

## JOHN L. ANDERSON

### EDUCATION

University of Illinois (Urbana)	Ph.D.	1971	Chemical Engineering
University of Illinois (Urbana)	M.S.	1969	Chemical Engineering
University of Delaware (Newark)	B.ChE.	1967	Chemical Engineering

### PROFESSIONAL EMPLOYMENT

*Illinois Institute of Technology*, Chicago, IL 60616

- President and Professor of Chemical Engineering (August 1, 2007–present)

*Case Western Reserve University*, Cleveland, Ohio

- Provost and University Vice President (April 1, 2004–July 2007)
- Professor of Chemical Engineering (April 1, 2004–July 2007)

*Carnegie Mellon University*, Pittsburgh, PA

- Adjunct Professor of Chemical Engineering (April 1, 2004–present)
- Dean, College of Engineering (July 1, 1996–March 31, 2004)
- University Professor (July 1, 1994–March 31, 2004)
- Professor of Chemical Engineering (September 1, 1979–March 31, 2004)
- Head, Department of Chemical Engineering (September 1, 1983–August 31, 1994)
- Director, Biomedical Engineering Program (June 1, 1980–June 30, 1985)
- Associate Professor of Chemical Engineering (September 1, 1976–August 31, 1979)

*Cornell University*, Ithaca, NY

- Assistant Professor of Chemical Engineering (September 1, 1971–August 31, 1976)  
(also Assistant Professor of Applied Mathematics)

*U.S. Army Reserves*

- 1st Lieutenant (1972–1976)

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

- Process Engineer (1967)

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

- Pilot plant engineer (1966)

### RESEARCH INTERESTS

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

## HONORS

- National Academy of Engineering
- Fellow of the American Academy of Arts and Sciences
- Fellow of the American Association for the Advancement of Science
- Fellow of The American Institute of Medical and Biological Engineering
- Fellow of the John Simon Guggenheim Memorial Foundation, 1982–1983
- Professional Progress Award, American Institute of Chemical Engineers, 1989
- Alumni Wall of Fame, University of Delaware, 1993
- Professorships:
  - a. Gulf Oil Professor of Chemical Engineering, Carnegie Mellon, 1991–1997
  - b. Visiting Professor (Research Scholar Award), University of Melbourne (Australia), 1995
  - c. Visiting Professor (NWO Fellow), Landbouw Universiteit Wageningen (The Netherlands), 1994
  - d. University Professor, Carnegie Mellon University, 1994-2004
  - e. Robert Mehrabian Professor, Carnegie Mellon University, 1997–2004
  - f. Visiting Professor of Chemical Engineering, MIT, 1982-83
  - g. Visiting Scholar, Irish American Technology Exchange Programme, Department of Chemical Engineering, University College Dublin, 1983
- Lectures:
  - a. Themis Medicare Chemcon Distinguished Speaker Award, Indian Institute of Chemical Engineers, Mumbai, India, 2004
  - b. First Annual John A. Quinn Lecture, University of Pennsylvania, 2004
  - c. Blue/Green Lecturer, University of Michigan and Michigan State University, 2003
  - d. Stanley Katz Lecturer 2001, City College of New York, 2001
  - e. 31st Annual W.N. Lacey Lectureship in Chemical Engineering, California Institute of Technology, 1998
  - f. Barnett Dodge Lectureship, Yale University, 1997
  - g. Holtz Lecture, Johns Hopkins University, 1990
  - h. Fifth Berkeley Lectures, University of California, 1989
  - i. National Science Foundation Commemorative Lectureship, 1989
- Award for “Outstanding Professional Accomplishments in the Field of Academics,” AIChE, Pittsburgh Section, 1999
- Co-author of “Best Technical Paper” at Annual AIChE Meeting, Miami Beach, 1992
- Co-Chair of Gordon Conference on “Membranes: Materials and Processes,” 1993
- Vice-Chair of Gordon Conference on “Synthetic Membranes,” 1991
- 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), 1969–1971
- National Science Foundation Pre-doctoral Fellowship (declined), 1969
- Tau Beta Pi, Omicron Delta Kappa, Phi Kappa Phi, Sigma Xi

## PROFESSIONAL ACTIVITIES

- Illinois Institute of Technology, Board of Trustees
- Fermi National Laboratory, Board of Directors
- Chicago Council on Science and Technology, Board of Directors

- National Research Council
  - Chair, Assessment Panel for the Chemical Science and Technology Laboratory, NIST (2007 – 2009); member of Panel (1992-98)
  - Chair, Study Committee on *Countering Improvised Explosive Devices: Basic Research to Interrupt the IED Delivery Chain* (2005–2007)
  - Chair, Study Committee on the *Review of Existing and Potential Explosives Detection Techniques* (2003–2004).
  - Chair, Workshop on *Challenges for the Chemical Sciences in the 21st Century: National Security and Homeland Defense* (2002). Report issued.
  - Study Committee on the *Design, Construction and Renovation of Laboratory Facilities* (1999–2000). Report issued.
  - Board on Chemical Sciences and Technology (1996–2001, co-chair 1998–2001)
  - Assessment Panel for Chemical Science and Technology Division of NIST, National Research Council (1992–1998)
- Associate Editor, *Industrial and Engineering Chemistry Research* (1986–2007)
- Editorial Board, *Current Opinion in Colloid and Interface Science* (1995–2004)
- Vice Chair of Engineering Deans' Council Executive Board, American Society of Engineering Education (2003–2004)
- Pittsburgh Technology Council Board of Directors (2000–2004)
- Awards Committee, American Institute of Chemical Engineers (1989–1994)
- Advisory Board, Petroleum Research Fund, American Chemical Society (1986–1990)
- Associate Editor, *Advances in Chemical Engineering* (1985–1998)
- Advisory Board, CBT Division of the Engineering Directorate, National Science Foundation (1986–1987)
- University Representative, Council for Chemical Research (1983–1994)
  - Governing Board (1991–1994)
  - Executive Committee (1991–1994)
  - University/Industry/Government Interaction Committee (1988–1993)
- Awards Committee, American Chemical Society (1987–1991)
- Review Committee NRC for the NSF Graduate Fellowship Program (1988–1990)
- Visiting Committees and Advisory Councils
  - School of Engineering Academic Advisory Council, Virginia Commonwealth University (2000–2007)
  - Whiting School of Engineering Advisory Council, Johns Hopkins University (1999–2007)
  - Department of Chemical Engineering, University of Michigan (1997–2007)
  - College of Engineering Advisory Council, University of Delaware (1993–2008)
  - College of Engineering Advisory Board, Georgia Institute of Technology (2002–2004)
  - College of Engineering, Cornell University (1998–2004)
  - Faculty Review Committee, University of Dublin (2003)
  - Chemical and Biomolecular Engineering Evaluation Board, Cornell University (2002)
  - 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 (1999)
  - School of Chemical Engineering, Cornell University (1990–1999)
  - IBM Center on Bioremediation, University of Virginia (1993–1997)

- Department of Chemical Engineering, Massachusetts Institute of Technology (1988–1992)
- Department of Chemical Engineering, University of Virginia (1988–1992)
- Consulting
  - Washington Advisory Group, for King Abdullah University of Science and Technology (KAUST)
  - HemaSure Inc., Marlborough, MA
  - Sepracor/Biosepra, Inc., Marlborough, MA (through Pennie & Edmonds)
  - Westvaco, Laurel, MD
  - Respironics, Pittsburgh, PA
  - Exxon Engineering and Research, Annandale, NJ
  - Baroid Drilling Fluids Inc., Houston, TX
  - E-Ink, Cambridge, MA

## PUBLICATIONS

1. “Diffusion of Insulin-like Growth Factor-I and Ribonuclease Through Fibrin Gels,” *Biophysical Journal*, **92**, 4444–4450 (with J. V. Nauman, P. G. Campbell, and F. Lanni).
2. “Movement of Colloidal Particles in Two-Dimensional Electric Fields,” *Langmuir*, **21**, 10941–10947 (2005) (with J. Kim, S. Garoff, and L. J. M. Schlangen).
3. “Ionic Conduction and Electrode Polarization in a Doped Nonpolar Liquid,” *Langmuir*, **21**, 8620–8629 (2005) (with J. Kim, S. Garoff, and L. J. M. Schlangen).
4. “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).
5. “Solvent Effects on the Permeability of Membrane Supported Gels,” *Industrial & Engineering Chemistry Research*, **41**, 464–472 (2002) (with K. Buehler).
6. “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).
7. “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).
8. “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).
9. “Aggregation of Pairs of Particles on Electrodes During Electrophoretic Deposition,” *Powder Technology*, **110**, 90–97, (2000) (with S. Guelcher and Y. Solomentsev).
10. “Measuring Colloidal Forces Using Differential Electrophoresis,” *Langmuir*, **16**, 7, 3372–3384 (2000) (with D. Velegol and S. Garoff).
11. “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).
12. “Thermocapillary Flow and Aggregation of Bubbles on a Solid Wall,” *J. Colloid and Interface Science*, **232**, 111–120 (2000) (with H. Kasumi, Y. E. Solomentsev, S. A. Guelcher, and P. J. Sides).

13. "Applications in Chemistry/Chemical Engineering: Introduction," *Current Opinion in Colloid and Interface Science*, **3**, 349–350 (1999) (with J. Y. Walz).
14. "Tangential Forces Between Non-Touching Colloidal Particles," *Physical Review Letters*, **83**, 1243–1246 (1999) (with D. Velegol, S. Catana, and S. Garoff).
15. "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).
16. "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).
17. "Transport of Proteins Through Gel-Filled Porous Membranes," *J. Membrane Sci.*, **131**, 143 (1997) (with V. Kapur and J. Charkoudian).
18. "Conduction in the Small Gap Between Two Spheres," *Phys. Fluids*, **9**, 1209 (1997) (with Y. Solomentsev and D. Velegol).
19. "Particle Clustering and Pattern Formation During Electrophoretic Deposition: A Hydrodynamic Model," *Langmuir*, **13**, 6058–6068 (1997) (with Y. Solomentsev and M. Bohmer).
20. "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).
21. "Boundary Effects on Electrophoretic Motion of Spherical Particles of Arbitrary  $\kappa a$ ," *J. Colloid Interface Science*, **185**, 497 (1997) (with J. Ennis-King).
22. "Hydrodynamic Effects of Surface Layers on Colloidal Particles," *Chem. Eng. Commun.*, **148–150**, 291 (1996) (with Y. Solomentsev).
23. "Probing the Structure of Colloidal Doublets by Electrophoretic Rotation," *Langmuir*, **12**, 675 (1996) (with D. Velegol and S. Garoff).
24. "Partitioning and Diffusion of Proteins and Linear Polymers in Polyacrylamide Gels," *Biophys. J.*, **70**, 1505 (1996) (with J. Tong).
25. "Rotation of a Sphere in Brinkman Fluids," *Phys. Fluids*, **8**, 1119 (1996) (with Y. Solomentsev).
26. "Hydrodynamic Permeability of Hydrogels Stabilized Within Porous Membranes," *I&EC Res.*, **35**, 3179 (1996) (with V. Kapur, J. C. Charkoudian, and S. B. Kessler).
27. "Determining the Forces Between Latex Particles Using Differential Electrophoresis," *Langmuir*, **12**, 4103 (1996) (with D. Velegol and S. Garoff).
28. "Thermal Expansion and Contraction of Adsorbed Diblock Copolymers Near  $\Theta$  Conditions," *Langmuir*, **12**, 1040 (1996) (with R. M. Webber and C. C. van der Linden).
29. "Electrophoretic Transport of Spheroidal Colloids in Nonhomogeneous Electric Fields," *I&EC Research*, **34**, 3231 (1995) (with Y. Solomentsev).

30. "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).
31. "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).
32. "Electrokinetic Transport of Colloidal Particles with Heterogeneous Surfaces," *J. Electrostatics*, **34**, 189 (1995).
33. "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).
34. "Effects of Adsorbing-Block Molecular Weight on the Thickness of Adsorbed Diblock Copolymers," *Langmuir*, **10**(9), 3156 (1994) (with R. M. Webber).
35. "Electrophoresis of Slender Particles," *J. Fluid Mech.*, **279**, 197 (1994) (with Y. Solomentsev).
36. "Electrophoretic Mobility of Nonuniformly Charged Spherical Particles with Polarization of the Double Layer," *J. Colloid and Interface Science*, **158**, 1 (1993) (with Y. Solomentsev and Y. Pawar).
37. "Polarization Effects on Diffusiophoresis in Electrolyte Gradients," *J. Colloid and Interface Science*, **155**, 488 (1993) (with Y. Pawar and Y. Solomentsev).
38. "A Model of Pulsatile Flow in a Uniform Deformable Vessel," *J. Biomechanics*, **25**, 91 (1992) (with G. A. Johnson and H. S. Borovetz).
39. "Electrophoresis of Heterogeneous Colloids: Doublets of Dissimilar Particles," *Langmuir*, **8**, 2850 (1992) (with M. C. Fair).
40. "Hindered Diffusion in Slit Pores," *I&EC Research*, **32**, 743 (1992) (with Y. Pawar).
41. "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. Solomentsev and L. Asavathiratham).
42. "Diffusion and Flow Through Polymer-Lined Micropores," *I&EC Research*, **30**, 1008 (1991) (with J. T. Kim).
43. "Model for Hydrodynamic Thickness of Thin Polymer Layers at Solid/Liquid Interfaces," *Langmuir*, **7**, 162 (1991) (with P. F. McKenzie and R. M. Webber).
44. "Diffusiophoresis Caused by Gradients of Strongly Adsorbing Solutes," *Langmuir*, **7**, 403 (1991) (with D. C. Prieve).
45. "Flow-Dependent Filtration of a Rigid-Rod Polymer," *Macromolecules*, **24**, 3562 (1991) (with R. P. Adamski).
46. "Electrophoresis of Dumbbell-Like Colloidal Particles," *Int. J. Multiphase Flow*, **16**, 663 (1990); **16**, 1131 (1990) (with M. C. Fair).

47. "Hydrodynamic Studies of Adsorbed Diblock Copolymers in Porous Membranes," *Macromolecules*, **23**, 1026 (1990) (with R. M. Webber and M. S. Jhon).
48. "Enhanced Protein Diffusion in a Solvent Gradient," *I&EC Research*, **29**, 309 (1990) (with E. S. Shane and M. M. Domach).
49. "Electrophoresis of Nonuniformly Charged Ellipsoidal Particles," *J. Colloid and Interface Science*, **127**, 388 (1989) (with M. C. Fair).
50. "Colloid Transport by Interfacial Forces," *Ann. Rev. Fluid Mech.*, **21**, 61 (1989).
51. "Hindered Diffusion of Short-Chain Polystyrene and Porphyrins in Small Pores," *Macromolecules*, **22**, 1215 (1989) (with I. A. Kathawalla and J. S. Lindsey).
52. "Restricted Transport in Micropores with Adsorbed Polymers," *Polymer Preprints*, **30**(1), 381 (1989) (with J. T. Kim, R. M. Webber, and M. S. Jhon).
53. "Hindered Transport Through Micropores with Adsorbed Polyelectrolytes," *J. Membrane Sci.*, **47**, 163 (1989) (with J. T. Kim).
54. "Diffusiophoresis of Latex Particles in Electrolyte Gradients," *Langmuir*, **4**, 396 (1988) (with J. P. Ebel and D. C. Prieve).
55. "Pore Size Effects on Diffusion of Polystyrene in Dilute Solution," *I&EC Research*, **27**, 866 (1988) (with I. A. Kathawalla).
56. "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).
57. "Fluid Dynamical Effects of Polymers Adsorbed to Spherical Particles," *J. Chem. Phys.* **86**, 5163 (1987) (with J. Kim).
58. "Chemically Induced Migration of Particles Across Fluid Streamlines," *Chem. Engr. Comm.*, **55**, 211 (1987) (with D. C. Prieve and J. P. Ebel).
59. "Transport Mechanisms of Biological Colloids," *Ann. New York Acad. Sci.: Biochemical Engineering IV*, **469**, 166 (1986).
60. "Effects of Adsorbed Polyelectrolytes on Convective Flow and Diffusion in Porous Membranes," *J. Membrane Sci.*, **28**, 269 (1986) (with W. K. Idol).
61. "Measuring Diffusion Coefficients by Taylor's Method of Hydrodynamic Stability," *AIChE J.*, **32**, 2028 (1986) (with J. A. Quinn and C. H. Lin).
62. "Configurational Effects on Polystyrene Rejection from Microporous Membranes," *J. Polym. Sci.: Polym. Physics*, **25**, 765 (1986) (with R. P. Adamski).
63. "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).
64. "Boundary Effects on Electrophoretic Motion of Colloidal Spheres," *J. Fluid Mech.*, **153**, 417 (1985) (with H. J. Keh).
65. "Effects of Non-Uniform Zeta Potential on Particle Movement in Electric Fields," *J. Colloid Interface and Science*, **105**, 45 (1985).

66. "Droplet Interactions in Thermocapillary Motion," *Int. J. Multiphase Flow*, **11**, 813 (1985).
67. "Electroosmosis Through Pores with Nonuniformly Charged Walls," *Chem. Eng. Communications*, **38**, 93 (1985) (with W. K. Idol).
68. "Electrophoretic Transport of Colloids in Porous Media," Proceedings on The Chemistry and Physics of Composite Media, The Electrochemical Soc., Pennington, NJ, **85-8**, 103-111 (1985).
69. "The Streaming Potential and Inadequacies of the Helmholtz Equation," *J. Colloid Interface and Science*, **106**, 1 (1985) (with C. C. Christoforou and G. B. Westermann-Clark).
70. "Shape and Permeability Effects on Osmophoresis," *PhysicoChemical Hydrodynamics*, **5**, 205 (1984).
71. "Configurational Statistics of Brownian Dumbbells in a Quadratic Flow," *J. Chem. Phys.*, **80**, 1632 (1984) (with H. J. Keh).
72. "Comparison of GPC Elution Characteristics and Diffusion Coefficients for Asphaltenes," *FUEL*, **63**, 530 (1984) (with R. E. Baltus).
73. "Diffusiophoresis: Migration of Colloidal Particles in Gradients of Solute Concentration," *Separation and Purification Methods*, **13**, 67 (1984) (with D. C. Prieve).
74. "Flow Dependent Rejection of Polystyrene from Microporous Membranes," *J. Polymer Sci.- Polymer Physics Ed.*, **22**, 1261 (1984) (with T. D. Long).
75. "Diffusional Mass Transfer in a Simple Diaphragm Cell," *ASEE Annual Conference Proceedings*, Session 1616, 189 (1984).
76. "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).
77. "Solute Concentration Effect on Osmotic Reflection Coefficient," *Biophys. J.*, **44**, 79 (1983) (with R. P. Adamski).
78. "Solute Concentration Effects on Membrane Reflection Coefficients," *AIChE Symp. Series*, **79**(227), 84 (1983) (with R. P. Adamski).
79. "Hindered Diffusion of Asphaltenes Through Microporous Membranes," *Chem. Eng. Sci.*, **38**, 1959 (1983) (with R. E. Baltus).
80. "Movement of a Semi-Permeable Vesicle Through an Osmotic Gradient," *Phys. Fluids*, **26**, 2871 (1983).
81. "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).
82. "Anomalous Diffusion Rates in Hydrocarbon-Filled Pores in Muscovite Mica," *Chem. Eng. Sci.*, **37**, 483 (1982) (with R. E. Baltus and C. L. Baker).
83. "Concentration Effects on Distribution of Macromolecules in Small Pores," *Adv. Colloid Interface Science*, **16**, 391 (1982).
84. "Concentration Effects on Partitioning of Dextrans and Serum Albumin in Porous Glass," *J. Polymer Sci.- Polymer Physics*, **25**, 857 (1982) (with J. H. Brannon).

85. "Experimental Verification of a Theory for Electrokinetics in Charged Microporous Membranes," *J. Electrochem. Soc.*, **130**, 839 (1982) (with G. B. Westermann-Clark).
86. "Stable Concentration Gradients in a Vertical Tube," *Chem. Eng. Communications*, **18**, 93 (1982) (with M. E. Lowell).
87. "Concentration Dependence of the Distribution Coefficient for Macromolecules in Porous Media," *J. Polymer Sci.—Polymer Physics Edition*, **19**, 405 (1981) (with J. H. Brannon).
88. "Configurational Effects on the Reflection Coefficient of Rigid Solutes from Small Pores," *J. Theor. Biology*, **90**, 405 (1981).
89. "Concentration Dependence of Electrophoretic Mobility," *J. Colloid Interface and Science*, **82**, 248 (1981).
90. "Configurational Effects on Membrane Rejection," *J. Membrane Sci.*, **9**, 13 (1981) (with T. D. Long and D. L. Jacobs).
91. "Motion of a Charged Particle in a Gradient of Electrolyte," *International J. Physicochemical Hydrodynamics*, **1**, 51 (1980).
92. "Sedimentation Rates for Concentrated Suspensions of Particles and Drops," in *Proceedings of International Symposium on Solids Separation Processes*, Dublin, April 1980.
93. "Hindered Settling of a Suspension at Low Reynolds Number," *AIChE J.*, **26**, 816 (1980) (with C. C. Reed).
94. "Solvent Dielectric Effects on Electrokinetic Phenomena in Pores," *J. Electrochem. Soc.*, **127**(8), C404 (1980) (with G. B. Westermann-Clark).
95. "Rejection of Polyelectrolytes from Microporous Membranes," *J. Membrane Sci.*, **5**, 77 (1979) (with W. D. Munch and L. P. Zestar).
96. "Diffusion of Neutral Molecules in Charged Pores," *J. Colloid and Interface Science*, **64**, 57 (1978) (with W. H. Koh).
97. "Hindered Diffusion of Particles through Small Pores," *Chem. Eng. Sci.*, **33**, 1429 (1978) (with D. M. Malone).
98. "Particle Diffusion as a Function of Concentration and Ionic Strength," *J. Phys. Chem.*, **82**, 608 (1978) (with F. Rauh and A. Morales).
99. "Electrokinetic Parameters for Capillaries of Different Geometries," *J. Colloid and Interface Science*, **59**, 149 (1977) (with W. H. Koh).
100. "Diffusional Boundary-Layer Resistance for Membranes with Low Porosity," *AIChE J.*, **23**, 177, (1977) (with D. M. Malone).
101. "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).
102. "Diffusion of Spherical Macromolecules at Finite Concentration," *J. Chem. Phys.*, **64**, 3240 (1976) (with C. C. Reed).
103. "Reply to the Comments by S. Alpert and G. Phillies," *J. Chem. Phys.*, **65**, 4336 (1976) (with C. C. Reed).

104. "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).
105. "Electroosmosis and Electrolyte Conductance in Charged Microcapillaries," *AIChE J.*, **21**, 1176 (1975) (with W. H. Koh).
106. "Restricted Diffusion in Small Pores: A Model for Steric Exclusion and Hindered Particle Motion," *Biophysical J.*, **14**, 130 (1974) (with J. A. Quinn).
107. "The Mechanism of Osmotic Flow in Porous Membranes," *Biophysical J.*, **14**, 957 (1974) (with D. M. Malone).
108. "The Concentration Dependence of Macromolecular Diffusion Coefficient," *Ind. & Eng. Chem. Fund.*, **12**, 488 (1973).
109. "Ionic Mobility in Microcapillaries: A Test for Anomalous Water Structures," *J. Chem. Soc., Faraday Trans. 1*, **68**, 608 (1972) (with J. A. Quinn).
110. "Diffusion of Small Particles: Electrostatic Effects," *J. Colloid and Interface Science*, **40**, 273 (1972) (with J. A. Quinn).
111. "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).
112. "The Relationship Between Particle Size and Signal in Coulter-Type Counters," *Rev. Sci. Inst.*, **42**, 1257 (1971) (with J. A. Quinn).
113. "Bubble Columns: Flow Transitions in the Presence of Trace Contaminants," *Chem. Eng. Sci.*, **25**, 373 (1970) (with J. A. Quinn).
114. "The Transition to Slug Flow in Bubble Columns," *Chem. Eng. Sci.*, **25**, 338 (1970) (with J. A. Quinn).

## BOOKS

### Chapters

1. "Electrokinetic- and Thermocapillary-Flow-Driven Aggregation of Particles and Bubbles on Surfaces," in *Transport Processes in Bubbles, Drops, and Particles*, D. De Kee and R. P. Chhabra, editor, Taylor & Francis, p. 55–78, (2002) (with P. J. Sides, H. Kasumi, S. A. Guelcher, and Y. E. Solomentsev).
2. "Electrophoresis of Complex and Interacting Particles," in *Interfacial Electrokinetics and Electrophoresis*, A. V. Delgado, editor, Marcel Dekker, p. 147–172, (2001) (with D. Velegol and Y. Solomentsev).
3. "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).

## 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).

## **DOCTORAL THESES SUPERVISED (26)**

Jess Nauman, Carnegie Mellon University (2005)

“Diffusive and Convective Transport of Proteins in Fibrin Gels”

Junhyung Kim, Carnegie Mellon University (2004)

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

Scott Guelcher, Carnegie Mellon University (1999)

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

Kristen Buehler, Carnegie Mellon University (1999)

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

Darrell Velegol, Carnegie Mellon University (1997)

“Determining the Forces Between Colloidal Particles Using Differential Electrophoresis”

Vivek Kapur, Carnegie Mellon University (1995)

“Transport in Polymer/Gel Modified Micropores”

Jane Tong, Carnegie Mellon University (1995)

“Partitioning and Diffusion of Macromolecules in Polyacrylamide Gels”

Yashodhara Pawar, Carnegie Mellon University (1993)

“Electrophoresis of Heterogeneously Charged Colloids”

Paul F. McKenzie, Carnegie Mellon University (1992)

“Effects of Adsorbed Polymers on Transport in Porous Membranes”

Erica S. Shane, Carnegie Mellon University (1991)

“Effects of Gradients of Solvent Composition on Diffusion of Proteins”

Richard M. Webber, Carnegie Mellon University (1991)

“Hydrodynamic Thickness as a Probe of the Extension of Adsorbed Diblock Copolymer in Microporous Membranes”

- Mark C. Fair, Carnegie Mellon University (1990)  
“Electrophoresis of Nonspherical and Nonuniformly Charged Colloidal Particles”
- Jeenok T. Kim, Carnegie Mellon University (1989)  
“Flow and Diffusion through Microporous Membranes with Adsorbed Polyelectrolyte”
- Imtiaz A. Kathawalla, Carnegie Mellon University (1988)  
“Configurational Effects on Hindered Diffusion through Microporous Membranes”
- Robert P. Adamski, Carnegie Mellon University (1987)  
“The Effect of Molecular Configuration and Flowrate on the Convective Transport of Polymer Molecules Through Microporous Membranes”
- James P. Ebel, Carnegie Mellon University (1986)  
“Diffusiophoretic Transport of Colloidal Particles”
- W. Keith Idol, Carnegie Mellon University (1985)  
“The Effect of Adsorbed Polymers on Solvent Flow and Molecular Diffusion in Small Pores”
- Huan J. Keh, Carnegie Mellon University (1984)  
“Hydrodynamic and Electrokinetic Characteristics of Transport of Macromolecules through Porous Media”
- Treva D. Long, Carnegie Mellon University (1983)  
“Convective Transport of Flexible Chain Macromolecules through a Well-Defined Porous Membrane”
- Mark E. Lowell, Carnegie Mellon University (1983)  
“Models for Diffusiophoretic Motions of Rigid Particles”
- Ruth E. Baltus, Carnegie Mellon University (1982)  
“Hindered Diffusion of Petroleum-Derived Asphaltenes”
- Judeth H. Brannon, Carnegie Mellon University (1981)  
“The Concentration Dependence of the Partition Coefficient for Macromolecules in Porous Media”
- Gerald B. Westermann-Clark, Carnegie Mellon University (1981)  
“Ion Transport in Charged Porous Media”  
Position: Associate Professor, Department of Chemical Engineering, University of (deceased, December 1995)
- C. Christopher Reed, Cornell University (1978)  
“Mathematical Concepts in the Transport of Interacting Particles: Diffusion, Sedimentation, and Osmosis”
- Wei-Hu Koh, Cornell University (1977)

“Electrokinetic Flows in a Charged Microcapillary Model Membrane: Studies of Streaming Potential and Molecular Diffusion”

Dermot M. Malone, Cornell University (1977)

“The Convection and Diffusion of Brownian Particles within Porous Systems: A Theoretical and Experimental Approach”

## PROFESSIONAL SOCIETIES

- National Academy of Engineering
  - Board on Chemical Sciences and Technology (1996–present; co-chair since 1998)
  - Assessment Panel to Evaluate Chemical Science and Technology Laboratory of NIST (1992–present)
  - Vice Chair/Chair Section 3 (Chemical Engineering) (2000–2002)
  - Chair of Section 3 Peer Group (2000–2001)
- American Institute of Chemical Engineers
  - Member, National Awards Committee (1990–95)
  - Programming Committee, Area 1J (Fluid Mechanics) (1984–1990)
  - Programming Committee, Area 1C (Interfacial Phenomena) (1980–1988)
  - Chaired Symposia at National Meetings: Chicago (1996), Miami (1995), New York (1987), Miami (1986), Chicago (1980), San Francisco (1979), Miami (1978), Houston (1977), Los Angeles (1975), Pittsburgh (1974)
  - Student Chapters Committee (National, 1972–1974)
  - Editor, *Student Members Bulletin* (Spring 1974)
  - Successfully nominated four winners of National AIChE Awards
  - Reviewer, *AIChE Journal*
- American Chemical Society
  - Associate Editor, *Industrial and Engineering Chemistry Research* (1986–2007)
  - Awards Committee (1987–1991)
  - Chaired Symposium (1983)
  - Member of Colloids Division and Polymers Division
- American Institute for Medical and Biological Engineering
- American Association for Advancement of Science
- Council for Chemical Research
  - Governing Board (1991–1994)
  - University Industry Interaction Committee (1987–1994)