

G. GLENN LIPSCOMB

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EMPLOYMENT

2004-Present Department Chair, Chemical & Environmental Eng., University of Toledo
1999-Present Professor, Chemical & Environmental Eng., University of Toledo
1995-1999 Associate Professor, Chemical & Environmental Eng., University of Toledo
1994-1995 Assistant Professor, Chemical & Environmental Eng., University of Toledo
1989-1994 Assistant Professor, Chemical Eng., University of Cincinnati
1988-1989 Project Leader, The Dow Chemical Company, Walnut Creek, CA
1986-1988 Senior Research Engineer, The Dow Chemical Company, Walnut Creek, CA

EDUCATION

1981-1987 PhD Chemical Engineering, University of California at Berkeley
1977-1981 BS Chemical Engineering, Summa Cum Laude, University of Missouri at Rolla

RESEARCH INTERESTS

- Membrane Separation Science and Technology
 - Process Development
 - Membrane Formation and Modification
 - Hollow Fiber and Spiral Wound Module Design
 - Spacer Design
- Separation Processes for Carbon Dioxide Capture
- Engineered Osmotic Systems for Water and Energy Production
- Biofuel Production

SELECTED HONORS & AWARDS

Outstanding Teacher Award, University of Toledo (2013)
Fellow, American Institute of Chemical Engineers (2012)
Academy of Chemical Engineers, University of Missouri at Rolla (2007)
Outstanding Researcher Award, College of Engineering, University of Toledo (2003)
Outstanding Teacher Award, College of Engineering, University of Toledo (1997)
Dean's Award for Special Service to the College of Engineering, University of Cincinnati (1993)
Outstanding Professor, Department of Chemical Engineering, University of Cincinnati (1991)
University Scholar, University of Missouri at Rolla (1977-1981)
Senior Chemical Engineering Student Outstanding Achievement Award, University of Missouri at Rolla (1981)
Omega Chi Epsilon Award, University of Missouri at Rolla (1981)
Phi Kappa Phi Outstanding Junior Award, University of Missouri at Rolla (1980)

ADVISORY BOARDS

University of Missouri at Rolla, Advisory Council, 2003-2006

Journal of Membrane Science, Editorial Board, 2010-present

Calera Corporation, 2012-present

HONOR AND PROFESSIONAL SOCIETIES

North American Membrane Society

American Institute of Chemical Engineers

American Chemical Society

American Society for Engineering Education

Phi Kappa Phi, Honor Society

Omega Chi Epsilon, Chemical Engineering Honor Society

Tau Beta Pi, Engineering Honor Society

PUBLICATIONS

Refereed

1. A. I. Liapis, G. G. Lipscomb, O. K. Crosser and E. Tsiroyianni-Liapis, "A Model of Oxygen Diffusion in Absorbing Tissue", *Mathematical Modelling*, 3 (1982) 83-92.
2. G. G. Lipscomb and M. M. Denn, "Mold Flow of Materials with a Yield Stress", *Journal of Rheology*, 26 (1982) 587-588.
3. G. G. Lipscomb and M. M. Denn, "The Transversely Isotropic Liquid as a Model for Fiber-Filled Systems", *Journal of Rheology*, 28 (1984) 463-463.
4. G. G. Lipscomb and M. M. Denn, "Flow of Bingham Fluids in Complex Geometries", *Journal of Non-Newtonian Fluid Mechanics*, 14 (1984) 337-346.
5. G. G. Lipscomb, R. Keunings and M. M. Denn, "Implications of Boundary Singularities in Complex Geometries", *Journal of Non-Newtonian Fluid Mechanics*, 24 (1987) 85-96.
6. G. G. Lipscomb, M. M. Denn, D. U. Hur and D. V. Boger, "The Flow of Fiber Suspensions in Complex Geometries", *Journal of Non-Newtonian Fluid Mechanics*, 26 (1988) 297-325.
7. G. G. Lipscomb, "Unified Thermodynamic Analysis of Sorption in Rubbery and Glassy Materials", *AIChE Journal*, 36 (1990) 1505-1516.
8. R. J. Spontak, J. M. Zielinski and G. G. Lipscomb, "Effect of Looping on the Microstructure of Linear Multiblock Copolymers", *Macromolecules*, 25 (1992) 6270-6276.
9. M. K. Akhtar, G. G. Lipscomb and S. E. Pratsinis, "Monte Carlo Simulation of Particle Coagulation and Sintering", *Journal of Aerosol Science* 21 (1994) 83-93.
10. T. Banerjee and G. G. Lipscomb, "Mixed Gas Sorption in Elastic Solids", *Journal of Membrane Science* 96 (1994) 241-258.
11. G. G. Lipscomb, "Melt Hollow Fiber Spinning for Membrane Manufacture", *Polymers for Advanced Technologies* 5 (1994) 745-758.
12. G. G. Lipscomb, T. Banerjee and M. K. Chhajer, "Sorption and Permeation in Elastic Solids: Applicability to Gas Transport in Glassy Polymeric Materials", *Polymers for Advanced Technologies* 5 (1994) 708-723.
13. S. Elmore and G. G. Lipscomb, "Analytical Approximations of the Effect of a Fiber Size Distribution on the Performance of Hollow Fiber Membrane Devices", *Journal of Membrane Science* 98 (1995) 49-56.

14. G. Xomeritakis and G. G. Lipscomb, "Analysis of Mass Transport in Composite Membranes", *Journal of Membrane Science* 103 (1995) 1-10.
15. J. Lemanski and G. G. Lipscomb, "Effect of Shell-Side Flows on Hollow-Fiber Membrane Device Performance", *AIChE Journal* 41 (1995) 2322-2326.
16. T. Banerjee, M. Chhajer, and G. G. Lipscomb, "Direct Measurement of the Heat of Carbon Dioxide Sorption in Polymeric Materials", *Macromolecules* 28 (1995) 8563-8570.
17. T. Banerjee and G. G. Lipscomb, "Calorimetric Probes of Carbon Dioxide Sorption in Bisphenol-A based Polymers", *Polymer* 38 (1997) 5807-5813.
18. T. Banerjee and G. G. Lipscomb, "Direct Measurement of the Carbon Dioxide Induced Glass Transition Depression in a Family of Substituted Polycarbonates", *Journal of Applied Polymer Science* 68 (1998) 1441-1449.
19. J. Lemanski, B. Liu, and G. G. Lipscomb, "Effect of Fiber Variation on the Performance of Cross-flow Hollow Fiber Gas Separation Modules", *Journal of Membrane Science* 153 (1999) 33-43.
20. L. Bao, B. Liu, and G. G. Lipscomb, "Entry Mass Transfer in Axial Flows Through Randomly Packed Fiber Bundles", *AIChE Journal* 45 (1999) 2346-2356.
21. J. Lemanski and G. G. Lipscomb, "Effect of Fiber Variation on the Performance of Counter-current Hollow Fiber Gas Separation Modules", *Journal of Membrane Science* 167 (2000) 241-252.
22. T. Banerjee and G. G. Lipscomb, "A Comparison of Analytic Thermodynamic Models for Gas Solubility, Volume Dilation, and Heat of Sorption in Glassy Polymeric Materials", *Computational and Theoretical Polymer Science* 10 (2000) 437-445.
23. B. Liu, X. Wu, G. G. Lipscomb, and J. Jensvold, "Novel Internally Staged Permeator Designs Using a Hollow Fiber Fabric", *Separation Science and Technology* 35 (2000) 1153-1177.
24. A. Frank, G. G. Lipscomb, and M. Dennis, "Visualization of Concentration Fields in Hemodialyzers by Computed Tomography", *Journal of Membrane Science* 175 (2000) 239-251.
25. A. Frank, A. Varma, G. G. Lipscomb, and M. Dennis, "Visualizing the Entrapment of Air Pockets in the Shell of a Hemodialyzer During Wet-out", *Chemical Engineering Communications* 184 (2001) 139-155.
26. B. Liu, G. G. Lipscomb, and J. A. Jensvold, "A Comparison of Optimal Internally Staged Permeator and External Two-Stage Module Designs for O₂ Enrichment from Air", *Separation Science and Technology* 36 (2001) 2385-2409.
27. B. Liu, G. G. Lipscomb, and J. A. Jensvold, "Effect of Fiber Variation on Staged Membrane Gas Separation Module Performance", *AIChE Journal* 47 (2001) 2206-2219.
28. J. Lemanski and G. G. Lipscomb, "Effect of Shell-side Flows on the Performance of Hollow-Fiber Gas Separation Modules", *Journal of Membrane Science* 195 (2001) 215-228.
29. L. Bao and G. G. Lipscomb, "Well-developed Mass Transfer in Axial Flows Through Randomly Packed Fiber Bundles with Constant Wall Flux", *Chemical Engineering Science* 57 (2002) 125-132.
30. L. Bao and G. G. Lipscomb, "Mass Transfer in Axial Flows Through Randomly Packed Fiber Bundles with Constant Wall Concentration", *Journal of Membrane Science* 204 (2002) 207-220.

31. L. Bao and G. G. Lipscomb, "Effect of Random Fiber Packing on the Performance of Shell-fed Hollow Fiber Gas Separation Modules", *Desalination* 146 (2002) 243-248.
32. G. G. Lipscomb, "A Compendium of Open-ended Membrane Problems in the Curriculum", *Chemical Engineering Education* 37 (2003) 46-51.
33. L. Bao and G. G. Lipscomb, "Mass Transfer in Axial Flows Through Randomly Packed Fiber Bundles", *New Insights into Membrane Science and Technology: Polymeric and Biofunctional Membranes*, D. Bhattacharyya and D. A. Butterfield, Eds., Elsevier, 5-26 (2003).
34. G. G. Lipscomb and S. Sonalkar, "Sources of non-ideal flow distribution and their effect on the performance of hollow fiber gas separation modules", *Separation and Purification Reviews* 33 (2004) 41-76.
35. Y. Su, G. G. Lipscomb, H. Balasubramanian, and D. R. Lloyd, "Observations of Recirculation in the Bore Fluid During Hollow Fiber Spinning", *AIChE Journal* 52 (2006) 2072-2078.
36. C. Ciocanel, G. Lipscomb, N. Naganathan, "A Constitutive Equation for Magnetorheological Fluid Characterization", *Journal of Phase Equilibria and Diffusion* 29 (2008) 305-311.
37. G. G. Lipscomb, "Membrane Separation Technology: Past, Present, and Future", *Innovations in Industrial and Engineering Chemistry*, ACS Symposium Series 1000, W. H. Flank, M. A. Abraham, and M. A. Matthews, Eds., American Chemical Society, 281-333 (2008).
38. H. A. Balasubramanian-Rauckhorst, D. R. Lloyd, and G. G. Lipscomb, "Predicting Extent of Anisotropy in Anisotropic Hollow Fiber Membrane Formation", *Journal of Membrane Science* 339 (2009) 250-260.
39. M. Bordawekar, I. C. Escobar, G. G. Lipscomb, "Use of a Temperature Sensitive Surface Gel to Reduce Fouling", *Separation Science and Technology* 44 (2009) 3369-3391.
40. P. V. Gawade, D. Patel, G. G. Lipscomb, and M. A. Abraham, "Kinetics and Modeling of the Flexible Fuel Reformer: n-Hexadecane Steam Reforming and Combustion", *Industrial & Engineering Chemistry Research* 49 (2010) 6931-6940.
41. P. Hao and G. G. Lipscomb, "The Effect of Sweep Uniformity on Gas Dehydration Module Performance", *Membrane Gas Separation*, Y. Yampolskii and B. Freeman, Eds., Wiley, 333-353 (2010).
42. S. Sonalkar, P. Hao, and G. G. Lipscomb, "Effect of Fiber Property Variation on Hollow Fiber Membrane Module Performance in the Production of a Permeate Product", *Industrial & Engineering Chemistry Research*, 49 (2010) 12074-12083 (DOI: 10.1021/ie100649q).
43. Y. Su and G. G. Lipscomb, "Simulation of Hollow Fiber Spinning", *Modern Applications in Membrane Science and Technology*, ACS Symposium Series Vol. 1078, I. Escobar and B. Van Der Bruggen, Eds., 129-152 (2011) (DOI: 10.1021/bk-2011-1078.ch009).
44. N. Peng, N. Widjojo, P. Sukitpaneemit, M. M. Teoh, G. G. Lipscomb, T.-S. Chung, and J.-Y. Lai, "Evolution of Polymeric Hollow Fibers as Sustainable Technologies: Past, Present, and Future", *Progress in Polymer Science* 37 (2012) 1401-1424.
45. K. L. Chong, N. Peng, H. Yin, G. G. Lipscomb, and T.-S. Chung, "Food Sustainability by Designing and Modelling a Membrane Controlled Atmosphere Storage System", *Journal of Food Engineering* 114 (2013) 361-374.

46. J. Liu, A. Iranshahi, Y. Lou, and G. Lipscomb, "Static mixing spacers for spiral wound modules", *Journal of Membrane Science* 442 (2013) 140-148 (DOI: 10.1016/j.memsci.2013.03.063).
47. Y. Lou, P. Hao, and G. Lipscomb, "NELF predictions of a solubility – solubility selectivity upper bound", *Journal of Membrane Science* 455 (2014) 247-253 (DOI: 10.1016/j.memsci.2013.12.071).
48. N. Che Mat, Y. Lou, and G. G. Lipscomb, "Hollow fiber membrane modules", *Current Opinion in Chemical Engineering* 4 (2014) 18-24 (DOI: 10.1016/j.coche.2014.01.002).
49. Y. Lou, R. Gogar, P. Hao, G. Lipscomb, K. Amo, and J. Kniep, "Simulation of Net Spacers in Membrane Modules for Carbon Dioxide Capture", *Separation Science and Technology* 52 (2017) 168-185 (DOI: 10.1080/01496395.2016.1220396).
50. N. Che Mat and G. G. Lipscomb, "Membrane Process Optimization for Carbon Capture", *International Journal of Greenhouse Gas Control* 62 (2017) 1-12 (DOI: 10.1016/j.ijggc.2017.04.002).
51. C. F. Wan, T. Yang, G. G. Lipscomb, D. J. Stookey, T. S. Chung, "Design and fabrication of hollow fiber membrane modules", *Journal of Membrane Science*, 538 (2017) 96-107.
52. "NELF – Transition State Theory predictions of a permeability – permeability selectivity upper bound" in preparation.
53. "Particle Image Velocimetry Studies of a Static Mixing Spacer" in preparation.

Non-refereed

1. G. G. Lipscomb, "ChE Educator – Steven E. LeBlanc of the University of Toledo", *Chemical Engineering Education* 36 (2002) 82-87.
2. G. G. Lipscomb and R. J. Giraud, "Sustainable Separations", *Encyclopedia of Sustainable Technologies*, M. A. Abraham, Ed., Elsevier, 553–563 (2017).

BOOKS

1. Advanced Membrane Technology, Eds. N. N. Li, E. Drioli, W. S. Ho, and G. G. Lipscomb, *Annals of the New York Academy of Sciences*, Volume 984, New York, 2003.

PATENTS

1. E. S. Sanders, Jr., D. O. Clark, J. A. Jensvold, H. N. Beck, G. G. Lipscomb II, and F. L. Coan, "Process for Preparing POWADIR Membranes from Tetrahalobisphenol A Polycarbonates", U.S. Patent No. 4,772,392, issued September 20, 1988 assigned to The Dow Chemical Company.
2. H. N. Beck, E. S. Sanders, Jr., and G. G. Lipscomb II, "Composition Useful in Process for Preparing POWADIR Membranes from Tetrahalobisphenol A Polycarbonates", U.S. Patent No. 4,962,131, issued October 9, 1990 assigned to The Dow Chemical Company.
3. J. Jensvold and G. Lipscomb, "Internal Staged Permeator for Fluid Separation", U.S. Patent No. 6,153,097, issued November 28, 2000 assigned to MG Generon and University of Toledo.
4. G. G. Lipscomb and S. Varanasi, "Liquid Recovery and Purification in Biomass Pretreatment Process", U.S. Patent Application US 2012/0298584 A1 filed November 9, 2010.

5. P. Paripati, R. Patil, G. G. Lipscomb, and M. Adiga, "Thermal energy conversion to electricity", U.S. Patent No. 9,297,366, issued March 29, 2016 assigned to Suganit Systems, Inc. and The University of Toledo.

CONFERENCE PROCEEDINGS

1. G.G. Lipscomb, R. Keunings, G. Marrucci and M.M. Denn, "A Continuum Theory for Fiber Suspensions", Proceedings of the 9th International Congress on Rheology, 2 (1984) 497-503.
2. G.G. Lipscomb, "The Thermodynamics of Gas Sorption in Glassy Polymeric Materials", Proceedings of the 1990 International Congress on Membranes and Membrane Processes, 2 (1990) 1367-1369.
3. M. Chhajer, T. Banerjee, G.G. Lipscomb, "Thermodynamic Analysis of Gas Permeation Through Glassy Polymeric Materials", Polymer Preprints, 32 (1991) 384-385.
4. M. K. Akhtar, Y. Xiong, S. E. Pratsinis, and G. G. Lipscomb, "Simulation of Irregular Particle Dynamics by Population Balance and Monte Carlo Techniques", Proceedings of the MRS 1992 Spring National Meeting, San Francisco, CA, April 27-May 1, 1992.
5. M. K. Akhtar, S. E. Pratsinis, and G. G. Lipscomb, Monte Carlo Simulation of Gas-Phase Particle Formation and Sintering, Materials Research Symposium Proceedings, 278 (1992) 261-266.
6. M. K. Chhajer and G. G. Lipscomb, "Analysis of Mixed Gas Transport in Elastic Solids", 1992 AIChE Separations Division Topical Conference Preprint Volume 914-919.
7. J. Lemanski and G. G. Lipscomb, "A Model for the Evaluation of Hollow-Fiber Membrane Device Performance", Advances in Filtration and Separation Technology, American Filtration Society, 7 (1993) 617-620.
8. A. Ashraf, S. D. Smith, M. M. Satkowski, R. J. Spontak, S. J. Clarson, and G. G. Lipscomb, "Synthesis and Morphological Studies of Random Styrene-diene Copolymers and 'Random-Diblock' Copolymers", Polymer Preprints, 35 (1994) 581-582.
9. J. H. Laurer, R. J. Spontak, S. D. Smith, A. Ashraf, D. J. Buoni, and G. G. Lipscomb, "Microstructural Development and Orientability in A(A/B)B Block Copolymers", Polymer Preprints, 35 (1994) 657-658.
10. G. G. Lipscomb, "Design of Hollow Fiber Gas Separation Modules: Academic/Industrial Perspectives", Proceedings of the 1995 Thirteenth Annual Membrane Technology/Planning Conference, Newton, MA, October 23-25, 1995.
11. G. G. Lipscomb, "Novel Internally Staged Hollow Fiber Module Designs", 1995 AIChE Separations Division Topical Conference Preprint Volume, Miami, FL, November 12-17, 1995.
12. G. G. Lipscomb, "Design of Hollow Fiber Contactors for Membrane Gas Separations", in The 1996 Membrane Technology Reviews, page 23-102, Business Communication Co., Inc., Norwalk, CT (1996).
13. G. G. Lipscomb, "Studies of Gas-Polymer Interactions by High Pressure Microcalorimetry", Proceedings of the 1997 Fifteenth Annual Membrane Technology/Planning Conference, Newton, MA, October 27-29, 1997.
14. A. Varma and G. G. Lipscomb, "Theoretical and Experimental Studies of the Influence of Dialysate Flow on Artificial Kidney Performance", 1997 AIChE Topical Conference on

- Separation Science and Technologies Preprint Volume, Los Angeles, CA, November 16-21, 1997.
15. J. Lemanski and G. G. Lipscomb, "The Effect of Fiber Variability on Counter-Current Module Performance: Simulation and Experiment", 1999 AIChE Topical Conference on Separation Sciences and Technology Preprint Volume, Dallas, TX, October 31-November 5, 1999.
 16. A. Frank, G. G. Lipscomb, and M. Dennis, "Visualization of Bubble Formation During the Wet-out of an Artificial Kidney and Its Effect on Performance", 1999 AIChE Topical Conference on Separation Sciences and Technology Preprint Volume, Dallas, TX, October 31-November 5, 1999.
 17. J. Lemanski and G. G. Lipscomb, "Effect of Shell Flow Distribution on the Performance of Shell Feed Gas Separation Modules", Proceedings of the AIChE 2000 Spring Meeting, Atlanta, GA, March 5-9 2000.
 18. G. G. Lipscomb and W. C. Vance, "A Compendium of Membrane Problems in the Curriculum", Proceedings of the AIChE 2001 National Meeting, Reno, NV, November 4-9, 2001.
 19. J. Dolgoff, G. G. Lipscomb, K. Pugh, S. Beltyukova, and N. Pinto, "Experiments in Membrane Separation Processes Delivered Through the Internet", Proceedings of the ASME 2003 Annual Conference, Nashville, TN, June 22-25, 2003.
 20. J. Jones, G. G. Lipscomb, and M. Dennis, "Visualization of the Effects of Ultrafiltration and Fiber Crimping on Concentration Fields in Hemodialyzers", Proceedings of the AIChE 2003 National Meeting, San Francisco, CA, November 16-21, 2003.
 21. C. Ciocanel, G. Lipscomb, and N. Naganathan, "Constitutive Equations for Magnetorheological Fluid Characterization", Proceedings of SPIE International Symposia, Smart Structures & Materials/NDE, Paper 5761-83, San Diego, CA, March 7-10, 2005.
 22. C. Ciocanel, G. Lipscomb, and N. Naganathan, "Evaluation of a Constitutive Equation for Magnetorheological Fluids in Shear and Elongational Flows", 2005 ASME International Mechanical Engineering Congress & Exposition, Paper 79974, Orlando, FL, November 5-11, 2005.
 23. P. Karthikeyan, H. C. Li, G. Lipscomb, S. Neelakrishnan, J. G. Abby, and R. Anand, "Experimental Investigation of the Water Impact on Performance of Proton Exchange Membrane Fuel Cells (PEMFC) with Porous and Non-Porous Flow Channels", International Mechanical Engineering Congress & Exposition – 2012 Parts A and B, 6 (2013) 781-788.

PRESENTATIONS

Conference Papers

1. G. G. Lipscomb, "The Thermodynamics of Gas Sorption in Glassy Polymeric Materials", presented at the 1990 International Congress on Membranes and Membrane Processes, Chicago, IL, August 20-24, 1990. (international)
2. G. G. Lipscomb, "Free Volume Approaches to the Prediction of Suspension Viscosity", presented at the AIChE 1990 National Meeting, Chicago, IL, November 11-16, 1990.
3. T. Banerjee and G. G. Lipscomb, "Thermodynamic Analysis of Mixed Gas Sorption in Glassy Polymers", GAS Separation International Conference, Austin, TX, April 22-24, 1991. (international)
4. T. Banerjee and G. G. Lipscomb, "Coupling Between Gas Sorption and Deformation in Glassy Polymers", Fourth National Meeting of the North American Membrane Society, San Diego, CA, May 29-31, 1991.
5. J. Reynolds and G. G. Lipscomb, "Influence of Shellside Flows on the Design of Hollow Fiber Membrane Devices", Fourth National Meeting of the North American Membrane Society, San Diego, CA, May 29-31, 1991.
6. M. K. Chhajer, T. Banerjee and G. G. Lipscomb, "Thermodynamic Analysis of Gas Permeation Through Glassy Polymeric Materials", ACS 1991 National Meeting, New York, NY, August 25-30, 1991.
7. M. K. Chhajer and G. G. Lipscomb, "Thermodynamic Analysis of Gas Permeation Through Glassy Polymeric Materials", AIChE 1991 National Meeting, Los Angeles, CA, November 17-22, 1991.
8. M. K. Akhtar, Y. Xiong, S. E. Pratsinis and G. G. Lipscomb, "Simulation of Irregular Particle Dynamics by Population Balance and Monte Carlo Techniques", MRS 1992 Spring National Meeting, San Francisco, CA, April 27-May 1, 1992.
9. M. K. Chhajer and G. G. Lipscomb, "Analysis of Gas Transport in Elastic Solids", Fifth National Meeting of the North American Membrane Society, Lexington, KY, May 17-20, 1992.
10. K. Yasuda and G. G. Lipscomb, "Stability and Sensitivity of the Hollow Fiber Melt Spinning Process", Fifth National Meeting of the North American Membrane Society, Lexington, KY, May 17-20, 1992.
11. G. Xomeritakis and G. G. Lipscomb, "Analysis of Transport Through Composite Membranes", Fifth National Meeting of the North American Membrane Society, Lexington, KY, May 17-20, 1992.
12. M. K. Chhajer and G. G. Lipscomb, "Analysis of Mixed Gas Transport in Elastic Solids", 24th Central Regional Meeting of the American Chemical Society, Cincinnati, OH, May 26-29, 1992. (regional)
13. R. J. Spontak, S. D. Smith, J. M. Zielinski, and G. G. Lipscomb, "Thermodynamic Ramifications of Looping in $(AB)_n$ Multiblock Copolymers", 24th Central Regional Meeting of the American Chemical Society, Cincinnati, OH, May 26-29, 1992. (regional)
14. M. K. Chhajer and G. G. Lipscomb, "Analysis of Mixed Gas Transport in Elastic Solids", AIChE 1992 National Meeting, Miami Beach, FL, November 1-6, 1992.
15. G. G. Lipscomb and K. Yasuda, "Stability and Sensitivity of the Hollow Fiber Membrane Spinning Process", AIChE 1992 National Meeting, Miami Beach, FL, November 1-6, 1992.

16. M. K. Akhtar, G. G. Lipscomb, Y. Xiong and S. E. Pratsinis, "Monte Carlo Simulation of Aggregate Particle Formation by Coagulation and Sintering", AIChE 1992 National Meeting, Miami Beach, FL, November 1-6, 1992.
17. J. M. Zielinski, R. J. Spontak, S. D. Smith, A. Ashcroft and G. G. Lipscomb, "The Effect of Looping on the Microstructure in Microphase-Separated (AB)_n Multiblock Copolymers", AIChE 1992 National Meeting, Miami Beach, FL, November 1-6, 1992.
18. J. Lemanski and G. G. Lipscomb, "A Model for the Evaluation of Hollow-Fiber Membrane Device Performance", 6th American Filtration Society Annual Meeting and Exposition, May 5, 1993.
19. J. Lemanski and G. Glenn Lipscomb, "The Influence of Shellside Flows on Large Scale Hollow Fiber", AIChE 1993 National Meeting, St. Louis, MO, November 7-12, 1993.
20. J. Reid, G. G. Lipscomb, and Steven Boyce, "Development of a Novel Collagen Support for Use as an Artificial Skin Support", AIChE 1993 National Meeting, St. Louis, MO, November 7-12, 1993.
21. G. G. Lipscomb, "Is the 3.4 Power Viscosity-Molecular Weight Scaling Relationship Consistent with Reptation Theory?", AIChE 1993 National Meeting, St. Louis, MO, November 7-12, 1993.
22. J. H. Laurer, R. J. Spontak, S. D. Smith, A. Ashraf, D. Buoni, and G. G. Lipscomb, "Microstructural Development and Orientability in A(A/B)B Block Copolymers", ACS 1994 Spring National Meeting, San Diego, CA, March 13-18, 1994.
23. J. Reid, G. G. Lipscomb, and S. Boyce, "Development of a Novel Collagen Membrane for Use as an Artificial Skin Support", MRS 1994 Spring National Meeting, April 4-8, 1994.
24. T. Banerjee and G. G. Lipscomb, "The Effect of High Pressure CO₂ Conditioning on the Heat of CO₂ Sorption in Polycarbonate", MRS 1994 Spring National Meeting, April 4-8, 1994.
25. T. Banerjee and G. G. Lipscomb, "Measurement of the Heat of CO₂ Sorption in Polycarbonate and PDMS", AIChE 1994 Spring National Meeting, Atlanta, GA, April 17-21, 1994.
26. J. Lemanski and G. G. Lipscomb, "The Influence of Shellside Flows on Large Scale Hollow Fiber Gas Separation Module Performance", AIChE 1994 Spring National Meeting, Atlanta, GA, April 17-21, 1994.
27. J. Lemanski and G. G. Lipscomb, "Shell-side Mass Transfer Coefficients for Irregular Fiber Packings", Sixth National Meeting of the North American Membrane Society, Breckenridge CO, May 23-25, 1994.
28. T. Banerjee and G. G. Lipscomb, "Direct Measurement of the Heat of CO₂ Sorption in Polycarbonate and PDMS", Sixth National Meeting of the North American Membrane Society, Breckenridge CO, May 23-25, 1994.
29. D. Buoni and G. G. Lipscomb, "Effect of Block Copolymer Composition on the Rheological Properties of Ternary Blends with the Corresponding Homopolymers", AIChE 1994 National Meeting, San Francisco, CA, November 14-18, 1994.
30. T. Banerjee and G. G. Lipscomb, "A Novel Calorimetric Method for the Measurement of Gas Diffusion Coefficients in Glassy Polymeric Materials", AIChE 1994 National Meeting, San Francisco, CA, November 14-18, 1994.

31. T. Banerjee and G. G. Lipscomb, "Use of High Pressure Calorimetry to Characterize Carbon Dioxide Plasticization of Polycarbonate", Seventh National Meeting of the North American Membrane Society, Portland, OR, May 22-24, 1995.
32. J. Lemanski and G. G. Lipscomb, "How Shell Side Flows Influence the Performance & Design of Gas Separation Modules", Seventh National Meeting of the North American Membrane Society, Portland, OR, May 22-24, 1995.
33. G. G. Lipscomb, "Design of Hollow Fiber Gas Separation Modules: Academic/Industrial Perspectives", 1995 Thirteenth Annual Membrane Technology/Planning Conference, Newton, MA, October 23-25, 1995.
34. T. Banerjee and G. G. Lipscomb, "Probing Carbon Dioxide Induced Changes in Glassy Polycarbonate by High Pressure Calorimetry", AIChE 1995 National Meeting, Miami Beach, FL, November 12-17, 1995.
35. G. G. Lipscomb, "Novel Internally Staged Hollow Fiber Module Designs", AIChE 1995 National Meeting, Miami Beach, FL, November 12-17, 1995.
36. R. Lyons and G. G. Lipscomb, "Rheological Studies of Thermal and Mechanical Degradation of Microbial Polyesters", AIChE 1995 National Meeting, Miami Beach, FL, November 12-17, 1995.
37. T. Banerjee and G. G. Lipscomb, "Calorimetric Probes of Carbon Dioxide Sorption in Substituted Polycarbonates", AIChE 1996 Spring National Meeting, New Orleans, LA, February 25-29, 1996.
38. X. Wu and G. G. Lipscomb, "Effects of Fiber Size and Transport Property Variation on Gas Separation Module Performance", Eighth Annual Meeting of the North American Membrane Society, Ottawa ON, May 18-22, 1996. (international)
39. X. Wu and G. G. Lipscomb, "Comparison of Internally Staged Gas Separation Modules", Eighth Annual Meeting of the North American Membrane Society, Ottawa ON, May 18-22, 1996. (international)
40. B. Ashman and G. G. Lipscomb, "Stability of Melt Hollow Fiber Spinning", AIChE 1996 National Meeting, Chicago, IL, November 10-15, 1996.
41. P. Spicer, R. Lyons, S. Pratsinis, and G. G. Lipscomb, "Visualization of Shear-Induced Flocculation Dynamics", AIChE 1996 National Meeting, Chicago, IL, November 10-15, 1996.
42. B. Ashman and G. G. Lipscomb, "Stability of the Melt Hollow Fiber Spinning Process", Ninth Annual Meeting of the North American Membrane Society, Baltimore, MD, May 31-June 4, 1997.
43. A. Varma and G. G. Lipscomb, "Evaluating the Effect of Dialysate Flow on Artificial Kidney Performance", Ninth Annual Meeting of the North American Membrane Society, Baltimore, MD, May 31-June 4, 1997.
44. G. G. Lipscomb, "Studies of Gas-Polymer Interactions by High Pressure Microcalorimetry", 1997 Fifteenth Annual Membrane Technology/Planning Conference, Newton, MA, October 27-29, 1997.
45. A. Varma and G. G. Lipscomb, "Theoretical and Experimental Studies of the Influence of Dialysate Flow on Artificial Kidney Performance", AIChE 1997 National Meeting, Los Angeles, CA, November 17-21, 1997.

46. B. Liu, L. Bao, and G. G. Lipscomb, "The Effect of Fiber Packing on Mass Transfer Coefficients in Hollow Fiber Membrane Modules", Tenth Annual Meeting of the North American Membrane Society, Cleveland, OH, May 16-20, 1998.
47. A. Varma, A. Frank, M. Dennis, and G. G. Lipscomb, "The Effect of Entrapped Air Bubbles in the Shell on Artificial Kidney Performance", Tenth Annual Meeting of the North American Membrane Society, Cleveland, OH, May 16-20, 1998.
48. B. Liu, L. Bao, and G. G. Lipscomb, "The Effect of Fiber Packing on Flow and Mass Transfer in Fiber Bundles", AIChE 1998 National Meeting, Miami Beach, FL, November 16-20, 1998.
49. J. Lemanski and G. G. Lipscomb, "The Effect of Fiber Variability on Counter-Current Module Performance: Simulation and Experiment", 1999 International Congress on Membranes and Membrane Process, Toronto, ON, June 12-18, 1999. (international)
50. B. Liu and G. G. Lipscomb, "Optimization of Internally Staged Hollow Fiber Permeators (ISP) for Gas Separations", 1999 International Congress on Membranes and Membrane Processes, Toronto, ON, June 12-18, 1999. (international)
51. A. Frank, G. G. Lipscomb, and M. Dennis, "Visualization of Concentration Fields in Hollow Fiber Membrane Modules", 1999 International Congress on Membranes and Membrane Processes, Toronto, ON, June 12-18, 1999. (international)
52. J. Lemanski and G. G. Lipscomb, "The Effect of Fiber Variability on Counter-Current Module Performance: Simulation and Experiment", AIChE 1999 National Meeting, Dallas, TX, October 31-November 5, 1999.
53. A. Frank, G. G. Lipscomb, and M. Dennis, "Visualization of Bubble Formation During the Wet-out of an Artificial Kidney and Its Effect on Performance", AIChE 1999 National Meeting, Dallas, TX, October 31-November 5, 1999.
54. J. Lemanski and G. G. Lipscomb, "Effect of Shell Flow Distribution on the Performance of Shell Feed Gas Separation Modules", AIChE 2000 Spring Meeting, Atlanta, GA, March 5-9 2000.
55. B. Liu and G. G. Lipscomb, "Experimental and Theoretical Comparison of Optimal Internally Staged Permeator and External Two-Stage Module Designs", AIChE 2000 Spring Meeting, Atlanta, GA, March 5-9 2000.
56. A. Frank, G. G. Lipscomb, and M. Dennis, "The Effect of Wet-out and Entrapped Air Pockets on Hemodialyzer Performance", Eleventh Annual Meeting of the North American Membrane Society, Boulder, CO, May 23-27, 2000.
57. J. Lemanski and G. G. Lipscomb, "Experimental and Theoretical Studies of the Effect of Shell Flow Distribution on Shell-Fed Gas Separation Module Performance", Eleventh Annual Meeting of the North American Membrane Society, Boulder, CO, May 23-27, 2000.
58. G. G. Lipscomb, "Are Hemodialyzers Designed for Optimal Performance?", Gordon Research Conference on Membranes: Materials and Processes, New London, CT, July 29 – August 3, 2000.
59. B. Liu, G. G. Lipscomb, and J. Jensvold, "The Effect of Staging on the Performance of Modules with Fiber Property Variations", Twelfth Annual Meeting of the North American Membrane Society, Lexington, KY, May 16-20, 2001.

60. L. Bao and G. G. Lipscomb, "The Effect of Mass Transfer in Non-uniform Fiber Bundles on Hemodialyzer Performance", Twelfth Annual Meeting of the North American Membrane Society, Lexington, KY, May 16-20, 2001.
61. G. G. Lipscomb and W. C. Vance, "A Compendium of Membrane Problems in the Curriculum", AIChE 2001 National Meeting, Reno, NV, November 4-9, 2001.
62. L. Bao and G. G. Lipscomb, "Effect of Random Fiber Packing on the Performance of Shell-fed Hollow Fiber Gas Separation Modules", Thirteenth Annual Meeting of the North American Membrane Society, Long Beach, CA, May 11-15, 2002.
63. J. Jones, G. G. Lipscomb, and M. Dennis, "Visualization of the Effects of Ultrafiltration on Concentration Fields in Hemodialyzers", Thirteenth Annual Meeting of the North American Membrane Society, Long Beach, CA, May 11-15, 2002.
64. L. Bao and G. G. Lipscomb, "Effect of Random Fiber Packing on the Performance of Shell-fed Hollow Fiber Gas Separation Modules", 2002 International Congress on Membranes and Membrane Processes, Toulouse, France, July 7-12, 2002. (international)
65. G. G. Lipscomb, "Why don't hollow fiber membrane gas separation modules perform as well as they should?", Gordon Research Conference on Membranes: Materials and Processes, New London, NH, August 4-9, 2002.
66. L. Bao and G. G. Lipscomb, "Effect of Random Fiber Packing on the Performance of Shell-fed Hollow Fiber Gas Separation Modules", AIChE 2002 National Meeting, Indianapolis, IN, November 3-8, 2002.
67. G. G. Lipscomb, N. Pinto, and J. Dolgoff, "Internet-based Unit Operation Laboratories", AIChE 2002 National Meeting, Indianapolis, IN, November 3-8, 2002.
68. M. Bordawekar, G. G. Lipscomb, and I. C. Escobar, "Use of a Temperature Sensitive Polymer Brush to Reduce Fouling", Fourteenth Annual Meeting of the North American Membrane Society, Jackson Hole, WY, May 17-21, 2003.
69. J. Dolgoff, G. G. Lipscomb, K. Pugh, S. Beltyukova, and N. Pinto, "Experiments in Membrane Separation Processes Delivered Through the Internet", ASEE 2003 Annual Conference, Nashville, TN, June 22-25, 2003.
70. H. Balasubramanian, G. G. Lipscomb, D. R. Lloyd, "Modeling Radial and Axial Temperature and Concentration Profiles in Hollow Fiber Membrane Spinning", AIChE 2003 National Meeting, San Francisco, CA, November 16-21, 2003.
71. J. Dolgoff, B. Xu, N. Pinto, G. G. Lipscomb, K. Pugh, and S. Beltyukova, "Internet-based Unit Operation Laboratories in Membrane Separation Processes", AIChE 2003 National Meeting, San Francisco, CA, November 16-21, 2003.
72. J. Jones, G. G. Lipscomb, and M. Dennis, "Visualization of the Effects of Ultrafiltration and Fiber Crimping on Concentration Fields in Hemodialyzers", AIChE 2003 National Meeting, San Francisco, CA, November 16-21, 2003.
73. M. Bordawekar, G. Lipscomb, and I. Escobar, "Use of a Temperature Sensitive Polymer Brush to Reduce Fouling", Engineering Conferences International Advanced Membrane Technology II Conference, Irsee, Germany, May 23-28, 2004. (international)
74. J. Dolgoff, G. Lipscomb, K. Pugh, S. Beltyukova, and N. Pinto, "Internet-delivered Experiments in Membrane Separation Processes", Fifteenth Annual Meeting of the North American Membrane Society, Honolulu, HI, June 26-30, 2004.

75. S. Sonalkar and G. G. Lipscomb, "Staged Module Configurations without Inter-Stage Compression for Production of a High Purity Permeate", Gordon Research Conference on Membranes: Materials and Processes, New London, NH, August 1-6, 2004.
76. Y. Su and G. G. Lipscomb, "Transport in Hollow Fiber Spinning", Gordon Research Conference on Membranes: Materials and Processes, New London, NH, August 1-6, 2004.
77. G. Lipscomb, M. Coleman, and I. Escobar, "Membrane Research Activity at the University of Toledo", AIChE 2004 National Meeting, Austin, TX, November 7-12, 2004.
78. J. Dolgoff, G. Lipscomb, K. Pugh, S. Beltyukova, and N. Pinto, "Evaluating the Effectiveness of Internet-Delivered Experiments", AIChE 2004 National Meeting, Austin, TX, November 7-12, 2004.
79. C. Ciocanel, G. Lipscomb, and N. Naganathan, "Constitutive Equations for Magnetorheological Fluid Characterization", Proceedings of SPIE International Symposia, Smart Structures & Materials/NDE, Paper 5761-83, San Diego, CA, March 7-10, 2005.
80. Y. Su, H. Balasubramanian, G. Lipscomb, D. Lloyd, "Theoretical Observations of Recirculation Regions in the Bore Fluid during Hollow Fiber Spinning", Sixteenth Annual Meeting of the North American Membrane Society, Providence, RI, June 11-15, 2005.
81. S. Sonalkar and G. Lipscomb, "The Effect of Fiber Variability on Permeate Purification using Hollow Fiber Membrane Gas Separation Modules", Sixteenth Annual Meeting of the North American Membrane Society, Providence, RI, June 11-15, 2005.
82. G. Lipscomb and J. Jensvold, "Studies of Hollow Fiber Membrane Modules - A Collaborative Project between The University of Toledo and Generon IGS, Inc.", Sixteenth Annual Meeting of the North American Membrane Society, Providence, RI, June 11-15, 2005.
83. G. Lipscomb, M. Coleman, and I. Escobar, "Membrane Research Activity at the University of Toledo", Sixteenth Annual Meeting of the North American Membrane Society, Providence, RI, June 11-15, 2005.
84. Y. Su, G. G. Lipscomb, H. Balasubramanian, and D. R. Lloyd, "Observations of Recirculation Regions in the Bore Fluid during Hollow Fiber Spinning", China/USA/Japan Joint Chemical Engineering Conference, Beijing, China, October 11-13, 2005. (international)
85. C. Ciocanel, G. Lipscomb, and N. Naganathan, "Evaluation of a Constitutive Equation for Magnetorheological Fluids in Shear and Elongational Flows", 2005 ASME International Mechanical Engineering Congress & Exposition, Paper 79974, Orlando, FL, November 5-11, 2005.
86. Y. Su, H. Balasubramanian, G. Lipscomb, and D. Lloyd, "Theoretical Observations of Recirculation Regions in the Bore Fluid during Hollow Fiber Spinning", AIChE 2005 Annual Meeting, Cincinnati, OH, October 30-November 4, 2005.
87. S. A. Sonalkar and G. Lipscomb, "Theoretical and Experimental Analyses of Fiber Property Variation in Hollow Fiber Membrane Module for Permeate Purification of Oxygen from Air", AIChE 2005 Annual Meeting, Cincinnati, OH, October 30-November 4, 2005.
88. G. G. Lipscomb, "Design of Hollow Fiber Membrane Modules", AIChE 2005 Annual Meeting, Cincinnati, OH, October 30-November 4, 2005.
89. J. Dolgoff, B. Xu, G. G. Lipscomb, K. Pugh, S. Beltyukova, and N. G. Pinto, "Membrane Gas Separation through the Internet", AIChE 2005 Annual Meeting, Cincinnati, OH, October 30-November 4, 2005.

90. E. Vogel, G. Lipscomb, and M. Coleman, "Novel Carbon Fiber Composite Materials for Gas Separations", ACS 233rd National Meeting & Exposition, Chicago, IL, March 25-29, 2007.
91. E. Vogel, G. Lipscomb, and M. Coleman, "Novel Carbon Fiber Composite Materials for Gas Separations", MRS Spring Meeting, San Francisco, CA, April 9-13, 2007.
92. Y. Su, H. Balasubramanian, D. Lloyd, and G. Lipscomb, "Simulation of the Hollow Fiber Spinning Process", Eighteenth Annual Meeting of the North American Membrane Society, Orlando, FL, May 12-16, 2007.
93. S. Chattopadhyay, G. Brunson, D. Patel, G.G. Lipscomb, "Design and Numerical Modeling of a Novel Reformer for Continuous Hydrogen Production from Logistic Fuels", ACS 234th National Meeting, Boston, MA, August 19-23, 2007.
94. G. G. Lipscomb, "The Pursuit of Energy Sustainability with Membrane Technology", 15th Symposium on Separation Science and Technology for Energy Applications, Gatlinburg, TN, October 22-25, 2007.
95. S. Sonalkar and G. Lipscomb, "Staged Membrane Systems for Hydrogen Recovery from H₂/CO₂ Mixtures", AIChE 2007 Annual Meeting, Salt Lake City, UT, November 4-9, 2007.
96. P. Gawade, D. Patel, S. Goud, M. Abraham, and G. Lipscomb, "Steam Reforming and Combustion Kinetics of N-Hexadecane for Modeling and Simulation of a Novel Catalytic Reformer", AIChE 2007 Annual Meeting, Salt Lake City, UT, November 4-9, 2007.
97. D. Patel, P. Gawade, S. Goud, M. Abraham, and G. Lipscomb, "Transient Steam Reforming and Combustion Simulation of a Novel Catalytic Reformer", AIChE 2007 Annual Meeting, Salt Lake City, UT, November 4-9, 2007.
98. G. G. Lipscomb, "Membrane Technology in Energy Sustainability", The Third China-USA Workshop, Tianjin, China, February 25-27, 2008. (international)
99. M. Bordawekar, G. G. Lipscomb, and I. Escobar, "Thermally Responsive Filtration Membranes with Increased Fouling Resistance", Engineering with Membranes 2008, Algarve, Portugal, May 25-28, 2008.
100. P. Hao and G. G. Lipscomb, "The Effect of Sweep Uniformity on Gas Dehydration Modules", International Congress on Membranes and Membrane Processes (ICOM 2008), Honolulu, HI, July 12-18, 2008. (international)
101. G. G. Lipscomb, "Membrane Separations", 236th ACS National Meeting, Philadelphia, PA, August 17-21, 2008.
102. Y. Su, H. Balasubramanian, G. Lipscomb, and D. Lloyd, "Asymmetric Membrane Formation by Hollow Fiber Spinning - Theory and Experiment", AIChE 2008 Annual Meeting, Philadelphia, PA, November 16-21, 2008.
103. P. Hao and G. G. Lipscomb, "The Effect of Sweep Uniformity on Gas Dehydration Modules", AIChE 2008 Annual Meeting, Philadelphia, PA, November 16-21, 2008.
104. G. G. Lipscomb, "Membrane Module Design", AIChE 2008 Annual Meeting, Philadelphia, PA, November 16-21, 2008.
105. G. G. Lipscomb, "Visualizing Flows in Hollow Fiber Modules", Nineteenth Annual Meeting of the North American Membrane Society, Charleston, SC, June 20-24, 2009.
106. P. Hao and G. G. Lipscomb, "Applicability of the Hagen-Poiseuille Law for Pressure Drop Calculations in Hollow Fiber Gas Separation Modules", Nineteenth Annual Meeting of the North American Membrane Society, Charleston, SC, June 20-24, 2009.

107. G. G. Lipscomb, "Solubility Selectivity and the Upper Bound", 238th ACS National Meeting, Washington, DC, August 16-20, 2009.
108. G. G. Lipscomb, "Mass Transfer in Crimped Hollow Fiber Membrane Modules", 5th Sino-US Chemical Engineering Conference, Beijing, China, October 13-16, 2009. (international)
109. G. G. Lipscomb, "Transport in Hollow Fiber Membrane Modules", 5th Sino-US Chemical Engineering Conference, Beijing, China, October 13-16, 2009. (international)
110. G. G. Lipscomb, "Mass Transfer in Crimped Hollow Fiber Membrane Modules", AIChE 2009 Annual Meeting, Nashville, TN, November 8-13, 2009.
111. R. Patil, G. G. Lipscomb, and F. F. Stewart, "Removal of Acetic Acid From Hydrolysate Using a Membrane Extractor/Reactor", AIChE 2009 Annual Meeting, Nashville, TN, November 8-13, 2009.
112. P. Hao and G. G. Lipscomb, "Coupling of Lumen and Shell Mass Transfer Coefficients in Hollow Fiber Membrane Modules", Twentieth Annual Meeting of the North American Membrane Society, Washington, DC, July 17-22, 2010.
113. S. Nanduri and G. G. Lipscomb, "Mass Transfer in Crimped Hollow Fiber Membrane Modules", Twentieth Annual Meeting of the North American Membrane Society, Washington, DC, July 17-22, 2010.
114. R. Patil and G. G. Lipscomb, "Reverse Electrodialysis for Energy Production from Mixing Fresh and Sea Water", Twentieth Annual Meeting of the North American Membrane Society, Washington, DC, July 17-22, 2010.
115. X. Du and G. G. Lipscomb, "Pervaporative Drying of Ionic Liquid Solutions", Twentieth Annual Meeting of the North American Membrane Society, Washington, DC, July 17-22, 2010.
116. G. G. Lipscomb, "Hollow fiber membrane spinning", 240th ACS National Meeting, Boston, MA, August 22-26, 2010.
117. X. Du and G. G. Lipscomb, "Ionic Liquid Recovery and Reuse in Ligno-Cellulosic Biomass Pretreatment Processes", AIChE 2010 Annual Meeting, Salt Lake City, UT, November 7-12, 2010.
118. P. Karthikeyan, H. C. Li, S. Jeffrey, and G. G. Lipscomb, "Experimental Investigation of the Impact of Water Accumulation On Performance of PEMFCs with Porous and Non-Porous Flow Channels", AIChE 2010 Annual Meeting, Salt Lake City, UT, November 7-12, 2010.
119. P. Hao and G. G. Lipscomb, "Coupling Between Lumen, Shell, and Membrane Mass Transfer Resistances", AIChE 2010 Annual Meeting, Salt Lake City, UT, November 7-12, 2010.
120. G. G. Lipscomb, "Solubility Selectivity and the Upper Bound", AIChE 2010 Annual Meeting, Salt Lake City, UT, November 7-12, 2010.
121. Y. Lou, M. Coleman, and G. G. Lipscomb, "Permeability upper bound predictions from transition state theory using the nonequilibrium lattice fluid model", 241st ACS National Meeting, Anaheim, CA, March 27-31, 2011.
122. A. Iranshahi and G. G. Lipscomb, "Static mixing spacer for spiral wound module", Twenty first Annual Meeting of the North American Membrane Society, Las Vegas, NV, June 4-8, 2011.

123. Y. Lou, M. Coleman, and G. G. Lipscomb, "Permeability upper bound predictions from transition state theory using the non-equilibrium lattice fluid model", Twenty first Annual Meeting of the North American Membrane Society, Las Vegas, NV, June 4-8, 2011.
124. R. Patil and G. G. Lipscomb, "Parametric sensitivity of reverse electrodialysis for energy production using difference in salinity", Twenty first Annual Meeting of the North American Membrane Society, Las Vegas, NV, June 4-8, 2011.
125. X. Du and G. G. Lipscomb, "Membrane drying of ionic liquid solutions", Twenty first Annual Meeting of the North American Membrane Society, Las Vegas, NV, June 4-8, 2011.
126. P. Hao and G. G. Lipscomb, "Coupling between lumen, shell, and membrane mass transfer resistances", Twenty first Annual Meeting of the North American Membrane Society, Las Vegas, NV, June 4-8, 2011.
127. A. Iranshahi and G. G. Lipscomb, "Static mixing spacers for spiral wound modules", International Congress on Membranes and Membrane Processes (ICOM 2011), Amsterdam, Netherlands, July 25-29, 2011. (international)
128. Y. Lou, M. Coleman, and G. G. Lipscomb, "Permeability upper bound predictions from transition state theory using the NELF model", International Congress on Membranes and Membrane Processes (ICOM 2011), Amsterdam, Netherlands, July 25-29, 2011. (international)
129. G. G. Lipscomb, "Hollow fiber spinning", Regional Symposium and Workshop on Membrane Science and Technology 2011, Singapore, August 24-26, 2011. (international)
130. G. G. Lipscomb, "Membrane Separation Process Design", AIChE 2011 Annual Meeting, Minneapolis, MN, October 16-21, 2011.
131. R. Patil, G. Lipscomb, and F. F. Stewart, "Acetic Acid Removal From the Hydrolysate Using Reactive Extraction In a Membrane Extractor/Reactor", AIChE 2011 Annual Meeting, Minneapolis, MN, October 16-21, 2011.
132. A. Iranshahi and G. Lipscomb, "Static Mixing Spacers for Spiral Wound Modules", AIChE 2011 Annual Meeting, Minneapolis, MN, October 16-21, 2011.
133. R. Patil and G. Lipscomb, "Parametric Sensitivity of Reverse Electrodialysis for Electricity Production Using Salinity Gradient", AIChE 2011 Annual Meeting, Minneapolis, MN, October 16-21, 2011.
134. A. Iranshahi and G. Lipscomb, "Static Mixing Spacers for Spiral Wound Modules", 6th Sino-US Joint Conference of Chemical Engineering, Beijing, China, November 7-10, 2011. (international)
135. A. Iranshahi and G. Lipscomb, "Static Mixing Spacers for Spiral Wound Modules", Water Treatment/Reuse III and the Water-Energy Nexus ECI Conference, Cancun, Mexico, January 8-12, 2012. (international)
136. J. Liu, A. Iranshahi, and G. Lipscomb, "Static Mixing Spacers for Spiral Wound Modules", Twenty second Annual Meeting of the North American Membrane Society, New Orleans, LA, June 9-13, 2012.
137. Y. Lou, M. Coleman, and G. Lipscomb, "Temperature Dependence of the Permeability Upper Bound Predicted from Transition State Theory and Non-equilibrium Lattice Fluid Theory", Twenty second Annual Meeting of the North American Membrane Society, New Orleans, LA, June 9-13, 2012.

138. R. Patil, J. Liu, and G. Lipscomb, "Reverse Electrodialysis for Sustainable Electricity Production by Coupling Thermal and Salinity Gradients", Twenty second Annual Meeting of the North American Membrane Society, New Orleans, LA, June 9-13, 2012.
139. X. Du and G. Lipscomb, "Membrane Drying of Ionic Liquids", Twenty second Annual Meeting of the North American Membrane Society, New Orleans, LA, June 9-13, 2012.
140. R. Patil and G. Lipscomb, "Hybrid Water Treatment Processes Utilizing Forward/Reverse Pressure Driven Processes and Reverse Electro-Dialysis", AIChE 2012 Annual Meeting, Pittsburgh, PA, October 28-November 2, 2012.
141. G. Lipscomb, "ABET Preparation and Visit at the University of Toledo", AIChE 2012 Annual Meeting, Pittsburgh, PA, October 28-November 2, 2012.
142. H. Yin, N. Peng, K. L. Chong, G. Lipscomb, and T. S. Chung, "The Design and Modeling of a Controlled Atmosphere Food Storage System Based On Membrane Technology", AIChE 2012 Annual Meeting, Pittsburgh, PA, October 28-November 2, 2012.
143. Y. Lou and G. G. Lipscomb, "CFD Simulation of Net Spacers in Membrane Modules for Carbon Dioxide Capture", Twenty third Annual Meeting of the North American Membrane Society, Boise, ID, June 8-12, 2013.
144. G. Lipscomb, "Reverse Electrodialysis for Renewable Energy Production", 7th International Conference on Materials for Advanced Technologies, Singapore, June 30-July 5, 2013. (international)
145. J. Liu, A. Iranshahi, and G. G. Lipscomb, "Static mixing spacers for spiral wound modules", 7th Sino-US Joint Conference of Chemical Engineering, Beijing, China, October 14-18, 2013. (international)
146. Y. Lou, M. Coleman, and G. Lipscomb, "Permeability upper bound predictions from transition state theory using the NELF model", 7th Sino-US Joint Conference of Chemical Engineering, Beijing, China, October 14-18, 2013. (international)
147. G. Lipscomb and R. Patil, "Membrane Processes for Conversion of Solar Energy to Electricity", AIChE 2013 Annual Meeting, San Francisco, CA, November 3-8, 2013.
148. G. Lipscomb and Y. Lou, "Simulation of Flow Through Spacers Used in Membrane Modules for Carbon Dioxide Capture", AIChE 2013 Annual Meeting, San Francisco, CA, November 3-8, 2013.
149. Y. Lou and G. Lipscomb, "Design of Net Spacers for Flat Sheet Membrane Modules for Carbon Dioxide Capture", Twenty fourth Annual Meeting of the North American Membrane Society, Houston, TX, May 31-June 4, 2014.
150. R. Kumar and G. Lipscomb, "Flow Visualization of Novel Static Mixing Spacers for Spiral Wound Modules", Twenty fourth Annual Meeting of the North American Membrane Society, Houston, TX, May 31-June 4, 2014.
151. Y. Lou, R. Gogar, and G. Lipscomb, "Design of low pressure drop spacers for flat sheet membrane gas separation modules", International Congress on Membranes and Membrane Processes (ICOM 2014), Suzhou, China, July 20-25, 2014. (international)
152. G. Lipscomb, "Membrane Science and Engineering at The University of Toledo", AIChE 2014 Annual Meeting, Atlanta, GA, November 16-21, 2014.
153. Y. Lou, R. Gogar, and G. Lipscomb, "Design of low pressure drop spacers for flat sheet membrane gas separation modules", AIChE 2014 Annual Meeting, Atlanta, GA, November 16-21, 2014.

154. G. Lipscomb, "Reverse electrodialysis in energy sustainability applications", Engineering Conferences International Advanced Membrane Technology VI: Water, Energy, and New Frontiers, Sicily, Italy, February 8-13, 2015. (international)
155. G. Vaseghi and G. Lipscomb, "Developing New Multilayer Polyelectrolyte Charge Mosaic Membranes", Twenty fifth Annual Meeting of the North American Membrane Society, Boston, MA, May 30-June 3, 2015.
156. N. Che Mat, G. Lipscomb and D. Willson, "Novel Staged Configurations for CO₂ Capture", Twenty fifth Annual Meeting of the North American Membrane Society, Boston, MA, May 30-June 3, 2015.
157. R. Gogar, Y. Lou, G. Lipscomb, "Particle Image Velocimetry of Flows in Spacer Filled Channels", 8th International Conference on Materials for Advanced Technologies, Singapore, June 28-July 3, 2015. (international)
158. G. Lipscomb, "Opportunities and challenges for membrane technology in designing sustainable separation processes", 19th Annual Green Chemistry and Engineering Conference, North Bethesda, MD, July 14-16, 2015.
159. N. Che Mat and G. Lipscomb, "Optimization of staged configurations for membrane-based CO₂ capture", 8th Sino-US Joint Conference of Chemical Engineering, Shanghai, China, October 12-16, 2015. (international)
160. G. Lipscomb, "The evolving role of assessment in chemical engineering education", 8th Sino-US Joint Conference of Chemical Engineering, Shanghai, China, October 12-16, 2015. (international)
161. N. Che Mat and G. Lipscomb, "Staged Membrane Configurations for CO₂ Capture", AIChE 2015 Annual Meeting, Salt Lake City, UT, November 8-13, 2015.
162. R. Gogar, Y. Lou, and G. Lipscomb, "Validation of Flow Simulations in Spacer Filled Channels with Particle Image Velocimetry", AIChE 2015 Annual Meeting, Salt Lake City, UT, November 8-13, 2015.
163. G. Vaseghi and G. Lipscomb, "Developing new multilayer polyelectrolyte charge mosaic membranes", Pacifichem 2015, Honolulu, HI, December 15-20, 2015.
164. G. Lipscomb and M. Mason, "Greening the curriculum through the School of Green Chemistry and Engineering at the University of Toledo", Pacifichem 2015, Honolulu, HI, December 15-20, 2015.
165. N. Che Mat and G. Lipscomb, "Membrane Process Optimization for Carbon Capture", Twenty sixth Annual Meeting of the North American Membrane Society, Bellevue, WA, May 21-25, 2016.
166. G. Lipscomb, "Achieving Energy Sustainability with Membrane Processes", European Membrane Society Summer School, Bertinoro, Italy, June 26-July 1, 2016.
167. G. Lipscomb, "Separations Opportunities and Challenges", ARPA-E Rewiring Anaerobic Digestion Workshop, Arlington, VA, October 27-28, 2016.
168. G. Lipscomb, "Membrane Process for Carbon Dioxide Capture", New Materials Horizon for Energy-Intensive Industrial Separations, Thuwal, Saudi Arabia, February 20-23, 2017.
169. G. Lipscomb and R. Giraud, "Sustainable Separations: Practice and Prospects", 21st Annual Green Chemistry and Engineering Conference, Reston, VA, June 13-15, 2017.
170. G.G. Lipscomb, "Mass transfer in hollow fiber membrane modules", International Congress on Membranes and Membrane Processes (ICOM 2017), San Francisco, CA, July 29-August 4, 2017.

171. G. Vaseghi and G. Lipscomb “Novel charge mosaic membranes and operational modes”, International Congress on Membranes and Membrane Processes (ICOM 2017), San Francisco, CA, July 29-August 4, 2017.
172. N. Jagani and G.G. Lipscomb, “Evaluating home point-of-use reverse osmosis membrane systems for cyanotoxin removal”, International Congress on Membranes and Membrane Processes (ICOM 2017), San Francisco, CA, July 29-August 4, 2017.
173. M. Younas, A. Muhammad, and G. Lipscomb, “Hollow fiber membrane contactor design for post-combustion capture of CO₂/N₂ through sweep gas”, (ICOM 2017), San Francisco, CA, July 29-August 4, 2017.
174. N. Jagani, X. Johnson, G. Lipscomb, O. Choi, and Y. Seo, “Removal of toxins with home drinking water filters”, Understanding Algal Blooms: State of the Science Conference, September 14, 2017.

University Seminars

1. G. G. Lipscomb, “Analysis of Mixed Gas Sorption in Glassy Polymers”, University of Kentucky Center of Membrane Sciences Colloquium, Lexington, KY, April 2, 1991.
2. G. G. Lipscomb, “Analysis of Mixed Gas Transport in Elastic Solids”, Department of Chemical Engineering, University of Toledo, Toledo, OH, April 8, 1992.
3. G. G. Lipscomb, “Sensitivity and Stability of the Melt Hollow Fiber Spinning Process”, University of Missouri - Columbia, November 19, 1992.
4. G. G. Lipscomb, “Design of Large Scale, Hollow Fiber Membrane Separation Devices”, University of Idaho, Moscow, ID, April 1, 1994.
5. G. G. Lipscomb, “Design of Large Scale, Hollow Fiber Membrane Separation Devices”, University of Missouri at Rolla, Rolla, MO, October 12, 1994.
6. G. G. Lipscomb, “Calorimetric Studies of Gas-Polymer Systems”, Chemistry Department, University of Toledo, Toledo, OH, January 27, 1997.
7. G. G. Lipscomb, “Evaluating the Performance of Artificial Kidneys”, Bioengineering Department, University of Toledo, OH, February 28, 1997.
8. G. G. Lipscomb, “Theoretical and Experimental Studies of the Influence of Dialysate Flow on Artificial Kidney Performance”, Chemical Engineering Department, McGill University, Montreal, QC, November 3, 1997. (international)
9. G. G. Lipscomb, “Theoretical and Experimental Studies of the Influence of Dialysate Flow on Artificial Kidney Performance”, Chemical Engineering Department, Ohio University, Athens, OH, November 13, 1997.
10. G. G. Lipscomb, “Theoretical and Experimental Studies of the Influence of Dialysate Flow on Artificial Kidney Performance”, Chemical Engineering Department, Cleveland State University, Cleveland, OH, February 11, 1998.
11. G. G. Lipscomb, “Let’s Educate Martians: Creative Uses of Electrons to Enhance Education”, University of Toledo, April 1, 1998.
12. G. G. Lipscomb, “Design Factors that Influence the Performance of Hollow Fiber Membrane Modules: A Case Study of Artificial Kidney Performance”, University of Notre Dame, Notre Dame, IN, November 10, 1998.
13. G. G. Lipscomb, “Why Do Hollow Fiber Membrane Modules Perform More Poorly Than Expected?” University of Texas at Austin, Austin, TX, April 11, 2000.

14. G. G. Lipscomb, "Evaluating the Effect of Shell-side Flows on Hemodialyzer Performance", University of Kentucky, Lexington, KY, January 24, 2001.
15. G. G. Lipscomb, "Why Don't Hollow Fiber Gas Separation Modules Perform as Well as They Should?" Colorado State University, February 8, 2002.
16. G. G. Lipscomb, "Why Don't Hollow Fiber Gas Separation Modules Perform as Well as They Should?" University of Cincinnati, February 21, 2002.
17. G. G. Lipscomb, "Why Don't Hollow Fiber Gas Separation Modules Perform as Well as They Should?" University of Texas, Separation Research Program, April 16, 2002.
18. G. G. Lipscomb, "Visualization of Concentration and Flow in Hemodialyzers" Case Western Reserve University, November 21, 2002.
19. G. G. Lipscomb, "Membrane Filtration Processes to Achieve Energy Sustainability", Central Michigan University, Mount Pleasant, MI, February 20, 2008.
20. G. G. Lipscomb, "Membrane Module Design to Achieve Energy Sustainability", National University of Singapore, Singapore, March 4, 2008. (international)
21. G. G. Lipscomb, "Membrane Module Design", Ohio State University, Columbus, OH, February 12, 2009.
22. G. G. Lipscomb, "The Evolving Art of Membrane Module Design", New Jersey Institute of Technology, Membrane Technologies Symposium in Honor of Dr. Kamlesh Sirkar, October 7, 2009.
23. G. G. Lipscomb, "Solubility selectivity and the upper bound", Clarkson University, March 30, 2010.
24. G. G. Lipscomb, "Solubility selectivity and the upper bound", National University of Singapore, Singapore, June 25, 2010. (international)
25. G. G. Lipscomb, "Permeability upper bound predictions from transition state theory using the non-equilibrium lattice fluid model", National University of Singapore, Singapore, August 22, 2011. (international)
26. G. G. Lipscomb, "Static mixing spacers for spiral wound modules", National University of Singapore, Singapore, July 12, 2012. (international)
27. G. G. Lipscomb, "Reverse Electrodialysis for Renewable Energy Production", Arizona State University, March 4, 2013.
28. G. G. Lipscomb, "Reverse Electrodialysis for Renewable Energy Production", National University of Singapore, Singapore, June 26, 2013. (international)
29. G. G. Lipscomb, "Design of low pressure drop spacers for flat sheet membrane gas separation modules", National University of Singapore, Singapore, July 29, 2014. (international)
30. G. G. Lipscomb, "Rheology and Membranes", City College of New York, New York, NY, May 8, 2015.
31. G. G. Lipscomb, "Membrane research at the University of Toledo (USA): From materials to process design", University of Bologna, Bologna, Italy, May 29, 2015. (international)
32. G. G. Lipscomb, "Can membrane processes help achieve energy sustainability?", University of Bologna, Bologna, Italy, June 9, 2015. (international)
33. G. G. Lipscomb, "Flow Visualization in Spacer Filled Channels with Particle Image Velocimetry", Huazhong University, Wuhan, China, October 9, 2015. (international)
34. G. G. Lipscomb, "Achieving Energy Sustainability with Membrane Processes", Missouri University of Science and Technology, Rolla, MO, August 31, 2016.

Industrial Seminars

1. G. G. Lipscomb, "Thermodynamics of Gas Sorption in Glassy Polymeric Materials", Air Products and Chemicals Inc., Allentown, PA, July 30, 1991.
2. G. G. Lipscomb, "Analysis of Gas Sorption and Transport in Elastic Solids", The Dow Chemical Co., Midland, MI, October 4, 1991.
3. G. G. Lipscomb, "Factors that Influence the Design of Hollow Fiber Separation Modules", Bend Research Inc., August 23, 1993.
4. G. G. Lipscomb, "Evaluating the Effect of Dialysate Flow on Artificial Kidney Performance", Althin Medical, Inc., March 17, 1997.
5. G. G. Lipscomb, "Studies of the Relationships Between Hollow Fiber Membrane Module Design Variables and Performance", Permea, Inc., January 20, 1999.
6. G. G. Lipscomb, "Membrane Gas Separation Modules", 'Fujifilm, Tilburg, Netherlands, August 1, 2011. (international)
7. G. G. Lipscomb, "Membrane Gas Separation Modules", Evonik Fibres GmbH, Schörfling, Austria, September 30, 2013. (international)

RESEARCH GRANTS

Principal Investigator

1. Startup Funds, Chemical Engineering Department, University of Cincinnati, 9/1/89, \$50,000.
2. Travel Award, University Research Council, 11/3/89, \$198.
3. Startup Funds, Herman Schneider Laboratory Fund, 12/14/89, \$7,000.
4. "The Effect of Shellside Flows on the Performance of an Artificial Kidney", Ohio Supercomputer Center, 4/1/90-4/1/91, 10 Resource Units.
5. Travel Award, University Research Council, 10/30/90, \$154.
6. "The Thermodynamics of Gas Sorption in Glassy Polymers", National Science Foundation, 11/1/90-10/31/94, \$69,642.
7. "The Relationship Between Sorption and Deformation in Glassy Polymers", American Chemical Society Petroleum Research Fund, 1/1/91-8/31/94, \$21,000.
8. Travel Award, University Research Council, 12/31/91, \$210.
9. "Engineering Research Equipment: Dynamic Mechanical Analyzers", National Science Foundation, 9/1/92-8/31/93, \$133,630.
10. "Dynamic Mechanical Spectrometers", Ohio Board of Regents, 9/1/92-8/31/93, \$60,000.
11. Unrestricted Research Grant, Procter and Gamble, 4/1/93, \$5,000
12. "Thermal and Mechanical Degradation of Microbially Produced Polyesters", Procter and Gamble, 1/1/93-8/31/94, \$15,664.
13. "The Influence of Shell-side Flows on Mass Transfer in Hollow Fiber Membrane Modules", National Science Foundation, 7/1/95-6/30/98, \$190,577.
14. "Development of an Instructional Web Site for the Introductory Chemical Engineering Class", OhioLINK, 3/15/97-8/15/97, \$5,000.
15. "Virtual Teams: A Novel Use of the Internet to Enhance Undergraduate Education", Information Technology in Coursework fund, Center for Teaching Excellence, University of Toledo, 9/1/97-8/31/98, \$13,493.
16. "Studies of Shell Flow Distribution and Its Effect on Artificial Kidney Performance", Althin Medical, Inc., 9/1/97-8/31/98, \$5,000.
17. "Experimental Studies of Flow Distribution in Spiral Wound RO Modules", FilmTec Corporation, 12/1/97-11/30/98, \$2,000.
18. "Support of Student Participation in NAMS 98", National Science Foundation, 2/1/98-8/1/98, \$8,000.
19. "Internally Staged Permeators for H₂/CH₄ Separations", MG Generon, 5/18/98-5/17/00, \$21,000.
20. "Development of Internet-Based Classes for the Masters of Engineering Program", University of Toledo Foundation, 8/1/98-7/31/99, \$9,900.
21. "Models for Simulating Hollow Fiber Membrane Modules and Systems", MG Generon, 1/1/00-12/31/01, \$26,350.
22. "Measurements of Concentration Field Variations in Hemodialyzers", Fresenius Medical Care, 7/1/00-12/31/01, \$8,562.
23. "Oscillating Polymer Brushes to Control Protein Adsorption", deArce Memorial Endowment Fund, 9/1/01-8/31/02, \$14,723.
24. "Internet-based Unit Operations Laboratories", National Science Foundation, 3/1/02-2/29/04, \$153,964.

25. "University of Toledo Internet 2 Connection", National Science Foundation, 9/1/02-8/31/04, \$162,098.
26. "University of Toledo Internet 2 Connection: REU Supplement", National Science Foundation, 5/13/03-12/31/03, \$6,250.
27. "University of Toledo Internet 2 Connection: REU Supplement", National Science Foundation, 5/12/04-12/31/04, \$6,250.
28. "Support of the 2004 'Membranes: Materials and Processes' Gordon Research Conference", National Science Foundation, 5/15/04-11/15/04, \$15,000.
29. "Membrane Separation for Hydrogen Purification", Northwest Ohio Partnership on Alternative Energy Systems, 8/1/04-7/31/05, \$29,500.
30. "Planning Meeting Proposal: Formation of a New Mast Center Site at The University of Toledo", National Science Foundation, 8/15/05-7/31/06, \$5,400.
31. "Simulation of Gas Dehydration Modules", Generon IGS, 5/1/06-4/30/07, \$26,412.
32. "Chemical Separations and Process Research to Enable Biorefinery Systems", Idaho National Laboratory, 6/1/07-5/31/10, \$122,878.
33. "Ultrasound Spacers for Sustainable Water Production and Wastewater Treatment", University of Toledo Strategic Enhancement Awards Program, 8/1/08-5/31/09, \$24,610.
34. "Static Mixing Spacers for Spiral Wound Modules", US Bureau of Reclamation, 10/1/10-2/28/12, \$93,454.
35. "Meetings: Support of Student Participation in the 2011 North American Membrane Society Meeting and the 2011 International Congress on Membranes and Membrane Processes", National Science Foundation, 7/1/11-12/31/11, \$10,000.
36. "Low-pressure Membrane Contactors for CO₂ Capture", U.S. Department of Energy, 1/1/12-12/31/14, \$289,304 (MTR Subcontract).
37. "Evaluating Home Point-of-Use Reverse Osmosis Membrane Systems for Cyanotoxin Removal", Ohio Department of Higher Education, 7/1/16-6/30/18, \$99,328.

Co-Principal Investigator

1. "Research Experiences for Undergraduates in Chemical Engineering", PI – Stevin Gehrke, National Science Foundation, 5/01/90-4/30/92, \$97,783.
2. "Future Directions in Dilute Separations Technology Workshop", PI – Amy Ciric, National Science Foundation, 3/25/91-12/25/91, \$38,839.
3. "Formation of Anisotropic Hollow Fiber Membranes via TIPS", PI – Doug Lloyd, National Science Foundation, 10/1/01-9/30/04, \$330,794.
4. "The Effect of Operating Conditions on the Conversion of Wood Chips and Rice Husks to Gas-Phase Products using Slow Pyrolysis in a Fixed-Bed Reactor", PI – Sasidhar Varanasi, Department of Energy (subcontract from REII), 1/1/10-8/31/10, \$50,000.
5. "Pilot-scale demonstration of cellulosic ethanol," PI – Sasidhar Varanasi, 2011 Third Frontier Advanced Energy Program, (subcontract from Suganit Systems, Inc.), 3/1/11-2/28/14, \$1,250,000.

Project Member

1. "Ohio Molecular Computation and Simulation Network", PI - Joel Fried, University of Cincinnati, Ohio Board of Regents Investment Fund, \$59,966 (out of total project cost of \$1,782,538).

STUDENTS

Doctoral

1. Tapan Banerjee, 1997, High Pressure Calorimetric Studies of Gas-Polymer Interactions
2. Bing Liu, 2000, Theoretical and Experimental Evaluation of the Performance of Staged Hollow Fiber Membrane Systems for Gas Separation
3. Joe Lemanski, 2001, The Effects of Shell-side Flows and Fiber Property Variations on Hollow Fiber Membrane Module Performance
4. Lihong Bao, 2001, Computational Studies of Shell-side Mass Transfer Coefficients in Hollow Fiber Membrane Devices
5. Holly Balasubramanian, 2004, Heat-Mass-Momentum Transfer in Hollow Fiber Spinning (primary advisor Professor Doug Lloyd, University of Texas at Austin)
6. Constantin Ciocanel, 2006, A Particle Based Constitutive Model for MR (magnetorheological) Fluids (primary advisor Professor Nagi Naganathan, University of Toledo)
7. Santosh Sonalkar, 2006, Membrane Gas Separation Processes for Permeate Purification
8. Yang Su, 2007, Theoretical Studies of Hollow Fiber Spinning
9. Pingjiao Hao, 2011, Studies of Air Dehydration by Using Hollow Fiber Modules
10. Rahul Patil, 2012, Membrane Processes for Sustainable Energy Applications
11. Xi Du, 2012, Membrane Drying of Ionic Liquid
12. Yuecun Lou, 2014, Transport Modeling and CFD Simulation of Membrane Gas Separation Materials and Modules
13. Norfamila Che Mat, 2016, Membrane Process Design for Post-Combustion Carbon Dioxide Capture
14. Ghazaleh Vaseghi, In progress

Masters

1. Tapan Banerjee, 1991, Thermodynamics of Mixed Gas Sorption in Glassy Polymers
2. Mukesh Chhajjer, 1992, Thermodynamics of Gas Sorption and Transport in Glassy Polymers
3. Jennifer Reid, 1993, Engineering of Biomedical Polymers for the Transplantation of Human Cells
4. Robert Lyons, 1997, Rheological Studies of Thermal and Mechanical Degradation of Microbial Polyesters
5. Xiaowen Wu, 1997, Theoretical Evaluation of Internally Staged Hollow Fiber Module Designs
6. Brian Ashman, 1998, Stability of Hollow Fiber Spinning
7. Anurag Varma, 1998, Theoretical and Experimental Studies of the Influence of Dialysate Flow on Artificial Kidney Performance
8. Dharmendra Kumar, 1998, Uses of the Internet to Enhance Engineering Education
9. Anthony Frank, 1999, Visualizing Wet-out and Concentration Fields in a Hemodialyzer Using Computed Tomography
10. Mahesh Bordawekar, 2002, Membrane Modification by Grafting a Temperature-Sensitive Polymer Brush to Reduce Fouling
11. Jim Dolgoff, 2004, Development and Evaluation of the Educational Experience Acquired through an Internet-Delivered Laboratory

12. Bei Xu, 2005, Development of a Web-based Membrane Gas Separation Laboratory
13. Jingyi Wang, 2005, Research Review of Unitized Regenerative Fuel Cell (URFC)
14. Dhavel Patel, 2008, Modeling and Simulation of a Novel Reformer for Continuous Hydrogen Production from Logistic Fuels
15. Sricharan Nanduri, 2011, CFD investigation of Mass Transfer to Crimped Hollow Fiber Membranes
16. Ashkan Iranshahi, 2012, Static Mixing Spacers for Spiral Wound Modules
17. Scott Wedding, 2014, Static Mixing Spacers for Heat Transfer Improvement Application in Air Cooled Steam Condensers
18. Ravikumar Gogar, 2014, Flow Investigation in Spacers of Membrane Modules
19. Neelam Jagani, In progress

Undergraduate

Aylin Altuglu, Glenn Taylor, Ken Yasuda, Collin Smith, Sunil Konath, Ralph Lieman, Jeff Hopkins, Lynn Ameen, William McKee, Paul Sagel, Jennifer Braun, Matthew Adams, Steven Elmore, Gareth Hughes, Devlin Riley, Stephen Ritchie, Christina Bejarano, Griffin Gappert, Dawn Hudak, Luci Garnes, George Robinson, Jennifer Jones, Mike Pepera, Elisa Vogel, Sherry Ackerman, Kassandra Coffman, Keith Keeler, Erin Gordon, Ian Schmidt, Tony Tomase, Max Reimer, Ngoc Lien Mai, Katlyn Ulinski, Xavier Johnson

Committee Member

Doctoral

1. Satish Lakhapatri, 2010
2. Hao Li, 2010
3. Chuanbo Yang, 2011
4. Heping Bai, 2012
5. Qiuying Zhao, 2012
6. Balakrishna Maddi, 2014

Masters

1. Brett Digman, 2010