

May 2005

JOHN L. ANDERSON

BIRTHPLACE Wilmington, Delaware
September 29, 1945

EDUCATION

U. Delaware	(Newark)	B.Ch.E.	1967	Chemical Engineering
U. Illinois	(Urbana)	M.S.	1969	Chemical Engineering
U. Illinois	(Urbana)	Ph.D.	1971	Chemical Engineering

PROFESSIONAL EMPLOYMENT

Sun Oil Company, Research and Development, Marcus Hook, PA 19061

- Supervised pilot scale catalytic reactor (Summer, 1966)

E.I. DuPont deNemours, Inc., Belle, WV 25015

- Process Engineer (Summer, 1967)

U.S. Army, Chemical Corps., Ft. McClellan, AL 36201

- 2nd Lt., Officer Basic School; Assistant Battalion S-3 (Jan. 1-March 31, 1972)
- 1st Lt., USAR, Ithaca, NY (1972-1976)

Cornell University

- Assistant Professor of Chemical Engineering (Sept. 1, 1971-Aug. 31, 1976)
(also, Assistant Professor of Applied Mathematics)

Carnegie Mellon University

- Associate Professor of Chemical Engineering (Sept. 1, 1976-Aug. 31, 1979)
- Professor of Chemical Engineering (Sept. 1, 1979-March 31, 2004)
- Director, Biomedical Engineering Program (June 1, 1980-June 30, 1985)
- Head, Department of Chemical Engineering (Sept. 1, 1983-Aug. 31, 1994)
- University Professor (July 1, 1994-March 31, 2004)
- Dean, College of Engineering (July 1, 1996-March 31, 2004)

Case Western Reserve University

- Provost and University Vice President (April 1, 2004 - present)

RESEARCH INTERESTS

Electrokinetic phenomena, electrophoresis of complex particles, transport in porous media and gels, membrane separations, fluid dynamics at low Reynolds numbers, bioengineering

HONORS

- Fellow of the American Academy of Arts and Sciences, 2005
- Themis Medicare Chemcon Distinguished Speaker Award, Indian Institute of Chemical Engineers, Mumbai, India, 2004
- First Annual John A. Quinn Lecture, University of Pennsylvania, 2004
- Blue/Green Seminar, University of Michigan and Michigan State University, 2003
- Stanley Katz Lecture 2001, City College of New York, 2001
- Award for “Outstanding Professional Accomplishments in the Field of Academics”, AIChE, Pittsburgh Section, 1999
- 31st Annual W.N. Lacey Lectureship in Chemical Engineering, California Institute of Technology, 1998
- Barnett Dodge Lectureship, Yale University, 1997
- Robert Mehrabian Professorship, Carnegie Mellon University, 1997-present
- Visiting Professor (Research Scholar Award), U. Melbourne, 1995
- Visiting Professor (NWO Fellow), Landbouwniversiteit Wageningen, 1994
- University Professor, Carnegie Mellon University, 1994
- Fellow of The American Institute of Medical and Biological Engineering
- Co-Chair of Gordon Conference on “Membranes: Materials and Processes,” 1993
- Vice-Chair of Gordon Conference on “Synthetic Membranes,” 1991
- Alumni Wall of Fame, University of Delaware, 1993
- National Academy of Engineering, 1992
- Co-author of “Best Technical Paper” at Annual AIChE Meeting, Miami Beach, 1992
- Gulf Professor of Chemical Engineering, 1991-97
- Holtz Lecture, Johns Hopkins University, 1990
- Professional Progress Award, American Institute of Chemical Engineers, 1989
- Fifth Berkeley Lectures, U. California, March 1989
- National Science Foundation Commemorative Lectureship, 1989
- Fellow of the John Simon Guggenheim Memorial Foundation, 1982-83
- Visiting Professor, Chemical Engineering Department, Massachusetts Institute of Technology, 1982-83
- Visiting Scholar, Irish American Technology Exchange Programme, Dept. Chemical Engineering, University College Dublin (1983)
- Honorable Mention, Tau Beta Pi Teaching Award of the Engineering College at Cornell University, 1975 and 1976
- National Institutes of Health Pre-doctoral Fellowship, University of Illinois (Urbana), 1969-71
- National Science Foundation Pre-doctoral Fellowship (declined), 1969
- Tau Beta Pi, Omicron Delta Kappa, Phi Kappa Phi, Sigma Xi

VISITING PROFESSORSHIPS

- University of Melbourne (Australia), Department of Mathematics, 1995 and 2001.
- Landbouw Universiteit Wageningen (The Netherlands), Vakgroep Fysische en Kolloidchemie, 1994.

- Massachusetts Institute of Technology, Department of Chemical Engineering, 1982-83.

PROFESSIONAL ACTIVITIES

- Co-chair of Engineering Deans' Council Executive Board, American Society of Engineering Education (2003-04).
- Pittsburgh Technology Council Board of Directors (2000-present).
- Board on Chemical Sciences and Technology, National Research Council (1996-present, co-chair 1998-2001; Chair of Committee on the Review of Existing and Potential Explosives Detection Techniques 2003).
- Assessment Panel for Chemical Science and Technology Division of NIST, National Research Council (1992-1998).
- Associate Editor, *Industrial and Engineering Chemistry Research* (1986-present).
- Editorial Board, *Current Opinion in Colloid and Interface Science* (1995-present)
- Associate Editor *Advances in Chemical Engineering* (1985-1998).
- Advisory Board, Petroleum Research Fund, American Chemical Society (1986-90).
- Advisory Board, CBT Division of the Engineering Directorate, National Science Foundation (1986-1987).
- Awards Committee, American Institute of Chemical Engineers (1989-1994).
- University Representative, Council for Chemical Research (1983-present).
 - Governing Board (1991-1994).
 - Executive Committee (1991-1994).
 - University/Industry/Government Interaction Committee (1988-93)
- Awards Committee, American Chemical Society (1987-1991).
- Review Committee NRC for the NSF Graduate Fellowship Program (1988-90).
- Visiting Committees & Advisory Councils
 - Faculty Review Committee, University of Dublin (2003)
 - Chemical & Biomolecular Engineering Evaluation Board, Cornell University (2002)
 - College of Engineering Advisory Board, Georgia Institute of Technology (2002)
 - School of Engineering Academic Advisory Council, Virginia Commonwealth University (2000-present)
 - Whiting School of Engineering Advisory Council, Johns Hopkins University (1999-present)
 - Department of Chemical Engineering, Princeton University (1999)
 - Department of Chemical Engineering, Vanderbilt University (1999)
 - College of Applied Science and Engineering, University of Toronto (1999)
 - Department of Chemical Engineering, University of California Santa Barbara
 - College of Engineering, Cornell University (1998-present)
 - School of Chemical Engineering, Cornell University (1990-1999)
 - College of Engineering Advisory Council, University of Delaware (1993-present)
 - Department of Chemical Engineering, University of Michigan (1997-present)
 - IBM Center on Bioremediation, University of Virginia (1993 - 97)
 - Department of Chemical Engineering, Massachusetts Institute of Technology (1988-1992)
 - Department of Chemical Engineering, University of Virginia (1988-1992)

- Consulting
 - HemaSure Inc., Marlborough, MA
 - Sepracor/Biosepra, Inc., Marlborough, MA (through Pennie & Edmonds)
 - Westvaco, Laurel, MD
 - Respirationics, Pittsburgh, PA
 - Exxon Engineering and Research, Annandale, NJ
 - Baroid Drilling Fluids Inc., Houston, TX
 - E-Ink, Cambridge, MA

PUBLICATIONS

1. "The Transition to Slug Flow in Bubble Columns," *Chem. Eng. Sci.* **25**, 338 (1970) (with J.A. Quinn).
2. "Bubble Columns: Flow Transitions in the Presence of Trace Contaminants," *Chem. Eng. Sci.* **25**, 373 (1970) (with J.A. Quinn).
3. "The Relationship between Particle Size and Signal in Coulter-type Counters," *Rev. Sci. Inst.* **42**, 1257 (1971) (with J.A. Quinn).
4. "Ionic Mobility in Microcapillaries: A Test for Anomalous Water Structures," *J. Chem. Soc., Faraday Trans. 1*, **68**, 608 (1972) (with J.A. Quinn).
5. "Diffusion of Small Particles: Electrostatic Effects," *J. Colloid Interface Sci.* **40**, 273 (1972) (with J.A. Quinn).
6. "Model Pores of Molecular Dimension. The Preparation of Track-Etched Membranes," *Biophysical J.* **12**, 990 (1972) (with J.A. Quinn, W.S. Ho and W.J. Petzny).
7. "The Concentration Dependence of Macromolecular Diffusion Coefficient," *Ind. & Eng. Chem. Fund.* **12**, 488 (1973).
8. "Restricted Diffusion in Small Pores: A Model for Steric Exclusion and Hindered Particle Motion," *Biophysical J.* **14**, 130 (1974) (with J.A. Quinn).
9. "The Mechanism of Osmotic Flow in Porous Membranes," *Biophysical J.* **14**, 957 (1974) (with D.M. Malone).
10. "Breaking Bubbles and the Water-to-Air Transport of Particulate Matter," *Chem. Eng. Sci.* **30**, 1177 (1975) (with J.A. Quinn and R.A. Steinbrook).
11. "Electroosmosis and Electrolyte Conductance in Charged Microcapillaries," *AIChE J.* **21**, 1176 (1975) (with W.H. Koh).
12. "Diffusion of Spherical Macromolecules at Finite Concentration," *J. Chem. Phys.* **64**, 3240 (1976) (with C.C. Reed).
13. "Reply to the Comments by S. Alpert and G. Phillis," *J. Chem. Phys.* **65**, 4336 (1976) (with C.C. Reed).
14. "Analysis of Sedimentation Velocity in Terms of Binary Particle Interactions," *Colloid Interface Sci.* Vol. IV. *Hydrosols and Rheology*, Academic Press (1976) (with C.C. Reed).

- 14A. "Diffusional Boundary-Layer Resistance for Membranes with Low Porosity," *AIChE J.* **23**, 177, (1977) (with D. M. Malone).
15. "Electrokinetic Parameters for Capillaries of Different Geometries," *J. Colloid Interface Sci.* **59**, 149 (1977) (with W.H. Koh).
16. "Diffusion of Neutral Molecules in Charged Pores," *J. Colloid Interface Sci.* **64**, 57 (1978) (with W.H. Koh).
17. "Hindered Diffusion of Particles through Small Pores," *Chem. Eng. Sci.* **33**, 1429 (1978) (with D.M. Malone).
18. "Particle Diffusion as a Function of Concentration and Ionic Strength," *J. Phys. Chem.* **82**, 608 (1978) (with F. Rauh and A. Morales).
19. "Rejection of Polyelectrolytes from Microporous Membranes," *J. Membrane Sci.* **5**, 77 (1979) (with W.D. Munch and L.P. Zestar).
20. "Motion of a Charged Particle in a Gradient of Electrolyte," *International J. Physicochemical Hydrodynamics* **1**, 51 (1980).
21. "Sedimentation Rates for Concentrated Suspensions of Particles and Drops," in *Proceedings of International Symposium on Solids Separation Processes*, Dublin, April 1980.
22. "Hindered Settling of a Suspension at Low Reynolds Number," *AIChE J.* **26**, 816 (1980) (with C.C. Reed).
23. "Solvent Dielectric Effects on Electrokinetic Phenomena in Pores," *J. Electrochem. Soc.* **127**(8), C404 (1980) (with G.B. Westermann-Clark).
24. "Concentration Dependence of the Distribution Coefficient for Macromolecules in Porous Media," *J. Polymer Sci. - Polymer Physics Edition* **19**, 405 (1981) (with J.H. Brannon).
25. "Configurational Effects on the Reflection Coefficient of Rigid Solutes from Small Pores," *J. Theor. Biology* **90**, 405 (1981).
26. "Concentration Dependence of Electrophoretic Mobility," *J. Colloid Interface Science* **82**, 248 (1981).
27. "Configurational Effects on Membrane Rejection," *J. Membrane Sci.* **9**, 13 (1981) (with T.D. Long and D.L. Jacobs).
28. "Motion of a Particle Generated by Chemical Gradients. Part I. Non-Electrolytes," *J. Fluid Mechanics* **117**, 107 (1982) (with M.E. Lowell and D.C. Prieve).
29. "Anomalous Diffusion Rates in Hydrocarbon-Filled Pores in Muscovite Mica," *Chem. Eng. Sci.* **37**, 483 (1982) (with R.E. Baltus and C.L. Baker).
30. "Concentration Effects on Distribution of Macromolecules in Small Pores," *Adv. Colloid Interface Science* **16**, 391 (1982).
31. "Concentration Effects on Partitioning of Dextran and Serum Albumin in Porous Glass," *J. Polymer Sci. - Polymer Physics* **25**, 857 (1982) (with J.H. Brannon).

32. "Experimental Verification of a Theory for Electrokinetics in Charged Microporous Membranes," *J. Electrochem. Soc.* **130**, 839 (1982) (with G.B. Westermann-Clark).
33. "Stable Concentration Gradients in a Vertical Tube," *Chem. Eng. Communications* **18**, 93 (1982) (with M.E. Lowell).
34. "Solute Concentration Effect on Osmotic Reflection Coefficient," *Biophys. J.* **44**, 79 (1983) (with R.P. Adamski).
35. "Solute Concentration Effects on Membrane Reflection Coefficients," *AIChE Symp. Series* **79**(227), 84 (1983) (with R.P. Adamski).
36. "Hindered Diffusion of Asphaltenes through Microporous Membranes," *Chem. Eng. Sci.* **38**, 1959 (1983) (with R.E. Baltus).
37. "Movement of a Semi-Permeable Vesicle through an Osmotic Gradient," *Phys. Fluids* **26**, 2871 (1983).
38. "Shape and Permeability Effects on Osmophoresis," *PhysicoChemical Hydrodynamics* **5**, 205 (1984).
39. "Configurational Statistics of Brownian Dumbbells in a Quadratic Flow," *J. Chem. Phys.* **80**, 1632 (1984) (with H.J. Keh).
40. "Comparison of GPC Elution Characteristics and Diffusion Coefficients for Asphaltenes," *FUEL* **63**, 530 (1984) (with R.E. Baltus)
41. "Diffusiophoresis: Migration of Colloidal Particles in Gradients of Solute Concentration," *Separation and Purification Methods* **13**, 67 (1984) (with D.C. Prieve).
42. "Flow Dependent Rejection of Polystyrene from Microporous Membranes," *J. Polymer Sci. - Polymer Physics Ed.* **22**, 1261 (1984) (with T.D. Long).
43. "Diffusional Mass Transfer in a Simple Diaphragm Cell," *ASEE Annual Conference Proceedings*, Session 1616, p. 189 (1984).
44. "Motion of a Particle Generated by Chemical Gradients. Part II. Electrolytes," *J. Fluid Mech.* **148**, 247 (1984) (with D.C. Prieve, J.P. Ebel and M.E. Lowell).
45. "Effects of Solvent Goodness and Polymer Concentration on Rejection of Polystyrene from Small Pores," *J. Polymer Sci. - Polymer Physics* **23**, 191 (1985) (with T.D. Long).
46. "Boundary Effects on Electrophoretic Motion of Colloidal Spheres," *J. Fluid Mech.* **153**, 417 (1985) (with H.J. Keh).
47. "Effects of Non-Uniform Zeta Potential on Particle Movement in Electric Fields," *J. Colloid Interface Sci.* **105**, 45 (1985).
48. "Droplet Interactions in Thermocapillary Motion," *Int. J. Multiphase Flow* **11**, 813 (1985).
49. "Electroosmosis through Pores with Nonuniformly Charged Walls," *Chem. Eng. Communications* **38**, 93 (1985) (with W.K. Idol).

50. "Electrophoretic Transport of Colloids in Porous Media," Proceedings on The Chemistry and Physics of Composite Media), Vol. 85-8, The Electrochemical Soc., Pennington, NJ, pp 103-111 (1985).
51. "The Streaming Potential and Inadequacies of the Helmholtz Equation," *J. Colloid Interface Sci.* **106**, 1 (1985) (with C.C. Christoforou and G.B. Westermann-Clark).
52. "Transport Mechanisms of Biological Colloids," *Ann. New York Acad. Sci.: Biochemical Engineering IV*, Vol. 469, p. 166 (1986).
53. "Effects of Adsorbed Polyelectrolytes on Convective Flow and Diffusion in Porous Membranes," *J. Membrane Sci.* **28**, 269 (1986).(with W.K. Idol).
54. "Measuring Diffusion Coefficients by Taylor's Method of Hydrodynamic Stability," *AIChE J.* **32**, 2028 (1986) (with J.A. Quinn and C.H. Lin).
55. "Configurational Effects on Polystyrene Rejection from Microporous Membranes," *J. Polym. Sci.: Polym. Physics* **25**, 765 (1986) (with R.P. Adamski).
56. "Fluid Dynamical Effects of Polymers Adsorbed to Spherical Particles," *J. Chem. Phys.* **86**, 5163 (1987) (with J. Kim).
57. "Chemically Induced Migration of Particles across Fluid Streamlines," *Chem. Engr. Comm.* **55**, 211 (1987) (with D.C. Prieve and J.P. Ebel).
58. "Diffusiophoresis of Latex Particles in Electrolyte Gradients," *Langmuir* **4**, 396 (1988) (with J.P. Ebel and D.C. Prieve).
59. "Pore Size Effects on Diffusion of Polystyrene in Dilute Solution," *I&EC Research* **27**, 866 (1988) (with I.A. Kathawalla).
60. "Configurational Effects on Hindered Diffusion in Micropores," *Convection and Pore Diffusion in Porous Catalyst*, AIChE Symp. Series **84** (No. 266), I.A. Webster and J.C. Strieder, editors (1988) (with I.A. Kathawalla and J.S. Lindsey).
61. "Electrophoresis of Nonuniformly Charged Ellipsoidal Particles," *J. Colloid Interface Sci.* **127**, 388 (1989) (with M.C. Fair).
62. "Colloid Transport by Interfacial Forces," *Ann. Rev. Fluid Mech.* **21**, 61 (1989).
63. "Hindered Diffusion of Short-Chain Polystyrene and Porphyrins in Small Pores," *Macromolecules* **22**, 1215 (1989) (with I.A. Kathawalla and J.S. Lindsey).
64. "Restricted Transport in Micropores with Adsorbed Polymers," *Polymer Preprints* **30**(1), 381 (1989) (with J.T. Kim, R.M. Webber, and M.S. Jhon).
65. "Hindered Transport through Micropores with Adsorbed Polyelectrolytes," *J. Membrane Sci.* **47**, 163 (1989) (with J.T. Kim).
66. "Electrophoresis of Dumbbell-like Colloidal Particles," *Int. J. Multiphase Flow* **16**, 663 (1990); **16**, 1131 (1990) (with M.C. Fair).
67. "Hydrodynamic Studies of Adsorbed Diblock Copolymers in Porous Membranes," *Macromolecules* **23**, 1026 (1990) (with R.M. Webber and M.S. Jhon).
68. "Enhanced Protein Diffusion in a Solvent Gradient," *I&EC Research* **29**, 309 (1990) (with E.S. Shane and M.M. Domach).

69. "Diffusion and Flow Through Polymer-Lined Micropores," *I&EC Research* **30**, 1008 (1991) (with J.T. Kim).
70. "Model for Hydrodynamic Thickness of Thin Polymer Layers at Solid/Liquid Interfaces," *Langmuir* **7**, 162 (1991) (with P.F. McKenzie and R.M. Webber).
71. "Diffusiophoresis Caused by Gradients of Strongly Adsorbing Solutes," *Langmuir* **7**, 403 (1991) (with D.C. Prieve).
72. "Flow-Dependent Filtration of a Rigid-Rod Polymer," *Macromolecules* **24**, 3562 (1991) (with R.P. Adamski).
73. "A Model of Pulsatile Flow in a Uniform Deformable Vessel," *J. Biomechanics* **25**, 91 (1992) (with G.A. Johnson and H.S. Borovetz).
74. "Electrophoresis of Heterogeneous Colloids: Doublets of Dissimilar Particles," *Langmuir* **8**, 2850 (1992) (with M.C. Fair).
75. "Polarization Effects on Diffusiophoresis in Electrolyte Gradients," *J. Colloid Interface Sci.* **155**, 488 (1993) (with Y. Pawar and Y.E. Solomentsev).
76. "Hindered Diffusion in Slit Pores," *I&EC Research* **32**, 743 (1992) (with Y. Pawar).
77. "Electrophoretic Mobility of Nonuniformly Charged Spherical Particles with Polarization of the Double Layer," *J. Colloid Interface Sci.* **158**, 1 (1993) (with Y.E. Solomentsev and Y. Pawar).
78. "Electrophoretic Transport of Heterogeneous Colloids: Plate-like Particles," Proceedings 9th International Symposium on Surfactants in Solution, Varna, Bulgaria, June 10-15, 1992 (not published) (with Y. Pawar, Y.E. Solomentsev and L. Asavathiratham).
79. "Effect of Solvated Block Size on the Layer Thickness of Copolymers Adsorbed to Liquid/Solid Interfaces," *Langmuir* **10**, 1539 (1994) (with P.F. McKenzie and R.M. Webber).
80. "Electrophoresis of Nonuniformly Charged Chains," In Macro-ion Characterization: From Dilute Solutions to Complex Fluids, K.S. Schmitz, editor, American Chemical Society, Washington, D.C. (1994) (with Y. Solomentsev).
81. "Electrokinetic Transport of Colloidal Particles with Heterogeneous Surfaces," *J. Electrostatics*, **34**, 189 (1995).
82. "Effects of Adsorbed Homopolymer and Diblock Copolymer on Molecular Transport in Micropores," *Colloids and Surfaces A: Physicochemical and Engineering Aspects* **86**, 263 (1994) (with P.F. McKenzie and V. Kapur).
83. "Effects of Adsorbing-Block Molecular Weight on the Thickness of Adsorbed Diblock Copolymers," *Langmuir* **10**(9), 3156 (1994) (with R.M. Webber).
84. "Electrophoresis of Slender Particles," *J. Fluid Mech* **279**, 197 (1994) (with Y. Solomentsev).
85. "Electrophoretic Transport of Spheroidal Colloids in Nonhomogeneous Electric Fields," *I&EC Research* **34**, 3231 (1995) (with Y. Solomentsev).

86. "Hydrodynamic Effects of Surface Layers on Colloidal Particles," *Chem. Eng. Commun.*, **148-150**, 291 (1996) (with Y. Solomentsev).
87. "Probing the Structure of Colloidal Doublets by Electrophoretic Rotation," *Langmuir* **12**, 675 (1996) (with D. Velegol and S. Garoff).
88. "Partitioning and Diffusion of Proteins and Linear Polymers in Polyacrylamide Gels," *Biophys. J.* **70**, 1505 (1996) (with J. Tong).
89. "Rotation of a Sphere in Brinkman Fluids," *Phys. Fluids* **8**, 1119 (1996) (with Y. Solomentsev).
90. "Hydrodynamic Permeability of Hydrogels Stabilized within Porous Membranes," *I&EC Res.*, **35**, 3179 (1996) (with V. Kapur, J.C. Charkoudian, S.B. Kessler).
91. "Determining the Forces between Latex Particles using Differential Electrophoresis," *Langmuir* **12**, 4103 (1996) (with D. Velegol and S. Garoff).
92. "Boundary Effects on Electrophoretic Motion of Spherical Particles of Arbitrary κa ," *J. Colloid Interface Science* , **185**, 497 (1997) (with J. Ennis-King).
93. "Thermal Expansion and Contraction of Adsorbed Diblock Copolymers near Θ Conditions," *Langmuir* **12**, 1040 (1996) (with R. M. Webber and C. C. van der Linden).
94. "Transport of Proteins through Gel-Filled Porous Membranes," *J. Membrane Sci.* **131**, 143 (1997) (with V. Kapur and J. Charkoudian).
95. "Conduction in the Small Gap Between Two Spheres," *Phys. Fluids* **9**, 1209 (1997) (with Y. Solomentsev and D. Velegol).
96. "Particle Clustering and Pattern Formation during Electrophoretic Deposition: A Hydrodynamic Model," *Langmuir* **13**, 6058-6068 (1997) (with Y. Solomentsev and M. Bohmer).
97. "Electrophoretic Motion of Two Spherical Particles with Thick Double Layers," *J. of Colloid Interface Science* **191**, 357-371 (1997) (with A.A. Shugai, S.L. Carnie and D.Y.C. Chan).
98. "Thermocapillary Phenomena and Bubble Coalescence during Electrolytic Gas Evolution," *J. of the Electrochemical Society* **145**, 1848-1855 (1998) (with S.A. Guelcher, Y.E. Solomentsev and P.J. Sides).
99. "Electrophoretic Rotation of Doublets Composed of Two Spheres almost in Contact," *Colloids and Surfaces A* **140**, 59-74 (1998) (with Y. Solomentsev, D. Velegol and S. L. Carnie).
100. "Applications in Chemistry/Chemical Engineering: Introduction," *Current Opinion in Colloid and Interface Science*, **3**, 349-350 (1999) (with J.Y. Walz)
101. "Tangential Forces between Non-Touching Colloidal Particles," *Physical Review Letters*, **83**, 1243-1246 (1999) (with D. Velegol, S. Catana and S. Garoff).
102. "Aggregation of Pairs of Particles on Electrodes during Electrophoretic Deposition," *Powder Technology*, **110**, 90-97, (2000) (with S. Guelcher and Y. Solomentsev).

103. "Measuring Colloidal Forces Using Differential Electrophoresis," *Langmuir*, **16**, 7, 3372-3384 (2000) (with D. Velegol and S. Garoff).
104. "Aggregation Dynamics for Two Particles during Electrophoretic Deposition at Steady Fields", *Langmuir*, **16**, 9208-9216 (2000) (with Y. Solomentsev, S.A. Guelcher and M. Bevan).
105. "Thermocapillary Flow and Aggregation of Bubbles on a Solid Wall", *J. Colloid Interface Sci.* **232**, 111-120 (2000) (with H. Kasumi, Y. E. Solomentsev, S. A. Guelcher and P. J. Sides).
106. "Solvent Effects on the Permeability of Membrane Supported Gels," *Industrial & Engineering Chemistry Research* **41**, 464-472 (2002) (with K. Buehler).
107. "Two-Particle Dynamics on an Electrode in *ac* Electric Fields," *Advances in Colloid & Interface Science* **96**, 131 - 142 (2002) (with J. Kim, S. Guelcher and S. Garoff).
108. "Effects of Zeta Potential and Electrolyte on Particle Interactions on an Electrode under *ac* Polarization," *Langmuir*, **18**, 5387-5391 (2002) (with J. Kim, S. Garoff and P.J. Sides).
109. "Two-Particle Dynamics On Electrodes," *Electrophoretic Deposition: Fundamentals and Applications*, Proceedings Volume **2002-21**, 191-197, (2002) (with J. Kim, S. Garoff, and P.J. Sides).
110. "Interactions Between Two Bubbles on a Hot or Cold Wall," *J. Colloid and Interface Science*, **276**, 239-247 (2004) (with H. Kasumi and P.J. Sides)

BOOKS

Chapters

1. "Electrophoresis of Nonuniformly Charged Chains," *In Macro-ion Characterization: From Dilute Solutions to Complex Fluids*, K.S. Schmitz, editor, American Chemical Society, Washington, D.C. (1994) (with Y. Solomentsev).
2. "Electrophoresis of Complex and Interacting Particles", in *Interfacial Electrokinetics and Electrophoresis*, A. V. Delgado, editor, Marcel Dekker, pp. 147-172, (2001) (with D. Velegol and Y. Solomentsev).
3. "Electrokinetic and Thermocapillary Flow-Driven Aggregation of Particles and Bubbles on Surfaces", pp. 55-78, (2002) (with P. J. Sides, H. Kasumi, S. A. Guelcher and Y. E. Solomentsev).

Reviewed

1. *Colloidal Dispersions*, by W.B. Russel, D.A. Saville and W.R. Schowalter, Cambridge University Press, 1989. Review in *J. Fluid Mech.* **222**, 693 (1991) and *Langmuir* **7**, 436 (1991).
2. *Colloidal Hydrodynamics*, by T.G.M. Van de Ven, Academic Press, 1989. Review in *Langmuir* **7**, 436 (1991).

INVITED PRESENTATIONS

“The Hydrodynamic Mechanism behind Osmotic Flow in Porous Membranes,” seminar presented at SUNY, Buffalo (1974).

“The Role of Wall-Solute Interactions in Determining Transport Rates in Small Pores,” seminar presented at U. Delaware and Penn State U. (1975).

“Diffusive Transport of Compact Macromolecules,” seminar presented at U. Illinois, U. Rochester, and Princeton U. (1975).

“Transport of Macromolecules in Confined Systems,” seminar presented at Carnegie-Mellon U., U. Pennsylvania and U. Virginia (1976).

“Diffusion of Brownian Particles: Electrostatic and Size Effects,” seminar presented at Carnegie-Mellon U. (Polymers group, 1977).

“Electrolyte Transport in Charged Pores,” seminar presented at Case Western Reserve U. (1978).

“Model Studies of Membrane Transport using Synthetic Porous Membranes,” seminar presented at Columbia U. (1978).

“Studies of Solute/Membrane Interactions using Synthetic Microporous Membranes,” Gordon Conference on Transport Phenomena in Biological and Synthetic Microporous Membranes (1978).

“Electrokinetics” and “Passive Separator Transport,” two separate seminars at Diamond Shamrock Corp. (1977-78).

“Coupling of Solute Flux to Water Flux,” Symposium on Direct Measurements of Transport and Permeability in Single Capillaries, U. of California (Davis) (1979).

“Studies of Solute/Membrane Interactions using Synthetic Microporous Membranes,” seminar presented at U. Michigan (1979).

“Hindered Molecular Transport in Porous Media,” seminar presented at Notre Dame U. (1980).

“Track-Etched Films as Model Membranes,” seminar presented at the National Institutes of Health Instrumentation Symposium (1981).

“Hindered Transport through Porous Membranes,” seminar presented to Research Center, Stauffer Chemical Co. (1981).

“Concentration Effects on Distribution of Macromolecules in Small Pores,” paper presented at the IUTAM-IUPAC Symposium on Interactions of Particles in Colloidal Dispersions, Canberra, Australia, March (1981).

“The Relationship Between Chemistry and Chemical Engineering Education,” seminar presented to the student affiliate chapter of ACS, Allegheny College (1981).

“Electrolyte Transport in Charged Capillary Pores,” seminar presented at the Illinois Institute of Technology (1981).

“Hindered Molecular Transport in Porous Media,” seminar presented at the California Institute of Technology, Syracuse U., and Rensselaer Polytechnic Institute (1981).

“Chemically-Driven Motion of Particles,” seminar presented at U. Houston (1981).

“Electrolyte Transport in Charged Capillary Pores,” seminar presented at Rice U. (1981).

“Equilibrium and Transport of Brownian Particles in Microporous Media,” State-of-the-Art paper for Symposium at the 74th Annual A.I.Ch.E. Meeting, New Orleans (1981).

“Chemically-Driven Motion of Colloidal Particles,” seminar presented at Clarkson College of Technology (1982).

“Hindered Diffusion of Asphaltenes through Microporous Membranes,” seminar presented at Cornell U., Stanford U., Chevron Research Co., M.I.T., Johns Hopkins University, and Exxon Corp. (Baton Rouge)] (1982).

“Continuum Model for Electrolyte Transport in Charged Pores,” paper presented at the Symposium on Membranes and Ionic/Electronic Conducting Polymers, sponsored by NASA and the Electrochemical Society, Case-Western Reserve U. (1982).

“Diffusiophoresis: Motion of Particles by a Gradient of a Small Solute,” seminar presented at Marshall Space Flight Center, NASA, Huntsville, AL. (1982).

“Space Charge Model for Electrokinetic Phenomena in Microporous Membranes,” invited lecture at Annual A.I.Ch.E. Meeting, Los Angeles (1982).

“Role of Steric Interactions on Membrane Transport: Osmosis,” presented at Gordon Conference on Water and Solute Exchange in the Microvasculature (1982).

“Transport Model for Electrokinetic Phenomena in Charged Microporous Membranes,” presented at Gordon Conference on Separation and Purification (1982).

“Particle Motion Driven by Gradients of Molecular Solutes,” seminar presented at Brown U., U. Michigan and U. Massachusetts (1983).

“Hindered Diffusion of Asphaltenes through Microporous Membranes,” seminar presented at Exxon Research and Engineering (Linden) (1983).

“Particle Motion in Chemical Gradients,” invited paper at 3rd International Conference on Partitioning in Two Polymer Systems.

“Chemically-Driven Motion of Colloids,” seminar presented at Dept. Appl. Math. Theor. Physics, Cambridge U. (England) (1983).

“Ultrafiltration of Linear Macromolecules through Microporous Membranes,” seminar presented at University College (Dublin), Imperial College (London), Centre de Recherches sur Res Macromolecules (Strasbourg), and Institute Francais du Petrole (Rueil Malmaison).

“Particle Motions Driven by Concentration Gradients of Molecular Solutes,” seminar presented at Schlumberger-Doll Research (1983).

“Flow Dependent Rejection of Polymer Chains from Porous Membranes,” seminar presented at U. Pittsburgh (1983).

“Ultrafiltration of Polymer Chains,” seminar presented at U. Puerto Rico (1984).

“Osmosis: Membrane Transport and Vesicle Motion,” seminar presented at U. Puerto Rico (1984).

“Ultrafiltration of Polymer Chains from Microporous Membranes,” seminar presented at U. Florida (1984), U. California, Berkeley (1985), UCLA (1985), U. West Virginia (1985).

“Transport Mechanisms of Biological Colloids,” paper at 4th International Conference on Biochemical Engineering, Galway, Ireland, Sept. 30-Oct. 5, 1984.

“Forces, Friction and the Transport of Colloidal Particles,” seminar presented at Stanford (1985), U. Southern California (1985), Iowa State (1985).

“Effect of Charge Distribution on Electrophoresis and Electroosmosis,” seminar presented at U. Arizona (1985).

“Electrokinetic Phenomena in Porous Membranes,” invited paper at the Conference on Electrolyte Solutions in Science and Engineering, National Bureau of Standards (1985).

“Transport of Polymer Solutions in Microporous Membranes,” seminar presented at U. Delaware (1985), U. Pennsylvania (1986) and U. Virginia (1986).

“Phoretic Mechanisms of Colloidal Transport,” seminar presented at the Dow Chemical Co. (1985).

“Diffusiophoresis: Chemotaxis of Dead Particles,” Gordon Conference on Theoretical Biology and Biomathematics, New Hampshire (1986).

“Polymer Dynamics in Small Pores: Ultrafiltration of Polymer Chains,” seminar presented at U. Rochester (1986).

“Transport of Polymers through Microporous Membranes,” seminar presented at U. Rochester (1986), U. Texas (1987), Lehigh U. (1987), U. Missouri-Rolla (1987).

“Polymer-Membrane Composites: Adjustable Permeability,” Symposium on Selective Transport and Reactions in Membranes, ACS National Meeting, New Orleans (1987).

“Diffusiophoresis: Transport of Colloids by Chemical Gradients,” seminar presented at Rensselaer Polytechnic Inst. (1988) and SUNY-Buffalo (1988).

“Effect of Molecular Configuration on Diffusion in Small Pores,” invited paper at 72nd Annual Meeting, Fed. Amer. Soc. for Exp. Biology, Las Vegas (1988).

“Transport of Colloids by Interfacial Forces,” seminar presented at Purdue (1988) and U. Illinois (1988).

“Principles of Membrane Separation,” invited paper at Symposium on “Separation Process Technology,” ARCO Chemical Co. (1988).

“Colloidal Transport by Interfacial Forces” and “Large Molecules in Small Pores: Membrane Separations and Life,” Berkeley Lectures in Chemical Engineering (1989).

“Diffusion of Large Molecules in Small Pores-Model Compounds and Asphaltenes,” invited seminar at Mobil Research and Development (1989).

“Hindered Transport through Microporous Membranes,” seminar at Indiana/Purdue Universities at Indianapolis (1989).

Presented First Annual John C. and Florence W. Holtz Lecture in Chemical Engineering, The Johns Hopkins University, April 9, 1990.

“Polymer/Membrane Composites: Tunable Selectivity and Permeability,” seminar at Penn State University (1990).

“Colloid Transport by Interfacial Forces - Electrophoresis and Diffusiophoresis,” seminar at Carnegie Mellon University (Physics Department, 1990).

“Polymer Membrane Composites: Tunable Selectivity and Permeability,” seminar at University of Washington, Seattle (1990).

“Transport in Membranes with Polymer-Filled Pores,” seminar at Air Products and Chemicals, Inc. (1990).

“Membrane Separation of Solutions” and “Electrokinetic Phenomena,” two lectures presented at Moscow Institute of Food Technology, Moscow, Russia (1990).

“Mass Transfer in Complex Media: Understanding Molecular Selectivity,” Professional Progress Award Lecture, AIChE Annual Meeting, Chicago, November 1990.

“Colloid Transport by Interfacial Forces - Electrophoresis and Diffusiophoresis,” seminar at University of Wisconsin, Madison (1991).

“Colloid Transport by Electrophoresis and Diffusiophoresis,” seminar at University of Wisconsin (1991).

“Phoretic Transport of Heterogeneous Particles,” Presentation at International Symposium on Non-Equilibrium Electrical Surface Phenomena Membrane Transport and Related Topics, Kiev, Ukraine, May 1991.

“Polymers and Membranes: Selectivity with Large Pores,” Presentation at Gordon Research Conference on Reverse Osmosis, Ultrafiltration and Gas Separations, Plymouth State College, Plymouth, NH, August 1991.

“Transport through Porous Membranes: Effects of Adsorbed Polymers,” invited seminar at Exxon Research & Development (1991).

“Transport through Porous Membranes: Effects of Adsorbed Polymers,” seminar at Georgia Institute of Technology (1991).

“Electrokinetics of Heterogeneous Colloids,” Keynote Paper, AIChE Annual Meeting, Los Angeles, November 1991.

“Electrokinetic Transport of Heterogeneous Colloids,” invited seminar at University of Pittsburgh and University of Toledo (1992).

“Electrokinetic Phenomena of Heterogeneous Surfaces,” 9th International Symposium on Surfactants in Solution, Varna, Bulgaria (1992).

“Hindered Transport in Fuzzy Pores: Effects of Adsorbed Polymers on Diffusion,” Fine Particle Society, Las Vegas (1992).

“Phoretic Transport of Colloidal Particles,” invited seminar at Princeton University, 1992.

“Electrophoresis of Non-Uniformly Charged Colloids,” University of Melbourne and University of Sydney, Australia (1992).

“Phoretic Transport of Colloidal Particles,” University of Kentucky (1993).

“Polymer Adsorbed to Porous Media: Good, Bad or Just Ugly?,” University of Delaware (A.B. Metzner Symposium) (1993).

“Electrokinetic Measurements of Heterogeneous Media,” invited paper at AIChE Annual Meeting, St. Louis (1993).

“Molecular Transport through Gel-Filled Pores,” Exxon Research & Engineering, Annandale, NJ (1994).

“Transport of Colloids in Electric Fields,” Hercules, Inc., Research and Development Center, Wilmington, DE (1994).

“Electrophoresis: Complex Particles and Nonuniform Electric Fields,” University of Utrecht, The Netherlands (1994).

“Molecular Transport through Gel-Filled Porous Media,” University of Bristol, UK (1994); NIZO, The Netherlands (1994).

“Probing the Structure of Colloidal Doublets by Electrophoretic Rotation,” U. South Australia, U. Sydney, U. Melbourne (1995).

“Electrokinetic Transport of Complex Colloids,” Gordon Conference on Microgravity (1995).

“Convective and Diffusive Transport through Gel-filled Porous Membranes,” U. Melbourne, U. Queensland, U. New Castle (1995).

“Probing the Structure of Colloidal Doublets by Electrophoretic Rotation,” University of Adelaide, University of Melbourne and University of Sydney (1995).

“Convective and Diffusive Transport through Gel-filled Porous Membranes,” University of Melbourne, New Castle University and University of Queensland (1995).

“On the Beach: a sabbatical in the Netherlands and Australia,” Carnegie Mellon University (1995).

“Partitioning and Diffusion of Proteins in Polymeric Gels,” University of Massachusetts (1995).

“Electrokinetic Transport of Complex Colloids”, invited paper at the Gordon Conference on Microgravity, Henniker, NH (1995).

“Clogged Pores: Gel-Filled Membranes as Separation Devices,” invited paper at the Fine Particle Society Meeting, Chicago (1995).

“Probing Colloidal Forces by Differential Electrophoresis,” University of Arizona and Clarkson University (1996).

“Probing Colloidal Forces by Differential Electrophoresis,” invited paper at Electrokinetic Phenomena ‘96,” Rome (1996).

“Differential Electrophoresis: A Method to Align and Stress Colloidal Aggregates,” University of California, Santa Barbara (1997).

“Differential Electrophoresis: A Method to Align and Stress Colloidal Aggregates,” UCLA (1997).

“Differential Electrophoresis: A Method to Probe the Forces Holding Colloidal Particles Together,” Barnett Dodge Lecture, Yale (1997).

“Self-Ordering of Particles during Electrophoretic Deposition,” Symposium honoring John Quinn, Los Angeles (1997).

“Electrokinetic Phenomena: Old Tricks for Young Dogs,” and “Differential Electrophoresis: A Method to Probe the Forces Holding Colloidal Particles Together,” 31st Annual W.N. Lacey Lectures in Chemical Engineering, CalTech (1998).

“Electrophoresis of Colloids in Aggregates and Near Electrodes,” NSF workshop on Particle Technology, Santa Barbara (1998).

“Determining Colloidal Forces using Differential Electrophoresis,” AIChE Meeting, Miami Beach (1998).

“A Model for Partnering: Carnegie Mellon University and Caterpillar Inc.,” ASEE National Meeting (1998).

“Differential Electrophoresis as a Probe of Colloidal Forces,” Massachusetts Institute of Technology (1998).

“Role of Electroosmosis and Thermocapillarity in the Motion of Particles and Bubbles at Surfaces,” Harvard University (1998).

“Role of Electroosmosis and Thermocapillarity on the Motion of Particles and Bubbles at Surfaces,” McMaster University (1999).

“Differential Electrophoresis as a Probe of Colloidal Forces,” University of Florida (1999).

“Differential Electrophoresis as a Probe of Colloidal Forces,” SUNY Buffalo, Symposium to Honor Eli Ruckenstein on his receiving the Medal of Science (1999).

“Role of Electroosmosis and Thermocapillarity in the Motion of Particles and Bubbles at Surfaces,” Tulane University (1999).

“Getting Something for Nothing: the Reciprocal Theorem,” Symposium to Honor Howard Brenner, MIT, (1999).

“Dynamics of Self-Aggregation of Particles on Electrodes,” Lehigh University and University of Kentucky (2000).

“Differential Electrophoresis: Rotation and Displacement of Heterogeneous Colloids,” Electrooptics 2000, Pamporovo, Bulgaria (2000).

"Dancing on a Surface: Self Assembly of Particles and Bubbles by Hydrodynamic Mechanisms," Stanley Katz Lecture 2001, City College of New York (2001).

“Electrophoresis of Heterogeneous Particles: Can Neutral Particles Move?,” AICHE 2001 Annual Meeting, Keynote Lecture (2001).

“Electrokinetic Flows in Heterogeneously Charged Systems,” Illinois Institute of Technology (2002).

“Successful Practices in International Engineering Education,” ASEE Annual Conference (2002).

“2-D Assembly of Colloids by Electrohydrodynamics”, Gordon Research Conference on Chemistry at Interfaces (2002).

“Assembly of Colloids in 2-D Electrohydrodynamic Flows near Electrodes,” Fourteenth U.S. National Congress of Theoretical and Applied Mechanics (2002).

“Two Particle Dynamics on Electrodes; Attraction and Repulsion in AC Fields,” EPD Conference, Banff, Canada (2002).

“Interfaces and Fields from Membranes to Optical Displays,” John Quinn Symposium, University of Pennsylvania (2003).

“Dancing on Surfaces: Self-Assembly of Particles using Electric Fields,” Ohio State University, Arizona State University, Case Western Reserve University, New Jersey Institute of Technology, and University of Michigan/Michigan State (2003).

“Diversity of Electrokinetics: Nonuniformly Charged Surfaces,” First Annual John A. Quinn Lecture, University of Pennsylvania (2004).

“Dancing on Surfaces: Self-Assembly of Particles Using Electric Fields,” Mumbai University Institute of Chemical Technology, Mumbai, India (2004).

“Electrokinetics of Non-Uniform Systems,” National Taiwan University, Taipei, Taiwan (2005).

“Dancing on Surfaces: Self-Assembly of Particles Using Electric Fields,” National Cheng Kung University, Tainan, Taiwan (2005).

“Dancing on Surfaces: Self-Assembly of Particles and Bubbles,” The University of Akron, Akron, Ohio (2005).

“Globalization of U.S. Business: Challenges and Opportunities for (Engineering) Education,” ASME International Mechanical Engineering Education Conference, San Diego, California (2005).

RESEARCH FUNDING

NSF Initiation GK-32682

“Particle/Wall Interactions in Transport through Porous Membranes,”
April 1, 1972-Sept. 30, 1973 (\$16,000).

NSF GK-41279, ENG 73-04112

“Interaction Among Mass-Charge-Momentum Transport within
Small, Charged Pores,”
Jan. 1, 1974-Aug. 31, 1976 (\$43,000).

NSF ENG 75-13440

“Transport of Polyelectrolytes in Aqueous, Microporous Systems,”
Sept. 1, 1975-Feb. 28, 1978 (\$40,500).

NSF ENG 76-21921, ENG 78-06424

“Interactions Among Mass-Charge-Momentum Transport within
Small, Charged Pores,”
Sept. 1, 1976-Nov. 30, 1980 (\$91,641).

NSF PCM 77-20525

“Hindered Molecular Transport in Confined Systems with Large Surface
Area/Volume Ratio,”
July 15, 1977-Dec. 31, 1979 (\$43,700).

NSF ENG 77-12997

“Hindered Diffusion with Chemical Reaction in Small Pores,”
Feb. 15, 1978-Feb. 14, 1980 (\$77,348).

NSF CPE 79-24558

“Gel Permeation Chromatograph with On-Line Low Angle Laser Light
Scattering Detection,”
Jan. 1, 1979-June 30, 1980 (\$41,800).

NSF CPE 80-05344

“Hindered Diffusion with Chemical Reaction in Small Pores,”
Aug. 1, 1980-July 31, 1983 (\$175,425).

NSF CPE 80-07524

“Transport of Electrolyte Solutions through Microscopic Charged Pores,”
Oct. 15, 1980-Oct. 14, 1982 (\$75,923).

Westvaco Corporation

“Flow of Linear Macromolecules through Microporous Membranes,”
Nov. 1980-July 1983 (\$20,000).

NSF CPE 81-21332

“Chemically-Driven Particle Motion,”
April 1, 1982-March 31, 1985 (\$125,320).

National Institutes of Health

National Research Service Award (Training Grants) GMO7477
July 1, 1983-June 30, 1988 (\$570,000).

NSF CPE 83-12788

“Flow of Macromolecules through Microporous Membranes,”
Feb. 1, 1984-July 31, 1985 (\$25,000).

ACS-PRF 16085-AC5

“Effect of Molecular Configuration on Hindered Diffusion in Small Pores,”
Sept. 1, 1984-Aug. 31, 1986 (\$31,850).

NSF CPT 84-12332

“Flow of Macromolecules through Microporous Membranes,”
Nov. 15, 1984-April 30, 1987 (\$127,000).

Westvaco Corporation

“Dynamics of Polymer Chains and Colloidal Particles,”
July 1983-June 1992 (\$80,000).

NSF CBT 85-13673

“Phoretic Transport of Colloidal Particles,”
April 1, 1986-Sept. 30, 1989 (\$240,000).

NSF CBT 86-16341

“Separation of Proteins using Ligand Gradients,”
Aug. 15, 1986-Jan. 31, 1988 (\$30,000).

NSF CBT 86-21332

“Transport of Polymers in Confined Geometries,”
Sept. 1, 1986-March 1, 1989 (\$133,000).

NSF CBT 87-8720258

“Protein Transport by Ligand Gradients,”
Feb. 1, 1988-July 31, 1991 (\$173,000).

NSF CTS 89-20600

“Electrophoretic Transport of Heterogeneous Colloids,”
April 15, 1990-April 14, 1992 (\$147,168)

NSF CTS-91-22573

“Polymer-in-Pore Composite Membranes”
March 15, 1992-February 14, 1995 (\$254,995).

ACS-PRF 25294-AC7E

“Diffusion, Flow and Partitioning in Gels,”
September 1, 1992-August 31, 1994 (\$40,000).

NASA NAG8-964

“Electrokinetic Transport of Heterogeneous Particles in Suspensions,”
January 1, 1993-December 31, 1995 (\$279,000)

Hercules, Inc.

“Unrestricted Support of Research in Colloid and Membrane Transport,”
October 1, 1994-September 30, 1996 (\$30,000)

NSF CTS-9420780

“Alignment and Transport of Colloidal Particles in Nonhomogeneous Electric
Fields,” April 1, 1995-March 31, 1998 (\$240,000)

NASA NAG3-2159

“Lateral Motion of Particles and Bubbles Caused by Phoretic Flows Near a Solid
Interface,”
January 1, 1998-December, 31, 2002 (\$400,000)

NSF CTS-9814064

“Particle Aggregation during Electrophoretic Deposition,”
June 1, 1999- May 30, 2000 (\$66,000)

Philips Research Labs, Eindhoven, The Netherlands

“Mechanism of ac Field Aggregation”
Sept. 1, 2001-August 31, 2003 (\$106,000)

NSF CTS-0089875

“Effect of Alternating Current on the Dynamics of Colloidal Particles Near
Electrodes,”
March 1, 2001-February 28, 2004 (\$270,000)

DOCTORAL THESES SUPERVISED

1. Dermot M. Malone, Cornell University (1977)
“The Convection and Diffusion of Brownian Particles within Porous Systems: A Theoretical and Experimental Approach”
Current Position: Lecturer (tenured)
Department of Chemical Engineering,
University College, Dublin, Ireland
2. Wei-Hu Koh, Cornell University (1977)
“Electrokinetic Flows in a Charged Microcapillary Model Membrane: Studies of Streaming Potential and Molecular Diffusion”
Current Position: Director of Advanced Technology Center-Asia
Motorola
3. C. Christopher Reed, Cornell University (1978)
“Mathematical Concepts in the Transport of Interacting Particles: Diffusion, Sedimentation and Osmosis”
Current Position: Research Scientist
The Aerospace Corp., Los Angeles, CA
4. Judeth H. Brannon, Carnegie-Mellon University (1981)
“The Concentration Dependence of the Partition Coefficient for Macromolecules in Porous Media”
Current Position: Senior Engineer
Borsig Technologies, Knight-Hawk Engineering
5. Gerald B. Westermann-Clark, Carnegie-Mellon University (1981)
“Ion Transport in Charged Porous Media”
Position: Associate Professor
Department of Chemical Engineering
University of Florida, Gainesville
(Deceased, December 1995)
6. Ruth E. Baltus, Carnegie-Mellon University (1982)
“Hindered Diffusion of Petroleum-Derived Asphaltenes”
Current Position: Associate Professor
Department of Chemical Engineering
Clarkson College of Technology, Potsdam, NY
7. Mark E. Lowell, Carnegie-Mellon University (1983)
“Models for Diffusiophoretic Motions of Rigid Particles”
Current Position: Manager, Engineering
Tamaqua Cable Products Corporation, Schuylkill Haven, PA

8. Treva D. Long, Carnegie-Mellon University (1983)
“Convective Transport of Flexible Chain Macromolecules through a Well-Defined Porous Membrane”
Current Position: Research Associate
Department of Chemical Engineering
Cornell University, Ithaca, NY
9. Huan J. Keh, Carnegie-Mellon University (1984)
“Hydrodynamic and Electrokinetic Characteristics of Transport of Macromolecules through Porous Media”
Current Position: Professor
Department of Chemical Engineering
National Taiwan University
10. W. Keith Idol, Carnegie-Mellon University (1985)
“The Effect of Adsorbed Polymers on Solvent Flow and Molecular Diffusion in Small Pores”
Current Position: Research Engineer
Exxon Production Research,
Houston, TX
11. James P. Ebel, Carnegie Mellon University (1986)
“Diffusiophoretic Transport of Colloidal Particles”
Current Position: Research Scientist
Procter and Gamble Co.
Cincinnati, OH
12. Robert P. Adamski, Carnegie Mellon University (1987)
“The Effect of Molecular Configuration and Flowrate on the Convective Transport of Polymer Molecules through Microporous Membranes”
Current Position: Associate Engineer
Shell Development
Houston, TX
13. Imtiaz A. Kathawalla, Carnegie Mellon University (1988)
“Configurational Effects on Hindered Diffusion through Microporous Membranes”
Current Position: Marketing Development Manager
Cabot Industries, Illinois
14. Jeenok T. Kim, Carnegie Mellon University (1989)
“Flow and Diffusion through Microporous Membranes with Adsorbed Polyelectrolyte”
Current Position: Research Engineer
Exxon Research & Engineering, Florham Park, NJ

15. Mark C. Fair, Carnegie Mellon University (1990)
“Electrophoresis of Nonspherical and Nonuniformly Charged Colloidal Particles”
Current Position: Research Project Engineer
Aristech Chemical Corporation
Process Implementation Division
Monroeville, PA
16. Erica S. Shane, Carnegie Mellon University (1991)
“Effects of Gradients of Solvent Composition on Diffusion of Proteins”
Current Position: Scientist III, Process Biochemistry
Med Immune, Inc., Gaithersburg, MD
17. Richard M. Webber, Carnegie Mellon University (1991)
“Hydrodynamic Thickness as a Probe of the Extension of Adsorbed Diblock Copolymer in Microporous Membranes”
Current Position: Research Scientist
Lubrizol
Cleveland, OH
18. Paul F. McKenzie, Carnegie Mellon University (1992)
“Effects of Adsorbed Polymers on Transport in Porous Membranes”
Current Position: Director of Pilot Plant Operations
Bristol-Myers Squibb, Pharmaceutical Research Institute
New Brunswick, NJ
19. Yashodhara Pawar, Carnegie Mellon University (1993)
“Electrophoresis of Heterogeneously Charged Colloids”
Current Position: Unknown
India
20. Vivek Kapur, Carnegie Mellon University (1995)
“Transport in Polymer/Gel Modified Micropores”
Current Position: Research Engineer
DuPont Central Research and Development
Wilmington, DE
21. Jane Tong, Carnegie Mellon University (1995)
“Partitioning and Diffusion of Macromolecules in Polyacrylamide Gels”
Current Position: Research Engineer
DuPont Company
Wilmington, DE
22. Darrell Velegol, Carnegie Mellon University (1997)
“Determining the Forces between Colloidal Particles Using Differential Electrophoresis”
Current Position: Assistant Professor, Department of Chemical Engineering
Pennsylvania State University
23. Scott Guelcher, Carnegie Mellon University (1999)

“Investigating the Mechanism of Aggregation of Colloidal Particles During Electrophoretic Deposition”

Current Position: Pittsburgh Tissue Engineering Initiative Postdoc
Pittsburgh, PA

24. Kristen Buehler, Carnegie Mellon University (1999)

“Effect of Membrane-Support and Solvent Quality on Permeability Characteristics of Confined Polyacrylamide Gels”

Current Position: Research Engineer
Institute for Defense Analyses, Alexandria, VA

25. Junhyung Kim, Carnegie Mellon University (2004)

“Dynamics of Particles in Spatially and Temporally Varying Electric Field near Electrodes”

Current Position: Senior Engineer, Samsung Electronics Co., Korea

PROFESSIONAL SOCIETIES

- National Academy of Engineering / National Research Council
 - Assessment Panel to evaluate Chemicals Technology Lab of NIST (1992-present)
 - Board on Chemical Sciences and Technology, (1996-present; co-chair since 1998).
 - Vice President Section 3 (Chemical Engineering) (2000 – present)
 - Chair of Section 3 Peer Group (2000 – present)
- American Institute of Chemical Engineers
 - Student Chapters Committee (National, 1972-1974)
 - Editor, Student Members Bulletin (Spring, 1974)
 - Reviewer, AIChE Journal
 - Programming Committee, Area 1C (Interfacial Phenomena) (1980-1988)
 - Programming Committee, Area 1J (Fluid Mechanics) (1984-1990)
 - Chaired Symposia at National Meetings Pittsburgh (1974), Los Angeles (1975), Houston (1977), Miami (1978), San Francisco (1979), Chicago (1980), Miami (1986), New York (1987), Miami (1995), Chicago (1996)
 - Successfully nominated four winners of National AIChE Awards
 - Member, National Awards Committee (1990-95)
- American Chemical Society
 - Member of Colloids Division and Polymers Division
 - Chaired Symposium (1983)
 - Awards Committee (1987-1991)
- American Institute for Medical and Biological Engineering
 - Fellow
- American Association for Advancement of Science
- Council for Chemical Research
 - Governing Board (1991-1994)
 - University Industry Interaction Committee (1987-1994)

MAJOR COMMITTEES AT CARNEGIE MELLON UNIVERSITY

- College Promotions Committee (1979-present)
- University Review and Grievance Committee (1979-81)
- Search Committees for Department Head of Mechanical Engineering (several times), Department Head of Chemistry (several times), and Dean of School of Computer Science (1999)
- University Radiation Safety Committee (1984-1994)
- Chairman, Committee to evaluate the University Athletic Department (1985-86)
- Committee to Develop Architectural Program for the Planned University Center; Juror for Architectural Competition (1986-88)
- Committee to Evaluate the Dean of Mellon College of Science (1987)
- Freshman Orientation Program (1988)
- Campaign for Carnegie Mellon, Faculty/Staff Development (Fund Raising Committee) (1990-1991)
- Faculty/Staff Development Committee (1990-1992)
- Committee to review the “Academic and Financial Relations of GSIA with the Undergraduate Curriculum in Economics and IM and the University” (1991).
- Committee to Evaluate Graduate Student Costs in Research (GTR Committee) (1993-94)
- Facilities Design and Construction Quality Team (1994)
- Faculty Advisory Committee to Review the President
- Educational Affairs and Enrollment Committee (1996-2004).
- Financial Management Project Steering Committee (1998-2004)
- Honorary Doctorate Degree Committee (1998 - 2000)
- Research and Technology Commercialization Committee of the Board of Trustees (1998-2004)
- Search Committee for VP of Development (1999)
- Campus Master Planning Committee (2000)
- University Promotion and Tenure Committee (1996 – 2004)
- University Committee for Experimental Sciences Space Planning (2001)