robinson, S.B. Tantekin, W.B. Krantz and A.R. Greenberg, "Influence of the Evaporation Step on Macrovoid Formation in Polymeric Membranes, 4th Annual Meeting of the North American Membrane Society, San Diego, CA., May 1991.
72. S.S. Shojaie, A.R. Greenberg and W.B. Krantz, "A Mathematical Model for Dry-Cast Polymeric Membrane Formation, 4th Annual Meeting of the North American Membrane Society, San Diego, CA., May 1991.
73. A.K. Som, J. Broz, L. Bond and A.R. Greenberg, "Acoustic Microscopy Applied to the Characterization of Tail-Suspension Induced Osteopenia in Mouse Femora, Ultrasonic International, Le Touquet, France, July 1991.
74. A.R. Greenberg, "Comprehensive Approach to the Study of the Formation of Solvent-Cast Polymeric Membranes and Thin Films," Invited Seminar, Dow Chemical, Midland, Michigan, October 1991.
75. S.S. Shojaie, W.B. Krantz and A.R. Greenberg, "Validation of a Dry-Cast Polymeric Membrane Casting Model Using Gravimetric, Infrared and Light-Reflectometry Analyses," Annual Meeting of the American Institute of Chemical Engineers, Los Angeles, CA., November 1991.
76. S.S. Shojaie, W.B. Krantz and A.R. Greenberg, "Modeling and Experimental Studies of the Formation of Evaporatively Cast Dense Polymeric Films," First International Conference on Transport Phenomena in Processing, Honolulu, HI, March 1992.
77. S.S. Shojaie, A.R. Greenberg and W.B. Krantz "Dry-Cast Membrane Formation Process: Modeling and Experimental Studies," 5th Annual Meeting of the North American Membrane Society, Lexington, KY, May 1992.
78. D.P. Miller, W.B. Krantz and A.R. Greenberg, "Predicting the Phase Diagram for Polymer/Solvent/Nonsolvent Systems," 68th Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Lubbock, TX, May 1992.
79. F. G. Paulsen, W.B. Krantz and A.R. Greenberg, "Macrovoid Formation in Polymeric Membranes," 68th Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Lubbock, TX, May 1992.
80. S.S. Shojaie, W.B. Krantz and A.R. Greenberg, "Dry-Cast Polymeric Membrane Formation via the Sol-Gel Process," Annual Meeting of the American Institute of Chemical Engineers, Miami, FL, November 1992.
81. S.S. Shojaie, W.B. Krantz and A.R. Greenberg, "A Nonisothermal Model for Polymeric Membrane Formation via the Dry Cast Process," Invited Paper, Spring Annual Meeting of the American Institute of Chemical Engineers, Houston, TX, March 1993.
82. Li Tan, A.R. Greenberg and W.B. Krantz, "Application of Laser Interferometry to Validate a Finite Element Model for Evaporative Casting of Polymeric Membranes," National Meeting of the American Chemical Society, Denver, CO, March 1993.
83. J.J. Broz, S.J. Simske, A.R. Greenberg and L. Bond, "Use of Scanning Acoustic Microscopy for Assessing Material Differences in Cortical Bone," 12th Southern Biomedical Engineering Conference, New Orleans, LA, April 1993.

84. Li Tan, A.R. Greenberg and W.B. Krantz, "Laser Applications in Membrane Science," 69th Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Albuquerque, NM, May 1993.
85. Li Tan, A.R. Greenberg and W.B. Krantz, "Development of a New Real-Time Technique and Continuous Modeling Studies of the Dry-Cast Polymeric Membrane Formation Process," International Conference on Membranes and Membrane Processes, Heidelberg, Germany, August 1993.
86. S.S. Shojaie, A.R. Greenberg and W.B. Krantz, "Morphological Studies of Cellulose Acetate Dense Films and Membranes Formed Via the Dry-Cast Process, International Conference on Membranes and Membrane Processes, Heidelberg, Germany, August 1993.
87. J. Broz, S.J. Simske and A.R. Greenberg, "Acoustic Characterization of Chemically Altered Cortical Bone," 126th Meeting of the Acoustical Society of America, Denver, CO, October 1993.
88. S.S. Shojaie, W.B. Krantz and A.R. Greenberg, "Cellulose Acetate Membranes: Their Use and Manufacture," 45th American Chemical Society Southeast Regional Meeting, Johnson City, TN, October 1993.
89. J. Brewster, S.S. Shojaie, A.R. Greenberg and W.B. Krantz, "Pure Gas Permeation Characteristics of Dry-Cast Cellulose Acetate Membranes and Films: Corroboration with Model Predictions," Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO. May 1994.
90. G. Hoest, J. Brewster, A.R. Greenberg, L. Bond and W.B. Krantz, "Real-Time Noninvasive Measurement of Membrane Compaction and Fouling," Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO. May 1994.
91. G.W. Loest, J.H. Brewster, W.B. Krantz, A.R. Greenberg and L.J. Bond, "Membrane Fouling in Desalination Systems," 70th Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, Durango, CO, May 1994.
92. V. Khare, W.B. Krantz and A.R. Greenberg, "Use of Pendant Drop Tensiometry for the Measurement of the Mechanical Properties of Interfacially Polymerized Barrier Layers," Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO. May 1994.
93. Li Tan, L Bond, A.R. Greenberg and W.B. Krantz, "Development of Novel Real-Time Experimental Techniques for Study of the Thermally Induced Phase Separation (TIPS) Membrane Formation Processes," Sixth Annual Meeting of the North American Membrane Society, Breckenridge, CO. May 1994.
94. A.R. Greenberg, "Novel Experimental Techniques for Study of Membrane and Thin-Film Phenomena," Invited Lecture Presented at the Dow Chemical Co., Midland, MI., June 1994.
95. L.J. Bond, G.W. Loest, J.H. Brewster, A.R. Greenberg and W.B. Krantz, "Real-Time Nondestructive Characterization of Membrane Compaction and Fouling, Review of Progress in Quantitative NDE, Snowmass Village, CO, July 1994.
96. A.R. Greenberg, "Novel Experimental Techniques for Study of Membrane and Thin-Film Phenomena," Invited Lecture Presented at Bend Research Inc., Bend, OR., August 1994.
97. Vivek P. Khare, A.R. Greenberg and W.B. Krantz, "A Novel Technique to Determine the Mechanical Properties of Ultrathin Interfacially Polymerized Films," National Meeting of the Materials Research Society, Boston, MA, November 1994.
98. Vivek P. Khare, W.B. Krantz, and A.R. Greenberg "Application of Pendant-Drop Tensiometry to Obtain Material Properties of Interfacially Polymerized Thin Barrier Layers," National Meeting of the American Institute of Chemical Engineers, San Francisco, CA, November, 1994.
99. A.P. Mairal, W.B. Krantz, A.R. Greenberg and L.J. Bond "Real-Time Noninvasive Measurement of Membrane Fouling Due to Inorganic Crystallization," National Meeting of the American Institute of Chemical Engineers, San Francisco, CA, November 1994.
100. Li Tan, A.R. Greenberg and W.B. Krantz, "Interfacial Microstructure Arising from Morphological Instabilities Induced During the TIPS Process for Membrane Formation," National Meeting of the American Institute of Chemical Engineers, San Francisco, CA, November, 1994.
101. G.W. Loest, A.P. Mairal, A.R. Greenberg, L.J. Bond, and W.B. Krantz, "Real-Time, Noninvasive, Measurement of Membrane Compaction and Fouling in Reverse Osmosis Desalination," National Meeting of the American Association for the Advancement of Science, Atlanta, GA, February 1995.
102. V. Khare, A.R. Greenberg and W.B. Krantz, "Pendant-Drop Mechanical Analysis of Interfacially Polymerized Thin Barrier Layers," Seventh Annual Meeting of the North American Membrane Society, Portland, OR, May 1995.

103. A.P. Mairal, A.R. Greenberg, L.J. Bond, and W.B. Krantz, "Real-Time, Noninvasive Measurement and Modeling of Membrane Fouling in Reverse-Osmosis Desalination." Seventh Annual Meeting of the North American Membrane Society, Portland, OR, May 1995.
104. A.P. Mairal, L.J. Bond, A.R. Greenberg and W.B. Krantz, "Real-Time, Noninvasive, In-Situ Characterization of Membrane Compaction and Fouling," Ultrasonics International, Edinburgh, Scotland, July 1995.
105. Vivek P. Khare, A.R. Greenberg, and W.B. Krantz "Development of Pendant Drop Mechanical Analysis," Membranes: Materials and Processes, Gordon Conference, Plymouth, NH, July 1995.
106. Jason Padilla, Anurag Mural, A.R. Greenberg, and W.B. Krantz "Analysis of Membrane Fouling Using Energy Dispersive Spectroscopy," NSF Diversity in the Scientific and Technological Workforce Conference, Washington, D.C., September 1995.
107. Matthew Kizerian, Vivek P. Khare, A.R. Greenberg, and W.B. Krantz "Determination of the Thickness of Interfacially Polymerized Thin Films, Annual Meeting of the American Institute of Chemical Engineers, Miami Beach, FA, November 1995.
108. A.R. Greenberg and L.J. Bond, "Membranes in Separations: Basic Principles, Critical Needs, and Application of Novel Measurement Techniques," Center for Process Analytical Chemistry, University of Washington, Seattle, WA, May 1996.
109. V. Khare, A.R. Greenberg and W.B. Krantz, "Pendent-Drop Mechanical Analysis of Interfacially Polymrized Thin Barrier Layers," Eighth Annual Meeting of the North American Membrane Society, Ottawa, Canada, May 1996.
110. Sanjay Komagurthu, W.B. Krantz, A.R. Greenberg, and P. Todd, "A Novel Approach to Test Alternative Hypotheses for Macrovoid Growth in Polymeric Membranes," Eighth Annual Meeting of the North American Membrane Society, Ottawa, Canada, May 1996.
111. A.P. Mairal, A.R. Greenberg, L.J. Bond, and W.B. Krantz "Real-Time, Noninvasive Characterization of Membrane Fouling in Reverse-Osmosis Desalination," Eighth Annual Meeting of the North American Membrane Society, Ottawa, Canada, May 1996.
112. R. Peterson, A.R. Greenberg, L.J. Bond, and W.B. Krantz, "Real-Time, Noninvasive Measurement of Membrane Compaction During High-Pressure Separation," Eighth Annual Meeting of the North American Membrane Society, Ottawa, Canada, May 1996.
113. A.R. Greenberg, "Development of Real-Time Acoustic Measurement Techniques for Polymeric Membrane and Thin Film Applications," Invited Seminar Presented at the 3M Corporation, St. Paul, MN, October 1996.
114. L.J. Bond, R. Peterson, A.R. Greenberg, S. Konagurthu, W.B. Krantz, D. Kuhns, L. Burgess, and A.M. Brodsky, "Development of an Acoustic Technique for Assessing Structure-Property Characteristics of Polymeric Thin Films Under High Pressure," IEEE International Ultrasonics Symposium, San Antonio, TX, November 1996.
115. V. Khare, A.R. Greenberg and W.B. Krantz, "Application of Pendent-Drop Tensiometry to Obtain Viscoelastic and Transport Properties of Interfacially Polymerized Thin Barrier Layers," Annual Meeting of the American Institute of Chemical Engineers, Chicago, November 1996.
116. R. Peterson and A.R. Greenberg, "Influence of Structure on the Viscoelastic Response of Polymeric membranes During High-Pressure Liquid Separation Processes," Invited Seminar Presented at the National Renewable Energy Laboratory, Golden, CO, November 1996.
117. R. Peterson and A.R. Greenberg, "Influence of Structure on the Viscoelastic Response of Polymeric membranes During High-Pressure Liquid Separation Processes," Invited Seminar Presented at the National Renewable Energy Laboratory, Golden, CO, November 1996.
118. A.R. Greenberg, "Use of membranes in Hazardous Waste Streams," Invited Seminar at the Union Camp Corporation, Princeton, NJ, December 1996.
119. S. S. Kelley, Saeed Shojaie, Rorik Peterson, Alan R. Greenberg, William B. Krantz, and Jonathon Filley, "Effects of Crosslinking on the Properties of Cellulose Ester Membranes," National Meeting of the American Chemical Society, San Francisco, CA, April 1997.
120. William B. Krantz, Alan R. Greenberg, and Leonard J. Bond, "Noninvasive Analytical Techniques for Monitoring Membrane Processes," Second International US - China Congress of Chemical Engineering, Beijing, China, May 1997.

121. John P. Lock, William B. Krantz, and Alan R. Greenberg, "Characterization of Novel Metallic Membranes for Use in Hostile Environments," 73th Annual Meeting of the Southwestern and Rocky Mountain Division of the American Association for the Advancement of Science, College Station, TX, May 1997.
122. S. Komagurthu, A.R. Greenberg, W.B. Krantz, P. Todd, and L.J. Bond, "Real-Time Measurement of Total Thickness Changes During Dry-Casting of Cellulose Acetate Binary- and Ternary Solutions," Annual Meeting of the North American Membrane Society, Baltimore, June 1997.
123. R.A. Petersen, A.R. Greenberg, L.J. Bond, S.S. Kelley, and W.B. Krantz, "Comprehensive Studies of Polymer Membrane Compaction," Annual Meeting of the North American Membrane Society, Baltimore, June 1997.
124. A.P. Mairal, A.R. Greenberg, L.J. Bond, and W.B. Krantz, "Real-Time Measurement of Fouling Layer Growth and Removal in Reverse-Osmosis Desalination Using Acoustic Time-Domain Reflectometry," Annual Meeting of the North American Membrane Society, Baltimore, June 1997.
125. R. Petersen, A.R. Greenberg, L.J. Bond, W.B. Krantz, and S.S. Kelley, "Chemical Modification of Porous Cellulose Acetate Membranes Using Titanium Isopropoxide to Mitigate Compaction During High-Pressure Separation," Euromembrane '97, Third International Symposium, University of Twente, The Netherlands, June 1997.
126. V. Khare, A.R. Greenberg and W.B. Krantz, "Pendant Drop Studies of Interfacially Polymerized Barrier Layers," Euromembrane '97, Third International Symposium, University of Twente, The Netherlands, June 1997.
127. S. Komagurthu, A.R. Greenberg, W.B. Krantz, and P. Todd, "Wider Applicability of the SKG Formation Model for Dry-Cast Polymeric Membranes," Euromembrane '97, Third International Symposium, University of Twente, The Netherlands, June 1997.
128. L.J. Bond, A.R. Greenberg, and L.W. Burgess, "Ultrasonics for Process Monitoring and Control," Ultrasonics International '97, Delft, June 1997.
129. L.J. Bond, A.R. Greenberg, W.B. Krantz, and A.P. Mairal, "Study of Fouling Growth and Cleaning Using Acoustic Time-Domain Reflectometry and Acoustic Microscopy," Ultrasonics International '97, Delft, June 1997.
130. L.J. Bond, A.R. Greenberg, R. Peterson, V. Reinsch, A. Metters, and W.B. Krantz, "Use of Acoustic Time-Domain Reflectometry for Real-Time Studies of Membrane Formation and Performance," Eighth International Symposium on Nondestructive Characterization of Materials, Boulder, CO, June 1997.
131. A.R. Greenberg, A.Mairal, S. Konagurthu, W.B. Krantz, and L.J. Bond, "Use of Ultrasonic Techniques for Measurement of Membrane Phenomena," Flemish Institute for Technological Research (VITO), Mol, Belgium, October 31, 1997.
132. A.R. Greenberg and A. Mairal, "Measurement of Membrane Phenomena," Technical University of Hamburg-Harburg, Hamburg, Germany, December 4, 1997.
133. A.R. Greenberg, "Innovative Experimental Techniques in Membrane and Thin Film Studies," Invited Seminar Presented at the 3M Corporation, St. Paul, MN, March 1998.
134. Lindquist, R.F., A.R. Greenberg, and W.B. Krantz, "Calculation of Liquid Flow Rates Through Metallic Membranes from Gas Permeability Data," paper presented at the 74th Annual Meeting of the SWARM Division of AAAS, Mesa State College, Grand Junction, Colorado, May 19, 1998.
135. Neice, A., S. Konagurthu, W.B. Krantz, A.R. Greenberg, and P. Todd, "A Novel, Real-Time Video Microscopy Technique for Studying Macrovoid Defect Formation in Polymeric Membranes," paper presented at the 74th Annual Meeting of the SWARM Division of AAAS, Mesa State College, Grand Junction, Colorado, May 19, 1998.
136. Staab, D.M., W.B. Krantz, and A.R. Greenberg "Development of a Characterization Method for Novel Metallic Microfiltration Membranes," paper presented at the Annual Meeting of the AIChE, Miami Beach, Florida, November 16, 1998.
137. Konagurthu, S., A.R. Greenberg, W.B. Krantz, and P. Todd, "Macrovoids in Dry-Cast Polymeric Membranes: Growth Mechanism, Non-Invasive Detection, and Effects on Performance," paper presented at the Annual Meeting of the AIChE, Miami Beach, Florida, November 20, 1998.
138. S. Ramaswamy, A.R. Greenberg, and W.B. Krantz, Fluoropolymer Membrane Fabrication via Thermally Induced Phase Separation, paper presented at the 75th Annual Meeting of the SWARM Division of AAAS, Sante Fe, April 14, 1999.
139. Christopher M. Staab, William B. Krantz, Alan R. Greenberg, and Robert C. Herrmann, Development of a

- Characterization Method for Novel Metallic Microfiltration Membranes, paper presented at the 75th Annual Meeting of the SWARM Division of AAAS, Sante Fe, April 14, 1999.
140. Matthew R. Pekny, Sanjay Konagurthu, Andrew Neice, Paul Todd, Alan R. Greenberg, and William B. Krantz, "Influence of Solutocapillary Convection on Macrovoid Defect Formation in Polymeric Membrnes", International Congress on Membranes and membrane Processes, Toronto, Canada, June 1999.
 141. Guo-Yong Chai, Alan R. Greenberg, Leonard J. Bond, and William B. Krantz, "Study of CaSO₄ FOouling in Spiral-Wound Membrane Modules Monitored by Real-Time Measurement", International Congress on Membranes and membrane Processes, Toronto, Canada, June 1999.
 142. Veronika Reinsch, Alan R. Greenberg, and William B. Krantz, "Simultaneous Real-Time Measurement of Membrane Compaction and Performance During Gas Separation", International Congress on Membranes and membrane Processes, Toronto, Canada, June 1999.
 143. Anurag P. Mairal, Alan R. Greenberg, and William B. Krantz, "Noninvasive Real-Time Measurement of Membrane Fouling and Cleaning", International Congress on Membranes and membrane Processes, Toronto, Canada, June 1999.
 144. P. Aerts, R. Leysen, A.R. Greenberg, W.B. Krantz, and P.A. Jacobs, "Real-Time Measurement of Structure-Related Mechanical and Filtration Properties of Composite Ultrafiltration Membranes", International Congress on Membranes and membrane Processes, Toronto, Canada, June 1999.
 145. Veronika E. Reinsch, Alan R. Greenberg, Stephen S. Kelley, and William B. Krantz, "The Effect of Crosslinking on Compaction and Performance of Cellulose Acetate Membranes During High-Pressure Gas Separation" American Chemical Society Meeting, New Orleans, August 22-25, 1999. *Invited lecture*
 146. Guo-Yong Chai, Alan R. Greenberg, and William B. Krantz, "Real-Time Ultrasonic Measurement of CaSO₄ Fouling in a Spiral Wound Membrane Module", Euromembrane 99, Leuven, Belgium, September 1999.
 147. P. Aerts, R. Leysen, A.R. Greenberg, V.E. Reinsch, W.B. Krantz, and P.A. Jacobs, "Simultaneous Real-Time Measurement of Compressive Strain and Permeability Pproperties of Zifron[□] Composite Ultrafiltration Membranes", Euromembrane 99, Leuven, Belgium, September 1999.
 148. Diana J. Hellman, William B. Krantz, and Alan R. Greenberg, "A Novel Process for Membrane Fabrication: Thermally-Assisted Evaporative Phase Separation (TAEPS)," AIChE National Meeting, Dallas, Oct. 31-Nov. 5, 1999.
 149. Senthil Ramaswamy, Alan R. Greenberg, and William B. Krantz, "Fabrication of Poly (ethylene chlorotrifluoroethylene) Membranes via Thermally Induced Phase Separation," AIChE National Meeting, Dallas, Oct. 31-Nov. 5, 1999.
 150. Matthew R. Pekny, Jeremiah Zartman, Alan R. Greenberg, William B. Krantz, and Paul Todd, "Influence of Buoyancy and Surfactant Solutes on Macrovoid Defect formation in Dry-Cast Cellulose Acetate Membranes," 219th National Meeting of the American Chemical Society, San Francisco, March 30, 2000.
 151. Guo-Yong Chai, Alan R. Greenberg, and William B. Krantz, "In-situ Ultrasonic Measurement of Fouling and Cleaning Processes in Spiral-Wound Membrane Modules," International Conference on Membrane Technology in Water and Wastewater Treatment, Leeds, England, March 27-29, 2000. *Best Paper award*
 152. Jeremiah Zartman, Paul Todd, Alan R. Greenberg, and William B. Krantz, "Microscopic Flow Visualization in Demixing Fluids During Polymeric Membrane Formation," SWARM-AAAS 76th Annual Meeting, Las Cruces, April 9-12, 2000.
 153. Michael Weber, Victor Barocas, William B. Krantz, Alan R. Greenberg, "Understanding Transport and Modeling of Nanofiltration Membranes," SWARM-AAAS 76th Annual Meeting, Las Cruces, April 9-12, 2000.
 154. Zhongxia Zhang, Guoyong Chai, Alan R. Greenberg, and William B. Krantz, "Ultrasonic Measurement of Calcium Sulfate Fouling in a Spiral-Wound Membrane Module," SWARM-AAAS 76th Annual Meeting, Las Cruces, April 9-12, 2000.
 155. Matthew R. Pekny, Jeremiah Zartman, Alan R. Greenberg, William B. Krantz and Paul Todd, "Influence of Buoyancy and Surfactant Solutes on Macrovoid Defect Formation in Dry-Cast Cellulose Acetate Membranes," Spacebound 2000, Vancouver, May 14-17, 2000.

156. Diana J. Hellman, Alan R. Greenberg, and William B. Krantz, "Model Development for the Thermally Assisted Evaporative Phase Separation (TAEPS) Process," Annual Meeting of the North American Membrane Society, Boulder, May 2000.
157. Dongmei Li, William B. Krantz, Robert R. Sani, and Alan R. Greenberg, "Modeling of the Thermally Induced Phase Separation (TIPS) Membrane Formation Process," Annual Meeting of the North American Membrane Society, Boulder, May 2000.
158. Senthil Ramaswamy, Alan R. Greenberg and William B. Krantz, "Characterization of TIPS-Cast ECTFE Membranes," Annual Meeting of the North American Membrane Society, Boulder, May 2000.
159. Neil P. Soice, Alan R. Greenberg, William B. Krantz and Arlan D. Norman, "A Technique for Assessing the Chlorine Degradation Resistance of Interfacially Polymerized Polyamide Films," Annual Meeting of the North American Membrane Society, Boulder, May 2000.
160. Neil P. Soice, William B. Krantz, Alan R. Greenberg, and Arlan D. Norman, "Investigation of Oxidative Degradation of Polyamide Reverse Osmosis Membranes: Insights from Molecular Model Compounds and Membrane Studies," Annual Meeting of the North American Membrane Society, Boulder, May 2000. *First-Place student research award*
161. Michael Weber, Victor Borocas, William B. Krantz and Alan R. Greenberg, "Development of a Nanofiltration Model for Laminar, Cross-Flow Conditions," Annual Meeting of the North American Membrane Society, Boulder, May 2000.
162. Matthew R. Pekny, Jeremiah Zartman, Alan R. Greenberg, Paul Todd, and William B. Krantz, "Influence of Solutocapillary Convection on Macrovoid Defect Formation in Polymeric Membranes," NASA Microgravity Materials Science Conference, Huntsville, AL, June 5-8, 2000.
163. Alan R. Greenberg, "Membrane Characterization Using Ultrasonic Techniques," Membranes: Materials and Processes: Gordon Research Conference, New London, CT, July 29-August 3, 2000. *Invited lecture.*
164. William B. Krantz, A.R. Greenberg, and P. Todd, "Microscopic Flow Visualization in Demixing Fluids during Polymeric Membrane Formation in Low-G," 5th NASA Microgravity Fluid Physics and Transport Phenomena Conference, Cleveland, OH, August 9-11, 2000.
165. Dongmei Li, William B. Krantz, Robert L. Sani, and Alan R. Greenberg, "Modeling Study of the Thermally Induced Phase Separation (TIPS) Membrane Formation Process," Proc. 3rd Joint China-USA Chemical Engineering Conference, 1 (2000) 04-209-212 Beijing, China, September 25-28, 2000.
166. William B. Krantz, and A.R. Greenberg,, "New Developments in the Methodology, Characterization, and Modeling of Polymeric Membrane Formation," AIChE National Meeting, Los Angeles, Nov. 12-17, 2000.
167. A.R. Greenberg , "Characterization and Control of Polymeric Membrane Compaction," University of Cincinnati, November 30, 2000. *Invited lecture.*
168. Zartman, J., Pekny, M.R., Greenberg, A.R., Todd, P. and Krantz W.B. "Solutocapillary-Convection-Driven Macrovoid-Defect Formation in Polymeric Membranes." AIAA Paper2001-0461, 39th AIAA Aerospace Sciences Meeting, Reno, NV, January 8-11, 2001.
169. Alan R. Greenberg, "Membrane Fouling and Cleaning The Need for Effective Measurement," University of Maine, Orano, April 2001. *Invited lecture.*
170. Dongmei Li, Robert L. Sani, Alan R. Greenberg, and William B. Krantz, "Study of the Thermally Induced Phase Separation (TIPS)," Annual Meeting of the North American Membrane Society, Lexington, May 2001.
171. Zhongxia Zhang, Guoyong Chai, Alan R. Greenberg, and William B. Krantz, "Real-time Measurement of Fouling and Cleaning of Membrane Modules," Annual Meeting of the North American Membrane Society, Lexington, May 2001.
172. Neil P. Soice, Alan R. Greenberg, William B. Krantz and Arlan D. Norman, "Polyamide RO Membrane Barrier Layers: Changes in the Mechanical and Water Transport Properties Upon Chlorination," Annual Meeting of the North American Membrane Society, Lexington, May 2001.
173. Il Juhn Roh, Soo Young Park, Jae-Jin Kim, and Alan R. Greenberg, "Synthesis and Characterization of Network Polyamide Thin Films," Annual Meeting of the North American Membrane Society, Lexington, May 2001.

174. Cristina Fonseca, Mark T. Hernandez, R. Scott Summers and Alan R. Greenberg, "Effect of Microbial Cells and Polysaccharide Exudate on Nanofiltration Membrane Flux Decline," Annual Meeting of the North American Membrane Society, Lexington, May 2001.
175. Diana J. Hellman, Alan R. Greenberg, and William B. Krantz, "Boundary Condition Effects On Polymeric Membrane Formation Via Evaporative Casting," Annual Meeting of the North American Membrane Society, Lexington, May 2001.
176. Dale W. Schaefer, Tingtai Guo, William Krantz, Alan Greenberg, Diana Hellman, and Steve Kelley "Microstructure of Asymmetric Membranes Prepared by Various Methods," Annual Meeting of the North American Membrane Society, Lexington, May 2001.
177. Alan R. Greenberg, Richard Noble and William B. Krantz, "Membrane Applied Science and Technology Center", Annual Meeting of the North American Membrane Society, Lexington, May 2001.
178. Alan R. Greenberg, "The MAST Center Research Program: Update on Five Current Research Projects," Millipore Corporation, Boston, June 2001. *Invited Presentation.*
179. G.-Y. Chai, W.B. Krantz, and A.R. Greenberg, "Measurement of Membrane Fouling in Spiral-Wound Modules," 6th World Congress of Chemical Engineering, Melbourne, Australia, September 2001.
180. P. Todd, J.C. Vellinger, S. Sengupta, M.G. Sportiello, A. R. Greenberg, and W.B. Krantz, "Sliding-Cavity Fluid Contactors in Low-Gravity Fluids, Materials and Biotechnology Research," Proceedings of the Microgravity Transport Processes in Fluid, Thermal, Biological and Materials Sciences II, Banff, Alberta, Canada, October 2001.
181. V. Khare, A. R. Greenberg, W.B. Krantz, H. Lee, P. Todd and S. Dunn, "Polymer Thin Film Formation on Low-Gravity Aircraft and on ISS," AIAA Paper2001-5024, Conference & Exhibit on International Space Station Utilization—2001, Cape Canaveral, FL, October 15-17, 2001.
182. W.B. Krantz, J. Zartman, V. Khare, A.R. Greenberg, and P. Todd, "Observation of Solutocapillary Flow During Polymer Membrane Casting," AIAA Paper2001-5022, Conference & Exhibit on International Space Station Utilization—2001, Cape Canaveral, FL, October 15-17, 2001.
183. J.S. Young, B. 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, "Polymeric-Metallic Composite Membranes for High-Temperature Applications," AIChE Annual Meeting, Reno, November 2001.
184. A.C. Fonseca, Alan R. Greenberg and Mark Hernandez "Real-Time Biofilm Detection with Ultrasonic Frequency Domain Reflectometry (UFDR)," International Specialized Conference on Biofilm Monitoring, Porto, Portugal, March 18-20 2002.
185. Vivek P. Khare and Alan R. Greenberg, "Elevated Temperature Compaction and Transport Behavior of Cellulose Acetate Dense Films" North American Membrane Society Annual Meeting, May 2002, Los Angeles.
186. Il Juhn Roh, Senthilkumar Ramaswamy, Alan R. Greenberg and William B. Krantz, "Fabrication of Poly (ethylene chlorotrifluoroethylene) Membranes via Thermally Induced Phase Separation (TIPS)," North American Membrane Society Annual Meeting, May 2002, Los Angeles.
187. Senthilkumar Ramaswamy, Alan R. Greenberg, Michael L. Peterson and Rorik A. Peterson, "Novel Ultrasonic Technique for Defect Detection in Polymeric Membranes," North American Membrane Society Annual Meeting, May 2002, Los Angeles.
188. Jennifer Young, Vivek Khare, Alan R. Greenberg, et al, "Carbon Dioxide Separation Using Thermally Optimized Membranes," American Geophysical Union Meeting, May 2002, Washington, D.C.
189. A.R. Greenberg, V.P. Khare, J. Zartman, W. B. Krantz, and P. Todd, "Macrovoid Defect Growth During Evaporative Casting of Polymeric Membranes," NASA Microgravity Materials Science Conference, Huntsville, AL, June 2002.
190. A.R. Greenberg, V. Khare, W. B. Krantz, H. Lee, and P. Todd, "Macrovoid Formation During Polymer Membrane Casting," International Conference on Membranes and Membrane Processes, Toulouse, France, July 2002.

191. Cristina Fonseca, Alan R. Greenberg and Mark T. Hernandez, "Biofouling of Nanofiltration Membranes and In-situ Biofilm Detection Using Acoustic Reflectometry." International Conference on Membranes and Membrane Processes, Toulouse, France, July 2002.
192. Senthilkumar Ramaswamy, Alan R. Greenberg and Michael L. Peterson, "Ultrasonic Technique for the Characterization of Membrane Morphology." International Conference on Membranes and Membrane Processes, Toulouse, France, July 2002.
193. A.R. Greenberg, "Ultrasonics for Membrane Applications," Gordon Conference on Membranes: Materials and Processes, August 2002, New London, New Hampshire, invited presentation.
194. A.R. Greenberg, "Ultrasonics Techniques for the Evaluation of Membrane Fouling and Membrane Morphology," Dow FilmTec, August 2002, invited presentation.
195. A.R. Greenberg, "NSF I/U CRC Program," The Ministry of Science & Technology, the People's Republic of China, September 2002, invited presentation.
196. A.R. Greenberg, G.-Y. Chai, W.B. Krantz and G.Y. Zhao, "In-Situ Study of Concentration Polarization and Fouling in RO Membrane Modules," Plenary Lecture, 2nd International Conference on the Application of Membrane Technology, Beijing, China, September 2002.
197. Alan R. Greenberg and William B. Krantz, "The Use of UTDR-Based Sensors for the Real-Time Quantification of Membrane Module Fouling and Cleaning," The 2002 Twentieth Annual Membrane Separations Technology Planning Conference, November 2002, Boston, invited presentation.
198. William B. Krantz and Alan R. Greenberg, "Controlling Pore Structure in Polymeric Membranes Using Non-uniform Electric Fields," The 2002 Twentieth Annual Membrane Separations Technology Planning Conference, November 2002, Boston, invited presentation.
199. A.R. Greenberg, Senthilkumar Ramaswamy, and Michael L. Peterson "Ultrasonic Characterization of Polymeric Thin Films," Materials Research Society Meeting, December 2002, Boston, invited presentation.
200. A.R. Greenberg and S-T Huang, "Multi-University Center Research Project Costs: Addressing Differences Between Sites," NSF I/U CRC Directors Meeting, Arlington, VA, January 2003.
201. R. Scott Summers, Alan R. Greenberg, Mark H. Hernandez and A. Cristina Fonseca, "Critical Factors Governing Biofouling of Nanofiltration Membranes," AWWA Membrane Technology Conference, March 2003, Atlanta.
202. Vivek Khare, Jennifer Young, Alan R. Greenberg, et al, "CO₂ Separations Using High-Temperature Polymeric-Metallic Composite Membranes," 28th International Technical Conference on Coal Utilization and Fuel Systems, March 2003, Clearwater.
203. Il Juhn Roh, Alan R. Greenberg and William B. Krantz, "Effect of Humid Air Exposure on the Structure of Immersion-Cast Membranes," North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.
204. Jianxin Li, Alan R. Greenberg, Siri Nelson, and Mark Hernandez, "Real-Time Detection and Quantification of Biological Polymers Immobilized on Water-Treatment Membranes using Ultrasonic Reflectometry." North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.
205. Vivek P. Khare and Alan R. Greenberg, "Elevated Temperature Compaction and Transport Behavior of Asymmetric Cellulose Acetate Membranes." North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.
206. IlJuhn Roh, Heidi Pilath, Stephen Kelley, Alan Greenberg, Formation of Dense and Microporous Films from Cellulose Derivatives with a Low Degree of Substitution, North American Membrane Society Meeting, May 2003, Jackson Hole WY.
207. Zhongxia Zhang, Victor M. Bright and Alan R. Greenberg, "Use of Capacitive Microsensors to Study the Concentration Polarization Boundary Layer in a Flat-Sheet NF Membrane Module." North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.
208. Vivek P. Khare and Alan R. Greenberg, "Macrovoid Formation During the Dry-Casting of Cellulose Acetate Membranes." North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.

209. Dongmei Li, Robert L. Sani, Alan R. Greenberg, and William B. Krantz, "Study of the Thermally Induced Phase Separation (TIPS) Membrane Formation Process: Comparison of Model Predictions and Experimental Results." North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.
210. Vineet Gupta, Sun-Tal Hwang, William B. Krantz and Alan R. Greenberg, "Characterization of RO and NF Membranes Using Nonequilibrium Thermodynamics." North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.
211. Jianxin Li, Guo-Yong Chai, Ron Sanderson and Alan R. Greenberg, "Real-Time Detection of Protein Fouling on Tubular Ultrafiltration Using a Non-Destructive Ultrasonic Technique." North American Membrane Society Annual Meeting, May 2003, Jackson Hole, WY.
212. Alan R. Greenberg, "Research Review" Membrane Formation and Membrane Fouling Studies." Millipore Corporation, June 2003, Bedford, MA.
213. A. Cristina Fonseca, Alan R. Greenberg, and Mark H. Hernandez, "Biofouling of Nanofiltration Membranes: Detection Using Ultrasonic Frequency-Domain Reflectometry," AWWA Annual Conference, Anaheim, June 2003.
214. A.R. Greenberg and William B. Krantz, "A Development and Management Model for a Successful Membrane Research Center," The Ministry of Science & Technology, the People's Republic of China, September 2003, Plenary Lecture.
215. A.R. Greenberg, G.-Y. Chai, W.B. Krantz and G.Y. Zhao, "Use of In-Situ Ultrasonic Measurements in Membrane Separations," China Conference on Membrane Science and Technology, Beijing, China, September 2003.
216. Alan R. Greenberg, "MAST Center: Organization, Operation and Research Program." Pall Corporation, October 2003, East Hills, NY.
217. Alan R. Greenberg and Vivek Khare, "Simultaneous Creep and Transport Measurements at Elevated Temperature." Pall Corporation, October 2003, East Hills, NY.
218. A.R. Greenberg, J.-X. Li, M. Hernandez and E.A. Evans, "Detection of Membrane Biofouling Using Ultrasonic Sensors," The 2003 Twentieth Annual Membrane Separations Technology Planning Conference, December 2003, Newton, MA.
219. Alan R. Greenberg, "MAST Center: Organization, Operation and Research Program." GE Water Technologies, December 2003, Trevose, PA.
220. Alan R. Greenberg and William B. Krantz, "The MAST Center: Future Membrane Developments." Genecor Corporation, San Jose, May 2004.
221. Vivek P. Khare, Alan R. Greenberg and William B. Krantz, "Role of the Humid Air Exposure Step in the Vapor-Induced Phase Separation (VIPS) Process," North American Membrane Society Annual Meeting, June 2004, Honolulu, Hawaii.
222. Jianxin Li, Emily A. Evans, Alan R. Greenberg, Michael Peterson and Mark Hernandez, "Extending Acoustic Reflectometry for Real-Time Monitoring of Biofilm Growth on Water Treatment Membranes of Different Geometries." North American Membrane Society Annual Meeting, June 2004, Honolulu, Hawaii.
223. Zhongxia Zhang, Victor M. Bright and Alan R. Greenberg, "Use of Capacitive Microsensors to Study Concentration Polarization and Fouling in a Flat Sheet Cross-flow NF Membrane Module." North American Membrane Society Annual Meeting, June 2004, Honolulu, Hawaii.
224. Vivek P. Khare and Alan R. Greenberg, "Elevated Temperature Compaction and Transport Behavior of Dense Cellulose Acetate Films." North American Membrane Society Annual Meeting, June 2004, Honolulu, Hawaii.
225. Vivek P. Khare, Alan R. Greenberg, Heidi Pilath and Stephen S. Kelley, "Synthesis and Testing of Dense and Porous Films Obtained from the Cellulose Polymer," North American Membrane Society Annual Meeting, June 2004, Honolulu, Hawaii.
226. Hanyong Lee, Sun-Tak Hwang and William B. Krantz, Alan R. Greenberg and Paul W. Todd, "Development of a New Ternary Diffusion Model for Macrovoid Formation," North American Membrane Society Annual Meeting, June 2004, Honolulu, Hawaii.

227. Alan R. Greenberg, "Research Review" Membrane Formation and Membrane Performance Studies." Millipore Corporation, June 2004, Bedford, MA.
228. Vivek P. Khare and Alan R. Greenberg, "Mechanical and Gas Transport Behavior of Dense Polymer Films." NIST Workshop on Reliability Issues in Nanomaterials, August 2004, Boulder.
229. Alan R. Greenberg, "The MAST Center: Developing a Center Site." University of Toledo, Toledo, September 2004.
230. Yiping Liu, Ken Gall, Martin L Dunn and Alan R Greenberg, "A One-dimensional Constitutive Model for the Thermomechanical Behavior of Shape Memory Polymers," 41st Annual Society Engineering Sciences Technical Meeting, October 2004, Lincoln, Nebraska.
231. Hanyong Lee, Sun-Tak Hwang and William B. Krantz, Alan R. Greenberg and Paul W. Todd, "Modeling and Experimental Studies of the Effect of Casting Thickness on Macrovoid Formation," American Institute of Chemical Engineers Annual Meeting, November 2004, Austin.
232. Alan R. Greenberg and Richard Noble, "NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology: University of Colorado Site Perspective," American Institute of Chemical Engineers Annual Meeting, November 2004, Austin.
233. Alan R. Greenberg, "The MAST Center: Cutting-Edge Membrane Research." AkzoNobel Chemical, Arnhem, Netherlands, November 2004.
234. Christopher M. Yakacki, Ken Gall, Robin Shandas, Alicia M. Ortega, Nick Willett, and Alan R. Greenberg: "Optimizing the Thermomechanics of Shape-Memory Polymers for Biomedical Applications." Materials Research Society Meeting, December 2004, Boston.
235. Alan R. Greenberg, Richard Noble and Steven Clarson. "MAST Center Research Program Perspective, I/UCRC Directors' Meeting," January 2005, Washington, D.C.
236. Robert Buchwald and Alan Greenberg, "Mechanical Properties of Honeybee Waxes," Materials Research Society Meeting, March 2005, San Francisco.
237. J.S. Young, K.A. Berchtold, E.S. Peterson, Alan R. Greenberg, et al, "Novel Polymeric-Metallic Composite Membranes for CO₂ Separations at Elevated Temperatures," American Institute of Chemical Engineers Annual Meeting, April 2005, Atlanta.
238. J.R. Klaehn, T.A. Luther, C.J. Orme, et. al., "*New Soluble N-Substituted Polybenzimidazoles by Post-Polymerization Modification.*" Fourth Annual Conference on Carbon Capture & Sequestration, May 2005, Alexandria, Virginia.
239. J. S. Young, K.A. Berchtold, Alan R. Greenberg, Vivek Khare et. al., "*Novel Polymeric-Metallic Composite Membranes for CO₂ Separations at Elevated Temperatures.*" Fourth Annual Conference on Carbon Capture & Sequestration, May 2005, Alexandria, Virginia.
240. C. Yakacki, K. Gall, R. Shandas, A. Ortega, N. Willett, A.R. Greenberg, "Optimizing the Thermomechanics of Shape-Memory Polymers for Biomedical Applications." 2005 Joint ASME, ASCE, SES Conference on Mechanics and Materials, June 2005, Baton Rouge.
241. Zhongxia Zhang, Victor M. Bright and Alan R. Greenberg, "Use of Capacitive Microsensors for Concentration Polarization Characterization in Pressure-Driven Crossflow Membrane Filtration." 13th International Conference on Solid State Sensors, Actuators and Microsystems, June 2005, Seoul, South Korea.
242. Emily A. Evans, Alan R. Greenberg, Michael Peterson and Mark Hernandez, "Leveraging Acoustic Reflectometry to Determine Biofouling Mechanisms." North American Membrane Society Annual Meeting, June 2005, Providence, RI.
243. Hanyong Lee, W.B. Krantz, Sun-Tak Hwang, Alan R. Greenberg, and Paul Todd, "A Model for Wet-Casting of Polymeric Membranes Incorporating Advective Transport." North American Membrane Society Annual Meeting, June 2005, Providence, RI.
244. Alan R. Greenberg, Richard Noble and Steve Clarson, "NSF Industry/University Cooperative Research Center for Membrane Applied Science and Technology (MAST): Overview and Perspective." North American Membrane Society Annual Meeting, June 2005, Providence, RI.

245. Anandh Balasubramanian, Vivek P. Khare, Julie Diani and Alan R. Greenberg, "Elevated Temperature Compaction Behavior of Dense Polymethyl methacrylate Films." North American Membrane Society Annual Meeting, June 2005, Providence, RI.
246. Vivek P. Khare and Alan R. Greenberg, "Mathematical Modeling and Corroboration of the Humid Air Exposure Step in the Vapor Induced Phase Separation (VIPS) Process," International Congress on Membranes and Membrane Processes, August 2005, Seoul, South Korea.
247. Vivek P. Khare and Alan R. Greenberg, "Transport and Mechanical Behavior of Polymeric Dense Films During Gas Separation at Elevated Temperatures," International Congress on Membranes and Membrane Processes, August 2005, Seoul, South Korea.
248. Vivek P. Khare, Alan R. Greenberg, Stephen Kelley and Heidi Pilath, "Synthesis of Dense and Porous Films Obtained from the Cellulose Polymer," International Congress on Membranes and Membrane Processes, August 2005, Seoul, South Korea.
249. Zhongxia Zhang, Victor M. Bright and Alan R. Greenberg, "Development of Capacitive Microsensors to Characterize Concentration Polarization," International Congress on Membranes and Membrane Processes 2005, August 21-26, 2005, Seoul, Korea.
250. Iljuhn Roh and Alan R. Greenberg, "Synthesis and Characterization of Interfacially Polymerized Polyamide Thin Films," International Congress on Membranes and Membrane Processes, August 2005, Seoul, South Korea.
251. Emily A. Evans, Alan R. Greenberg, Mark Hernandez and Michael Peterson, "Early-Stage Biofilm Detection Using Acoustic Methods," International Congress on Membranes and Membrane Processes, August 2005, Seoul, South Korea.
252. Vineet Gupta, Sun-Tal Hwang, William B. Krantz and Alan R. Greenberg, "Assessment of Solvent-Stable Nanofiltration Membranes for the Purification of Small Molecules," International Congress on Membranes and Membrane Processes, August 2005, Seoul, South Korea.
253. Vivek P. Khare, Alan R. Greenberg, Anandh Balakrishnan, Julie Diani and Sudhir Brahmmandam, "Gas transport and mechanical behavior of polymeric dense films at elevated temperatures," 230th ACS National Meeting, August 2005, Washington, DC Prepr. Pap. - Am. Chem. Soc., Div. Fuel Chem. 2005, 50(1).
254. Alan R. Greenberg, Mick Peterson and Mark Hernandez, "UTDR Sensors for the Quantification of Membrane Module Fouling and Cleaning," FilmTec Corporation, September 2005, Edina, MN
255. Alan R. Greenberg, Richard Noble and Stephen Clarson, "Building an NSF MAST Center Site," University of Toledo, Toledo, Ohio, September 2005.
256. Yiping Liu, Alicia Ortega, Ken Gall, Alan R. Greenberg, Julie Diani, and Martin L. Dunn, "Shape Memory Polymers: Experimental and Modeling Studies," China/USA/Japan Joint Chemical Engineering Conference, October 2005, Beijing, China.
257. Alan R. Greenberg, "Characterization of Membranes and Thin Films Using Acoustic Methods," ExxonMobil Research, November 2005, Annandale, NJ.
258. Elmira Kujundzic, Emily Evans, Alan R. Greenberg and Mark Hernandez, "Early Stage Biofilm Detection Using Acoustic Methods." CU-NIST Fall 2005 Symposium, November 2005, Boulder, CO.
259. Alan R. Greenberg, Richard Noble and Stephen Clarson, "Building an NSF MAST Center Site," University of Southern California, March 2006, Los Angeles
260. Alan R. Greenberg, Elmira Kujundzic, Mark Hernandez, William B. Krantz, and G.-Y. Chai, "Use of Ultrasonic Reflectometry to Monitor Membrane Fouling in Aqueous Environments." Membrane Science & Technology 2006, April 2006, Singapore. **Invited Presentation**
261. Alan R. Greenberg, Elmira Kujundzic, Mark Hernandez, William B. Krantz, and G.-Y. Chai, "Use of Ultrasonic Reflectometry for Fouling Detection." Membrane Science & Technology 2006, April 2006, Singapore. **Invited Keynote Presentation**
262. Alan R. Greenberg, Sudhir Brahmmandam, et al, "Mechanical and Transport Behavior of Polybenzimidazole (PBI) Dense Films Used for Elevated-Temperature Gas Separation." Fifth Annual Conference on Carbon Capture & Sequestration, May 2006, Alexandria, VA.

263. John R. Klaehn, Alan R. Greenberg, Sudhir Brahmamdam, et al, "Polyamide and Polybenzimidazole Derivatives for Gas Separation Applications." Fifth Annual Conference on Carbon Capture & Sequestration, May 2005, Alexandria, VA.
264. Kathryn A. Berchtold, Alan R. Greenberg, Sudhir Brahmamdam, et al, "Novel Polymeric-Metallic Composite membranes for CO₂ Separations at Elevated Temperatures." Fifth Annual Conference on Carbon Capture & Sequestration, May 2006, Alexandria, VA.
265. Dudley Finch, Elmira Kujundzic, Pandurang Nikrad, Alan R. Greenberg, Mark Hernandez and William Mickols, "Early Stage Biofilm Detection on Surface-Modified Polyamide RO Membranes." North American Membrane Society Annual Meeting, May 2006, Chicago, IL.
266. S. Brahmamdam, V. Khare and A.R. Greenberg; et al, "Elevated-Temperature Mechanical and Gas Transport Behavior of Polybenzimidazole (PBI) Dense Films." North American Membrane Society Annual Meeting, May 2006, Chicago, IL
267. Dudley Finch, Elmira Kujundzic, Pandurang Nikrad, Alan R. Greenberg, and Mark Hernandez, "Early Stage Biofilm Detection on Surface-Modified Hollow-Fiber Membranes." North American Membrane Society Annual Meeting, May 2006, Chicago, IL
268. Elmira Kujundzic, Keith Cobry, Alan R. Greenberg, Mark Hernandez, "Development of a Methodology for Distinguishing Fouling Mechanisms in Cross-Flow Membrane Modules." North American Membrane Society Annual Meeting, May 2006, Chicago, IL.
269. A.R. Greenberg; R.N. Noble and S. Clarson, Membrane Applied Science and Technology Center." North American Membrane Society Annual Meeting, May 2006, Chicago, IL
270. Alan R. Greenberg, "A MAST Site for NUS." National University of Singapore, September, 2006, Singapore.
271. Lin Lin, Michael, Michael Peterson, and Alan R. Greenberg, "Critical Frequency Measurement of Slow Wave in Porous Materials." ASME International Mechanical Engineering Congress and Exposition, November 5-10, 2006 Chicago, IL.
272. Alan R. Greenberg, Mark Hernandez, William B. Krantz, and Michael L. Peterson, "Membrane Applications: Current Work and Future Opportunities." Annual Meeting of the American Institute of Chemical Engineers, November 2006, San Francisco. *Invited Presentation*
273. Alan R. Greenberg, "MAST Center Membrane Research." ExxonMobil Research and Engineering Center, February 2007, Annandale, NJ.
274. Alan R. Greenberg, "MAST Center Update: Overview of Membrane Research Projects." Millipore Corporation, February 2007, Bedford, MA.
275. Alan R. Greenberg and Dr. Jack Gilron, "Demonstration of a Novel High Recovery Desalination Process for Brackish Groundwater." NATO Science for Peace Program Meeting, February 2007, Brussels.
276. Alan R. Greenberg, "Issues and Challenges for Graduated Centers, I/UCRC Directors' Meeting," January 2007, Washington, D.C.
277. Alicia M. Ortega, Scott Kasprzak, Christopher M. Yakacki, Alan R. Greenberg, and Ken Gall "Structure-Property Relationship in Photopolymerizable Polymer Networks Demonstrating Shape Memory Behavior," Materials Research Society Spring 2007 National Meeting, San Francisco, April 2007.
278. Elmira Kujundzic, Keith Cobry, Alan R. Greenberg, Mark Hernandez, "Development of a Methodology for Distinguishing Fouling Mechanisms in Cross-Flow Membrane Modules." North American Membrane Society Annual Meeting, May 2007, Orlando, FL.
279. Elmira Kujundzic, Alan R. Greenberg, Mark Hernandez and William Mickols, "Monitoring Early-Stage Biofilm Growth on Surface-Modified Thin Film Composite Polyamide RO Membranes." North American Membrane Society Annual Meeting, May 2007, Orlando, FL.
280. Elmira Kujundzic, Chia-Chi Ho, Weiyi Li, Alan R. Greenberg, and Mark Hernandez, "Detection of Protein Fouling on Membrane Surfaces Using Ultrasonic Reflectometry." North American Membrane Society Annual Meeting, May 2007, Orlando, FL.

281. Alan R. Greenberg and Richard Noble, "Perspective: 15 Years of Industry-University Cooperative Research." North American Membrane Society Annual Meeting, May 2007, Orlando, FL.
282. Alicia M. Ortega, Scott Kasprzak, Christopher M. Yakacki, Alan R. Greenberg, and Ken Gall, "Structure-Property Relationships in Photopolymerizable Polymer Networks." Photopolymerization Fundamentals 2007 Conference, June 2007, Breckenridge, CO.
283. Alan R. Greenberg, "Use of Ultrasonic Reflectometry to Monitor Membrane Fouling." Ben Gurion University, July 2007, Beer Sheva, Israel. **Invited Presentation**
284. Elmira Kujundzic, Alan R. Greenberg, and Mark Hernandez, "MAST Center Update: Overview of Membrane Research Projects." Genencor Corporation, July 2007, Palo Alto, CA.
285. Alan R. Greenberg and Richard Noble, Membrane Formation: Novel Materials & Innovative Processing. MemFAST Center Planning Meeting, North Carolina State University, November, 2007, Raleigh, NC.
286. Alan R. Greenberg, Sensors for Real-Time Characterization of Membrane Fouling. MemFAST Center Planning Meeting, North Carolina State University, November, 2007, Raleigh, NC.
287. John Pellegrino, Alan R. Greenberg and Richard Noble, MAST Center: Desalination Activities and Perspectives. Interagency Consortium for Desalination and Membrane Separations Research Meeting, November, 2007, Yuma, AZ. **Invited Presentation.**
288. Alan R. Greenberg, "Center Management Innovations: Local Best Practices," I/UCRC Directors' Meeting, January 2008, Washington, D.C.
289. Alan R. Greenberg, "Mechanical and Gas Transport Behavior of Polymeric Dense Films at Elevated Temperatures," National University of Singapore, May 2008, Singapore. **Invited Presentation.**
290. Elmira Kujundzic, Chia-Chi Ho, Weiyi Li, Alan R. Greenberg, and Mark Hernandez, Monitoring Protein Fouling on Polymeric Membranes Using Ultrasonic Frequency-Domain Reflectometry. International Conference on Membranes (ICOM), July 2008, Honolulu, Hawaii. **Keynote Presentation**
291. Elmira Kujundzic, Alan R. Greenberg, Mark Hernandez, and Robin Fong The Impact of Pharmaceutical Broth Components on Microfiltration Membrane Flux-Decline (ICOM). International Conference on Membranes, July 2008, Honolulu, Hawaii.
292. Alan R. Greenberg, "MAST Center Membrane Research." New Jersey Institute of Technology, August 2008, Newark, NJ.
293. Alicia M. Ortega, Christopher M. Yakacki, Alan R. Greenberg, and Ken Gall "Effect of crosslinking on the shape-memory behavior and optimization of photopolymerizable (meth)acrylate-based polymer networks," Materials Research Society Spring 2009 National Meeting, San Francisco, April 2009.
294. Alan R. Greenberg, "Membrane Applications for Ultrasonic Reflectometry (UR): Current Work & Future Prospects." Beijing University of Chemical Technology, April 2009, Beijing. **Invited Presentation.**
295. Alan R. Greenberg, "Use of Ultrasonic Sensors in Membrane Applications." National University of Singapore, June 2009, Singapore. **Invited Presentation.**
296. Keith Cobry, Alan Greenberg, and Victor M. Bright "Comprehensive Experimental Studies of Early-Stage Membrane Scaling During Nanofiltration," North American Membrane Society Annual Meeting, Charleston, SC, June 2009.
297. Elmira Kujundzic, Alan R. Greenberg, Mark Hernandez, and Robin Fong "The Impact of Crossflow Velocity on MF Membrane Fouling Associated with Microbial Broth and its Components." North American Membrane Society Annual Meeting, Charleston, SC, June 2009.
298. Alan R. Greenberg, "MAST Center Membrane Research." Donaldson Membranes, June 2009, Philadelphia, Pa.
299. Alan R. Greenberg, "MAST Center Membrane Desalination Research." New Mexico State University, July 2009, Los Cruces, NM.
300. Alan R. Greenberg, "Novel High-Recovery Desalination Process for Brackish Groundwater." MWH Global Inc. Research Partnership Workshop Follow-up Meeting, December 2009, Broomfield, CO.

301. Dae Up Ahn, Yifu Ding, Virginia Ferguson, Alan R. Greenberg, Richard Noble, Kevin Kjoller and Craig Prater, "Nanoscale Thermal Mechanical Analysis of Membrane Barrier Layer Materials." Materials Research Society Spring 2010 National Meeting, San Francisco, April 2010.
302. Elmira Kujundzic, Adrian Yeo, Seyed S. Hosseini, William B. Krantz, and Alan R. Greenberg, "Evaporometry, a Novel Technique for Characterizing Membrane Pore-Size Distribution." NAMS-ICIM 2010, July 2010, Washington, D.C.
303. Xiaoyun Lu, Elmira Kujundzic, Guy Mizrahi, Keith Cobry, Jack Gilron, and Alan R. Greenberg, "Scaling Mitigation via Flow Reversal in Reverse Osmosis Desalination." NAMS-ICIM 2010, July 2010, Washington, D.C.
304. Sajjad Maruf, Dae Up Ahn, Virginia L. Ferguson, Richard D. Noble, Alan R. Greenberg, and Yifu Ding, "Nanoscale Thermal Mechanical Analysis of RO Membrane Barrier Layers." NAMS-ICIM 2010, July 2010, Washington, D.C.
305. William B. Krantz, Alan R. Greenberg, Elmira Kujundzic, Adrian Yeo, and Seyed S. Hosseini, "A Novel Technique for Characterizing Membrane Pore Size – Evaporometry." AIChE Annual Meeting, November 2010, Salt Lake City, Utah.
306. Jack Gilron and Alan R. Greenberg, "Scaling Mitigation via Flow Reversal in Reverse Osmosis Desalination." Ben Gurion University, Beer Sheva, Israel, December 2010.
307. Jack Gilron, Michael Peterson and Alan R. Greenberg, "Development of Smart Module for Implementation of Flow Reversal in Reverse Osmosis Desalination." Bel Industries, Beer Sheva, Israel, December 2010.
308. Alan R. Greenberg and Kam Sirkar, Dynamics of Multi-Site Centers, I/UCRC Directors' Meeting, Washington, D.C., January 2011.
309. Alan R. Greenberg, Small Business Sponsorship, I/UCRC Directors' Meeting, Washington, D.C., January 2011.
310. Sajjad Maruf, Dae Up Ahn, Alan R. Greenberg, and Yifu Ding, "Quantifying Chlorine-Induced Degradation of TFC RO Membranes via Glass Transition Temperature Change." North American Membrane Society Annual Meeting, June 2011, Las Vegas, NV.
311. Keith Cobry, Victor Bright, and Alan R. Greenberg, "Integrated Electrolytic Sensors for Monitoring Concentration Polarization During Cross-Flow Nanofiltration." North American Membrane Society Annual Meeting, June 2011, Las Vegas, NV.
312. Xiaoyun Lu, Elmira Kujundzic, Guy Mizrahi, Keith Cobry, Jay Wang, Jack Gilron, and Alan R. Greenberg, "Scaling Mitigation in Reverse Osmosis Desalination via Flow Reversal Controlled by Ultrasonic Sensors." North American Membrane Society Annual Meeting, June 2011, Las Vegas, NV.
313. Xiaoyun Lu, Elmira Kujundzic, Guy Mizrahi, Keith Cobry, Jay Wang, Jack Gilron, and Alan R. Greenberg, "Scaling Mitigation in Reverse Osmosis Desalination via Flow Reversal Controlled by Ultrasonic Sensors." International Congress on Membranes and Membrane Processes, July 2011, Amsterdam.
314. Alan R. Greenberg, Xiaoyun Lu, Elmira Kujundzic, Keith Cobry, and William B. Krantz, "Membrane Characterization – A Current Perspective." International Congress on Membranes and Membrane Processes, July 2011, Amsterdam. **Invited Keynote Presentation**
315. Khoren Sahagian, Craig Prater, Sajjad Maruf, Dae Up Ahn, Alan Greenberg, and Yifu Ding, "Detecting Transition Temperatures in Ultra-thin Coatings & Membranes." 39th Annual Conference of the North American Thermal Analysis Society, August 2011, Des Moines, Iowa.
316. Xiaoyun Lu, Elmira Kujundzic, Jay Wang, Jack Gilron, Guy Mizrahi, Keith Cobry, and Alan R. Greenberg, "Ultrasonic Sensor-Controlled Flow Reversal for Scaling Mitigation in Reverse Osmosis Desalination." Membrane Science & Technology 2011, August 2011, Singapore. **Invited Presentation**
317. Xiaoyun Lu, Elmira Kujundzic, and Alan R. Greenberg "Ultrasonic Sensors in Membrane Applications." Membrane Science & Technology 2011, Workshop Presentation, August 2011, Singapore. **Invited Presentation**
318. William B. Krantz and Alan R. Greenberg, "Evaporometry – A Novel Method for Characterizing Pore-Size Distribution." Membrane Science & Technology 2011, Workshop Presentation, August 2011, Singapore. **Invited Presentation**

319. William B. Krantz and Alan R. Greenberg, "Evaporometry – Use of Ultrasound for Characterizing Membranes and Membrane Processes." Membrane Science & Technology 2011, Workshop Presentation, August 2011, Singapore. **Invited Presentation**
320. William B. Krantz, Alan R. Greenberg, Elmira Kujundzic, "Evaporometry – A Novel Method for Determining the Pore-Size Distribution of MF and UF Membranes." AIChE Annual Meeting, October 2011, Minneapolis, MN.
321. Xiaoyun Lu, Elmira Kujundzic, Guy Mizrahi, Keith Cobry, Jay Wang, Jack Gilron, Michael Peterson and Alan R. Greenberg, "A Sound Approach to Scaling Mitigation in RO Desalination. 6th Sino-US Joint Chemical Engineering Conference, November 2011, Beijing. **Invited Presentation**
322. Alan R. Greenberg, *Running Your Center: Challenges and Best Practices*, I/UCRC Directors' Meeting, Washington, D.C., January 2012.
323. Alan R. Greenberg, IUCRC Recruiting & Relationship Marketing: A Systems Perspective, I/UCRC Directors' Meeting, Washington, D.C., January 2012.
324. D. Peled, N. Perlmutter, N. Daltrophe, Y. Gelman, I. Ben-David, R. Harpness, M. Priel, A.R. Greenberg, and J. Gilron, "Pilot study from 120 m³/d flow reversal pilot plant operating on brackish well water." EDS Desalination for the Environment Conference, Barcelona, March 2012.
325. Sajjad H. Maruf, Dae U. Ahn, John Pellegrino, Jason P. Killgore, Alan R. Greenberg, and Yifu Ding, "Correlation Between Barrier Layer T_g and the Permselectivity of a Thin-film Composite Polyamide Membrane Upon Chlorine Treatment." 244th ACS National Meeting, August 2012, Philadelphia, PA.
326. Alan R. Greenberg, "Innovative Techniques for Membrane Fabrication and Characterization." AIChE Annual Meeting, October 2012, Pittsburgh, PA.
327. William B. Krantz, Alan R. Greenberg, Elmira Kujundzic, Adrian Yeo, and Seyed S. Hosseini, "Recent Developments in Evaporometry for Characterizing the Pore-Size Distribution of Membranes." AIChE Annual Meeting, October 2012, Pittsburgh, PA.
328. Sajjad Maruf, John Pellegrino, Alan Greenberg, and Yifu Ding, "Direct Patterning of Polymeric Separation Membranes for Enhanced Liquid Filtration Performance", *Symposium: Membrane Material Platforms and Concepts for Energy, Environment, and Medical Applications*, MRS meeting, November 2012, Boston, MA.
329. Yifu Ding, Sajjad Maruf, John Mersch, Melissa Richman, John Pellegrino, and Alan Greenberg, "Mitigating Fouling of Ultrafiltration Membrane With Sub-Micron Surface Patterns," Annual Meeting of North American Membrane Society (NAMS), June 2013, Boise, ID.
330. Sajjad Maruf, John Mersch, Melissa Richman, John Pellegrino, Alan Greenberg, and Yifu Ding, "Surface Pattern On Ultrafiltration Membrane Using Nanoimprinting Lithography", Annual Meeting of North American Membrane Society (NAMS), June 2013, Boise, ID.
331. M. Peterson, L. Lin, M. Maynard and A. Greenberg, "Direct Measurement of Permeability" Engineering Mechanics Institute Conference, Evanston, Illinois, August 4-7. 2013.
332. Alan R. Greenberg, The Ups and Downs of Recruiting and Retaining Members to your I/UCRC, I/UCRC Directors' Meeting, Washington, D.C., January 2014.
333. Yueyang Shen, John Tang, Qian Lei, Ezinwa Elele, Katherine L. Guerra, Frank Leitz, Boris Khusid, Kamallesh K. Sirkar, and Alan R. Greenberg, "Effects of Magnetic Treatment of Feed Solution on Scale Formation in Reverse Osmosis," Annual Meeting of North American Membrane Society (NAMS), May 2014, Houston, submitted.
334. Yueyang Shen, Dana Qasem, Ezinwa Elele, John Tang, Christina Carbrello, Gabriel Tkacik, Boris Khusid, Kamallesh K. Sirkar, and Alan R. Greenberg, "Mechanical Constitutive Equations for Polymeric Microfiltration Membranes," Annual Meeting of North American Membrane Society (NAMS), May 2014, Houston, submitted.
335. Mads Koustrup Jørgensen, Elmira Kujundzic, and Alan R. Greenberg "Ultrasonic Reflectometry for Monitoring the Effect of Pressure on Sludge Fouling of MF Membranes," International Congress on Membranes and Membrane Processes, July 2014, Shanghai, submitted.
336. Elmira Kujundzic, Jacob Dove, Todd Murray, Ajay Lajmi, Xiaosong Wu, and Alan R. Greenberg, "Using Ultrasonic Reflectometry to Advantage for Real-Time Detection of Protein Fouling," International Congress on Membranes and Membrane Processes, July 2014, Shanghai, submitted.

337. Elmira Kujundzic, Ajay Lajmi, Xiaosong Wu, and Alan R. Greenberg, "New Developments in Evaporometry for Characterizing the Pore-Size Distribution of Membranes," International Congress on Membranes and Membrane Processes, July 2014, Shanghai, submitted.
338. Sajjad H. Maruf, Dae U. Ahn, John Pellegrino, Jason P. Killgore, Alan R. Greenberg, and Yifu Ding, "Correlation between barrier layer T_g and the permselectivity of a thin-film composite polyamide membrane upon chlorine treatment," International Congress on Membranes and Membrane Processes, July 2014, Shanghai, submitted.
339. Sajjad H. Maruf, Alan R. Greenberg, John Pellegrino, and Yifu Ding, "Fabrication and Characterization of a Surface-Patterned Thin Film Composite Membrane," International Congress on Membranes and Membrane Processes, July 2014, Shanghai, submitted.
340. Sajjad H. Maruf, Alan R. Greenberg, John Pellegrino, and Yifu Ding, "Mitigating Deposition of Proteins and Particles on UF Membranes with Sub-micron Surface Patterns," International Congress on Membranes and Membrane Processes, July 2014, Shanghai, submitted.