

**PROFESSIONAL VITA**  
**Donald C. Sundberg**

Birthdate: December 23, 1942

Married: 2 adult children

Home Address:

Business Address:

39 Nute Road  
Madbury, New Hampshire 03823  
Ph: (603) 742-3370  
Cell: (603) 534-0466

39 Nute Road  
Madbury, New Hampshire 03823  
Ph: (603) 742-3370  
Cell: (603) 534-0466  
and  
Materials Science Program  
Room W112 Parsons Hall  
University of New Hampshire  
Durham, New Hampshire 03824

**Education:**

1965-1969 University of Delaware, Newark, Delaware MChE (1968), PhD (1970)

1961-1965 Worcester Polytechnic Institute, Worcester, MA. BSChE (1965)

**Professional Experience:**

1/11 – present Founder and President of Emulsion Polymers Consulting and Education, LLC, Madbury, NH

2/09 – present Emeritus Professor of Materials Science, University of New Hampshire, Durham, NH

7/06 – 2/09 Professor of Materials Science, University of New Hampshire, Durham, NH

8/03 – 6/06 Associate Professor of Materials Science, University of New Hampshire, Durham, NH

1/97- 8/03 Vice President for Research and Public Service, University of New Hampshire, Durham, NH

12/94 - 12/96 Interim Vice President for Research and Public Service, University of New Hampshire, Durham, NH

2/90 - 12/94 Executive Director of Sponsored Research, University of New Hampshire,

Durham, NH

- 7/87 – 2/90      Director of Industrial Research and Consulting Center, University of New Hampshire, Durham, NH
- 8/84 - 7/85      Visiting Scientist, Swedish Institute for Surface Chemistry, Stockholm, Sweden
- 9/82 – 8/03      Associate Professor of Chemical Engineering, University of New Hampshire, Durham, NH
- 9/78 - 9/82      Assistant Professor of Chemical Engineering, University of New Hampshire, Durham, NH
- 9/74 - 9/78      Assistant Professor of Chemical Engineering, University of Idaho, Moscow, Idaho
- 8/69 - 7/74      Senior Chemical Engineer, Monsanto Company Springfield, Mass.  
Process and product development activities for ABS polymers

## **Memberships:**

American Chemical Society/Division of Polymer Chemistry and  
Division of Polymeric Materials: Science and Engineering  
American Coatings Association

## **Current and Previous Consulting Activities:**

Arkema  
Asian Paints  
Baxa Corporation  
Cabot Corporation  
Davidson Rubber Company  
Dow Chemical Company  
Erie Scientific  
Fiber Materials, Inc.  
IDEXX  
Ivenix  
Invia Pavement Technologies  
Janco, Inc.  
Jump Start Engineering  
Lubrizol  
Monsanto Company  
Nashua Corporation  
New England Chemical Co.  
NP Medical Company  
Northeastern University  
Polysar Limited  
Sherwin-Williams  
South African Pulp and Paper Industries  
Stauffer Chemical Co.

## **Honors**

Mattiello Memorial Lecture – Lifetime Achievement Award from the American  
Coatings Association (2016)  
Roon Award of the Federation of Societies for Coatings Technologies (2004)  
Chairman for 1997 Gordon Conference on Polymer Colloids  
Elected as a member of the International Polymer Colloids Group (1983)  
NASA Fellow (1965-1968)  
Sigma Xi  
Tau Beta Pi  
BSChE with distinction (1965)

## **Professional Service Activities:**

Referee for research papers submitted to:

Journal of Polymer Science  
Journal of Applied Polymer Science  
Macromolecules  
Polymer Reaction Engineering  
Langmuir  
ACS Symposium Series  
AIChE Journal  
Biofouling  
Colloids and Surfaces A: Physicochemical and Engineering Aspects  
Science  
Polymer Engineering and Science  
Industrial and Engineering Chemistry – Research  
Polymer Bulletin  
Progress in Organic Coatings

Reviewer of research proposals for;

National Science Foundation  
American Chemical Society/Petroleum Research Foundation  
National Science and Engineering Research Council (NSERC, Canada)  
US Department of Defense

### **UNH Related Committees and Task Forces Service**

National Review Committee for NOAA/CICEET Program, 2005  
Materials Science Program Curriculum Committee, Chair, 2003-2009  
Managing @ UNH, Mentor to Participants, 2003-2004  
President's Staff, 1994-2003  
Space Allocation, Repair and Renovation Committee, 1994-2003  
Research Advisory Board, Chair, 1994-2003  
Sea Grant Policy Advisory Committee, 1992-1998  
Marine Program Board, Chair, 1996-2003  
NH Industrial Research Center Oversight Committee, 1994-2003  
Budget Task Force on Research, Chair, 1994-1995  
UNH Planning Council, 1994-1996  
Morse Hall Repair Task Force, Chair, 1996-1997  
Governor's Economic Development Coalition, 1996-1998  
Information Technology Policy Advisory Committee, 1996-2002  
University Environmental Health and Safety Committee, Chair, 1998-2003  
Disclosure Review Committee – Financial Conflict of Interest, Chair, 1998-2003  
Responsibility Centered Management Budgeting Subcommittee on  
Indirect Costs, 1998-1999  
Environmental Technology Building Steering Committee, 1997-2003  
Entrepreneurial Campus Committee, 1996-2003  
College (CEPS) Promotion and Tenure Committee, 1983-84

Committee to Review and Reorganize the Center for Institutional  
and Industrial Development, 1981  
College (CEPS) Curriculum and Academic Planning Committee, 1979-82,  
Chair 1981-82

### **Community Service:**

Chaoticom, Inc. (UNH spin-off company), Board of Directors, 1999-2003  
Oyster River School District, Long Range Planning Committee, Chair, 1988-1992  
Cochecho Country Club, Board of Directors, President, 1981-1984

### **Courses Taught at UNH:**

ChE 410	Survey of Energy and Pollution Control Technologies
ChE 501	Introduction to Chemical Engineering, I
ChE 502	Introduction of Chemical Engineering, II
ChE 604	Chemical Engineering Thermodynamics
ChE 605	Mass Transfer and Equilibrium Staged Operations
ChE 612	Chemical Engineering Laboratory, I
ChE 613	Chemical Engineering Laboratory, II
ChE 695	Chemical Engineering Project
ChE 696	Independent Study
ChE 701	Introduction to Polymer Engineering
ChE 815	Heat Transfer
ChE 832	Advanced Chemical Engineering Kinetics
ChE 896	Graduate Independent Study
ChE 899	Master's Thesis
ChE 999	Doctoral Research
MS 900	Seminar (for first year graduate students)
MS 905	Macromolecular Synthesis
MS 910	Macromolecular Characterization
MS 915	Properties and Processing of Polymer Fluids and Solids
MS 960	Thermodynamics and Kinetics of Materials II
MS 899	Masters Thesis
MS 999	Doctoral Research

### **Advising Duties:**

- Chief advisor for 16 Masters and 7 PhD theses
- Member of thesis committees in Materials Science, Chemistry, Civil Engineering, Mechanical Engineering and Chemical Engineering Departments
- Thesis juries at University of Sydney (Australia), Waterloo University

(Canada), University of Lyon (France), Technical University of Eindhoven (The Netherlands)

- Advisor to Freshman-to-Senior Class in Chemical Engineering

### **Patents:**

US Patent 4,534,865

"Methods and Apparatus for Reducing Levels of Organics in Liquids", August 13, 1985, with P. Bishop and D. McBee.

US Patent 8,318,060 B2

"Microencapsulation of Amines", November 27, 2012, with John G. Tsavalas and Jonathan Nguyen.

US Patent 8,652,758 B2

"Lithographic Imaging and Printing with Printing Members Having Fusible Polymeric Particles", February 18, 2014 with John G. Tsavalas and Richard Kearny

### **Publications:**

#### **A. Submitted or in preparation**

"Radical Entry to Latex Particles – Revisited", with B. Perry, in preparation.

#### **B. Peer Reviewed Publications (104)**

"Structured, Composite Nanoparticles from Emulsion Polymerization – Morphological Possibilities", *Biomacromolecules*, 21(11), 4388-4395 (2020).

DOI:10.1021/acs.biomac.0c00549.

"Emulsion Polymerization", with Michael Cunningham, *Kirk-Other Encyclopedia of Chemical Technology*, (2020). <https://doi.org/10.1002/0471238961.koe00054>

"Polymerization Induced Phase Separation in Composite Latex Particles During Seeded Emulsion Polymerization", with P. Zhang and J. Tsavalas, *Industrial & Engineering Chemistry Research*, 56, 21118-21129 (2019).

"Comparative release rates from controlled release polymer coatings—comparisons between models and experiment", with P. Sane and S. Ghosh, *J. Coat. Tech. Res.*, 16(4), 1193-1200 (2019).

"Morphology Control in Surfactant Free Polyurethane /Acrylic Hybrid Latices – the Special Role of Hydrogen Bonding", with B. Jiang and J. Tsavalas, *POLYMER*, 139,107-122 (2018).

"Multi-lobed Composite Polymer Nanoparticles Prepared by Conventional Emulsion Polymerization", with D. Blenner, and J. Stubbs, *POLYMER*, 114, 54-63 (2017).

“Water Whitening of Polymer Films: Mechanistic Studies and Comparisons between Latex and Solvent Borne Films”, with B. Jiang and J. Tsavalas. *Progress in Organic Coatings*, 105, 56-66 (2017).

“Influence of n-Alkyl Ester Groups on Efficiency of Crosslinking for Methacrylate Monomers Copolymerized with EGDMA: Experiments and Monte Carlo Simulations of Reaction Kinetics and Sol-Gel Structure”, with A. Tripathi, M. Neenan and J. Tsavalas, *POLYMER*, 96, 130-145 (2016).

“Partitioning of 2-Carboxyethyl Acrylate between Water and Vinyl Monomer Phases Applied to Emulsion Polymerization: Comparisons with Hydroxy Acrylate and Other Vinyl Acid Functional Monomers” with Jenna Vossoughi and Amit Tripathi, *Industrial & Engineering Chemistry Research*, dx.doi.org/10.1021/ie500499q; 54(9), 2447-2452 (2015).

“Monte Carlo Simulations of Free Radical Polymerizations with Divinyl Crosslinker: Pre- and Post-Gel Simulations of Reaction Kinetics and Molecular Structure” with Amit Tripathi and John Tsavalas, *Macromolecules*, 48(1), 184-197 (2015),  
<http://dx.doi.org/10.1021/ma502085x>

"A Hybrid Algorithm for Accurate and Efficient Monte Carlo Simulations of Free-Radical Polymerization Reactions", with Amit Tripathi, *Macromolecular Theory and Simulations*, 24, 52-64, (2015).

“Partitioning of Functional Monomers in Emulsion Polymerization: Distribution of Carboxylic Acid and Hydroxy (Meth)acrylate Monomers between Water and Polymers”, with Amit Tripathi and John Tsavalas, *Industrial & Engineering Chemistry Research*, dx.doi.org/10.1021/ie500492q, 53, 6600 – 6612 (2014).

“Partitioning of Functional Monomers in Emulsion Polymerization: Distribution of Hydroxy (Meth)acrylate Monomers between Water and Single and Multimonomer Systems”, with Amit Tripathi, *Industrial & Engineering Chemistry Research*, 52, 17047-17056 (2013).  
dx.doi.org/10.1021/ie402733w

“Partitioning of Functional Monomers in Emulsion Polymerization: Distribution of Carboxylic Acid Monomers between Water and Multimonomer Systems”, with Amit Tripathi, *Industrial & Engineering Chemistry Research*, 52, 9763-9769 (2013).  
dx.doi.org/10.1021/ie401433a

“Quantitative Measurements of the Extent of Phase Separation During and After Polymerization Using Differential Scanning Calorimetry”, with Amit Tripathi and John Tsavalas, *Thermochimica Acta*, 568, 20-30 (2013).  
<http://dx.doi.org/10.1016/j.tca.2013.06.013>

“Partitioning of Functional Monomers in Emulsion Polymerization: Distribution of Carboxylic Acid Monomers Between Water and Monomer Phases”, with Amit Tripathi, Ind. Engr. Chem. Res., 52, 3306–3314 (2013), <http://dx.doi.org/10.1021/ie400038q> .

“Latex Aging: The Effects of Coalescing Agents and Thermal Annealing on the Morphology of Composite Latex Particles”, with Jeffrey M. Stubbs, Journal Polymer Science, Part B: Polymer Physics, 49, 1583-1589 (2011).

“Synthesis and Characterization of Paraffin Wax Microcapsules with Acrylic-Based Polymer Shells”, with Luz Sanchez-Silva, John Tsavalas, P. Sanchez and Juan Rodriguez, Industrial Engineering Chemistry, Research, 49, 12204-12211 (2010).

“The Structural Evolution of Composite Latex Particles during Starve-Fed Emulsion Polymerization: Modeling and Experiments for Kinetically Frozen Morphologies”, with Jeffrey Stubbs, Robert Carrier and John Tsavalas, Macromolecular Reaction Engineering, 4, 424-431 (2010).

“Measuring the Glass Transition of Latex Based Polymers in the Hydroplasticized State via Differential Scanning Calorimetry”, with Bo Jiang and John Tsavalas, Langmuir, 26, 9408-9415 (2010).

“Hydroplasticization of Polymers – Model Predictions and Application to Emulsion Polymers”, with John Tsavalas, Langmuir, 26, 6960-6966 (2010).

“Monte Carlo Simulation of Emulsion Polymerization Kinetics and the Evolution of Latex Particle Morphology and Polymer Chain Architecture”, with Jeffrey Stubbs and Robert Carrier, Macromolecular Theory and Simulations, 17, 147-162 (2008).

“Core-Shell and Other Multi-Phase Latex Particles – Confirming Their Morphologies and Relating Those to Synthesis Variables”, with Jeffrey Stubbs, J. Coatings Technology - Research, 5, 169-180 (2008).

“Catalytic Emulsion Polymerization of Olefins: Ab Initio Polymerization of a Family of Norbornene Derived Monomers”, with Diane Crosbie and Jeffrey Stubbs, Macromolecules, 41, 2445-2450 (2008).

“The Dynamics of Morphology Development in Multiphase Latex Particles”, with Jeffrey Stubbs, Progress in Organic Coatings, 61, 156-165 (2008).

“Catalytic Emulsion Polymerization of Olefins: Surfactant Effects in the Ab Initio Polymerization of Norbornene”, with Diane Crosbie and Jeffrey Stubbs, Macromolecules, 40



(25), 8947-8953 (2007).

“Catalytic Emulsion Polymerization of Olefins: Ab Initio Polymerization of Norbornene”, with Diane Crosbie and Jeffrey Stubbs, Macromolecules, **40** (16), 5743-5749 (2007).

“Non-Equilibrium Morphology Development in Seeded Emulsion Polymerization. V. The Effect of Crosslinking Agent”, with Jeffrey Stubbs, J. Applied Polymer Science, **102** (3), 2043-2054 (2006).

“Soft X-ray Scattering of Structured Polymer Nanoparticles”, with T. Araki, H. Ade, G. Mitchell, J. Kortright, A. Kilcoyne and J. Stubbs, Applied Physics Letters, **89**, 124106-1 to 124106-3 (2006).

“Non-Equilibrium Morphology Development in Seeded Emulsion Polymerization. IV. Influence of Chain Transfer Agent”, with Jeffrey Stubbs, J. Applied Polymer Science, **102**, 945-957 (2006).

“Probing the Surface of Polymer Colloids by Conductometric Surfactant Titration”, with P. Roose, H. De Brouwer, S. van Es, Ph. De Groote, J. Stubbs, Langmuir, **22**(6), 2697-2705 (2006).

“Measuring the Extent of Phase Separation During Polymerization of Composite Latex Particles Using Modulated Temperature DSC”, with Jeffrey Stubbs, J. Polym. Sci.: Part B. Polym. Phys., **43**, 2790-2806 (2005).

“Preparation of Aqueous Dispersions of Polyolefins via Catalytic Emulsion Polymerization”, with Jeffrey Stubbs and Lynne Muscato, Polymeric Materials: Science and Engineering, **93**, 884-885 (2005).

“Latex Produced with Carboxylic Acid Comonomer for Waterborne Coatings: Variations with Changing pH”, with Daisuke Fukuhara, J. Coatings Technology – Research, **2**(7), 509-516 (2005).

“A Round Robin Study for the Characterization of Latex Particle Morphology – Multiple Analytical Techniques to Probe Specific Structural Features”, with Jeffrey Stubbs, Polymer, **46**, 1125-1138 (2005).

“Non-Equilibrium Particle Morphology Development in Seeded Emulsion Polymerization. III. Effect of Initiator End Groups”, with Jeffrey Stubbs, J. Appl'd. Polym. Sci., **91**, 1538-1551 (2004).

“Dynamic Modeling of Non-Equilibrium Latex Particle Morphology Development During

Seeded Emulsion Polymerization” with Ola Karlsson, Jeffrey Stubbs and Robert Carrier, Polymer Reaction Engineering, 11, 589-625 (2003).

“Polymer phase separation in composite latex particles. 1. Considerations for the nucleation and growth mechanism”, with Jeffrey Stubbs and Yvon Durant, Comptes Rendus Chemie, 6, 1217-1232 (2003).

“The role of carboxylic acid comonomers in morphology control of synthetic latex particles – batch reactions”, with Daisuke Fukuhara, Progress in Colloid Polymer Sci., 124, 18-21 (2003).

“Simulation of particle morphology development under kinetically controlled conditions”, with Jeffrey Stubbs, Robert Carrier and Ola Karlsson, Progress in Polymer Colloid Sci., 124, 131-137 (2003).

“Mathematical Model for the Emulsion Polymerization Reaction Kinetics of Two Phase Latex Particles”, with Yvon Durant and Robert Carrier, Polymer Reaction Engineering, 11, 433-456 (2003).

“Latex Particle Morphology, Fundamental Aspects: A Review”, with Yvon Durant, Polymer Reaction Engineering, 11, 379-432 (2003).

“Microencapsulation of oil with poly(styrene-*N,N*-dimethylaminoethyl methacrylate) by SPG emulsification technique: Effects of conversion and composition of oil phase”, with Guang Ma, Zhi Su, Shinzo Omi and Jeffrey Stubbs, J. Colloidal and Interfacial Science, 266, 282-294 (2003).

“Non-Equilibrium Particle Morphology Development in Seeded Emulsion Polymerization. II. Influence of Seed Polymer  $T_g$ ”, with Lina Karlsson and Ola Karlsson, J. Appl'd Polym. Sci., 90, 905-915 (2003).

“Fundamental Studies on Morphology Control for Latex Systems with Applications to Waterborne Coatings: The Effect of Polymer Radical Mobility in Latex Particles During Polymerization”, with Jeffrey Stubbs, J. Coatings Tech., 75, 59-67 (2003).

“Estimation of polymer/water interfacial tensions: hydrophobic homopolymer/water interfaces”, with Yan Dong, J. Colloid and Interfacial Science, 258, 97-101 (2003).

“Radical Entry in Emulsion Polymerization: Estimation of the Critical Length of Entry Radicals via a Simple Lattice Model”, with Yan Dong, Macromolecules, 35, 8185-8190 (2002).

“Particle Nucleation Mechanism for the Emulsion Polymerization of Styrene with a Novel Polyester Emulsifier”, with Yih-her Chang, Yu-der Lee and Ola Karlsson, J. Appl'd Polym. Sci., 82, 1061-1070 (2001).

“Estimating diffusion coefficients for small molecules in polymers and polymer solutions”, with Ola Karlsson, Jeffrey Stubbs and Lina Karlsson, Polymer, 42, 4915-4923 (2001).

“Control of particle morphology and film structures of Carboxylated poly(*n* butylacrylate/poly(methyl methacrylate) composite latex particles”, with S. Kirsch, A. Pfau and J. Stubbs, Colloids and Surfaces A: Physiochemical and Engineering Aspects, 183-185, 725-737 (2001).

“Surfactant characteristics of random block polyelectrolyte polyester emulsifier (SMTAPE) in aqueous solution and on polystyrene latex particles”, with Yi-her Chang, Yu-der Lee and Ola Karlsson, Polymer, 41, 6741-6747 (2000).

“Influence of Glass Transition Temperature on Latex Particle Morphology,” with Lina E. Ivarsson and Ola J. Karlsson, Macromolecular Symposium, 151, 407-412 (2000).

“AlkalSwelling of Carboxylated Latices Having Glass Transitions at Ambient Temperatures,” with Ola J. Karlsson and Karin Caldwell, Macromolecular Symposia, 151, 503-508 (2000).

“Penetrant Diffusion in Poly(methyl methacrylate) Near T<sub>g</sub>: Dependence on Temperature and Weight Fraction,” with Mathew Tonge, Jeffrey Stubbs and Robert Gilbert, Polymer, 41, 3659-3670 (2000)

“Competitive Adsorption of Sodium Dodecyl Sulfate on Two Polymer Surfaces Within Latex Blends,” with Jeffrey Stubbs and Yvon Durant, Langmuir, 15, 3250 (1999).

“Non-Equilibrium Particle Morphology Development in Seeded Emulsion Polymerization. 1: Penetration of Monomer and Radicals as a Function of Monomer Feed Rate During Second Stage Polymerization,” with J. Stubbs, O. Karlsson, J-E Jonsson, E. Sundberg and Y. Durant, Colloids and Surfaces A: Physiochemical and Engineering Aspects, 153, 255 (1999).

“Recent Developments in Emulsion Polymers—Controlling and Predicting Latex Particle Morphology,” with Ola Karlsson, Recent Res. Devel. in Macromol. Res., 3, 325 (1998).

“Thermodynamic and Kinetic Aspects for Particle Morphology Control,” with Yvon G. Durant, Polymeric Dispersions: Principles and Applications, NATO ASI Series E: Applied Sciences - Volume 335, p155, 1997, edited by J.M. Asua, Kluwer Publishing, 1997.

“The Effects of Crosslinking on the Morphology of Structured Latex Particles. 2. Evidence for Lightly Crosslinked Systems,” with Yvon G. Durant and Eric J. Sundberg, Macromolecules, 30, 1028, (1997).

“Progress in Predicting Latex Particle Morphology and Projections for the Future,” with Yvon G. Durant, ACS Symposium Series, No. 663, 44 (1997).

“Selection, Design and Delivery of Environmentally Benign Antifouling Agents,” with n. Vasishtha, R.C. Zimmerman and C.M. Smith, Naval Research Reviews, XLIX, 51-59 (1997).

The Effects of Crosslinking on the Morphology of Structured Latex Particles. 1. Theoretical Considerations,” with Yvon G. Durant, Macromolecules, 29, 8466 (1996).

“An Advanced Computer Algorithm for Determining Morphology Development in Latex Particles” with Yvon G. Durant, Journal of Applied Polymer Science, 58, 1607 (1995).

"Fundamental Studies of Grafting Reactions in Free Radical Copolymerization. 1. A Detailed Kinetic Model for Solution Polymerization" with Nai-Jen Huang, J. Poly. Sci., Part A: Poly. Chem., 33, 2533 (1995).

"Fundamental Studies of Grafting Reactions in Free Radical Copolymerization. 2. Grafting of Styrene, Acrylate and Methacrylate Monomers onto cis-Polybutadiene Using AIBN Initiator in Solution Polymerization" with Nai-Jen Huang, J. Poly. Sci. Part A: Poly. Chem., 33, 2551 (1995).

"Fundamental Studies of Grafting Reactions in Free Radical Copolymerization. 3. Grafting of Styrene, Acrylate and Methacrylate Monomers onto cis-Polybutadiene Using Benzoyl Peroxide Initiator in Solution Polymerization" with Nai-Jen Huang, J. Poly. Sci., Part A: Poly. Chem., 33, 2571 (1995).

"Fundamental Studies of Grafting Reactions in Free Radical Copolymerization. 4. Grafting of Styrene, Acrylate and Methacrylate Monomers onto vinyl-Polybutadiene Using Benzoyl Peroxide and AIBN Initiators in Solution Polymerization." with Nai-Jen Huang, J. Poly. Sci., Part A: Poly. Chem., 33, 2587 (1995).

"Evaluation of Release Rates and Control of Biofouling using Monolithic Coatings Containing an Isothiazolone" with Niraj Vasishtha and Dan Rittschof, Biofouling 9, 1 (1995).

"Challenges in Predicting and Controlling Particle Morphology in Latices of Commercial Complexity" with Y. G. Durant, Macromolecular Symposia, 92, 43 (1995).

“On-Line Monitoring of Biofilm Biomass and Activity on Antifouling and Fouling-Release Surfaces Using Bioluminescence and Fluorescence Measurements During Laminar Flow,” with A.A. Arrage, N. Vasishtha, G. Baush, H.L. Vincent and D.C. White, Journal of Industrial Microbiology, 15, 277 (1995).

"A Gel Permeation Chromatography Method to Determine Grafting Efficiency During Graft Copolymerization" with Nai-Jen Huang, Polymer, 35, 5693(1994).

"A Comparison of Methods for the Estimation of Polymer/Monomer Interaction Parameters - The Polystyrene/n-Butyl Methacrylate System," with Y.G. Durant and J. Guillot, Journal

of Applied Polymer Science, 52, 1823 (1994).

"On the Determination of the Interfacial Tensions for Latex Particles," with Y. G. Durant and J. Guillot, Journal of Applied Polymer Science, 53, 1469(1994).

"Morphology Development for Three Component Emulsion Polymers--Theory and Experiments," with E.J. Sundberg, Journal of Applied Polymer Science, 47, 1277 (1993).

"Controlled Release Antifouling Coatings. I. Approaches for Controlled Release of 2, 4-Dinitrophenolate and Benzoate into Seawater," with G.R. Weisman, R.A. Cimini, M.G. Brown, B.R. Beno and T.T. Eighmy, Biofouling, 6, 123 (1992).

"Controlled Release Antifouling Coatings. II. The Effects of Controlled Release of 2, 4 Dinitrophenolate and Benzoate on Marine Biofilm Development and Metabolic Activity," with T.T. Eighmy, J. Arwa, L. de Rome, M.G. Brown, R.A. Cimini, and G.R. Weisman, Biofouling, 6, 147 (1992).

"Conversion Dependent Morphology Predictions for Composite Emulsion Polymers. II. Artificial Latices," with C.L. Winzor, Polymer, 33, 4269 (1992).

"Conversion Dependent Morphology Predictions for Composite Emulsion Polymers. I. Synthetic Latices," with C.L. Winzor, Polymer, 33, 3797 (1992).

"A Note on the Morphology of Composite Latex Particles," with M.R. Muscato, J. Poly. Sci.: Part B: Poly. Physics, 29, 1021 (1991).

"Morphology Development of Polymeric Microparticles in Aqueous Dispersions. I. Thermodynamic Considerations," with M.R. Muscato, Journal of Applied Polymer Science, 41, 1425 (1990).

"Polymeric Indicator Substrates for Fiber Optic Chemical Sensors," with W.R. Seitz, Biosensor Technology-Fundamentals and Applications, Edited by R.P. Buck, W.E. Hatfield, M. Umana and E.f. Bowden, p 311-328, Marcel Dekker, Inc., New York (1990).

"Microencapsulation of Emulsified Oil Droplets by In-Situ Vinyl Polymerization," with M.R. Muscato et. al., Journal of Microencapsulation, 6, 327 (1989).

"Poly(vinyl alcohol) as a Substrate for Indicator Immobilization for Fiber Optic Chemical Sensors," with W.R. Seitz, Analytical Chemistry, 61, 202 (1989).

"A Clear, Amine-Containing Poly(vinyl Chloride) Membrane for In Situ Optical Detection of TNT," with W.R. Seitz, Anal. Chim. Acta, 217, 217 (1989).

"Unsteady-State Heat Transfer Involving a Phase Change," with A.V. Someshwar, Chemical Engineering Education, 23(No.1), 44 (1989).

"New Approaches to Indicators for In Situ Optical Sensing", with W.R. Seitz, Proceedings of the Electrochemical Society, 87-15, 54 (1987).

"Microencapsulation of Emulsified Oil Droplets by In-Situ Polymerization," Polymer Materials Science and Engineering, 54, 367 (1986).

"A Mechanistic Kinetic Model for the Initiated Anionic Polymerization of n-Caprolactam," Polymer Engineering and Science, 26, 560 (1986).

"An Experimental Study of the Effect of Polymer Molecular Weight Upon Reaction Rates in Emulsion Polymerization," Polymer, 27, 265 (1986).

"Diffusion Controlled Polymerization in Highly Crosslinking Systems - The Curing Kinetics of Unsaturated Polyester Resin," Polymer Preprints, 26, 296 (1985).

"Grafting of Styrene onto Polybutadiene Latices in Batch and Semi-Continuous Reactors," Journal of Dispersion Science and Technology, 5, 433 (1984).

"Startup and Transient Response of Continuous Stirred-Tank Reactors in series," AICHE Modular Instruction, Series E; Kinetics, 4, 1 (1983).

"Kinetics of Two Phase Emulsion Polymerization," AIChE Manuscript Number 7739-Houston AIChE Meeting, March, 1983.

"Computational Aspects of Free Radical polymerization with Chain Length Dependent Termination," ACS Symposium series, 197, 27 (1982).

"Diffusion Controlled Vinyl Polymerization. I. The Gel Effect," Journal of Polymer Science, Polymer Chemistry Edition, 20, 1299 (1982).

"Diffusion Controlled Vinyl Polymerization. II. Limitations Upon the Gel effect," Journal of Polymer Science, Polymer Chemistry Edition, 20, 1315 (1982).

"Diffusion Controlled Vinyl Polymerization. III. Free Volume Parameters and Diffusion Controlled Propagation," Journal of Polymer Science, Polymer Chemistry Edition, 20, 1331 (1982).

"Diffusion Controlled Vinyl Polymerization. IV. Comparison of Theory and Experiment," Journal of Polymer Science, Polymer Chemistry Edition, 20, 1345 (1982).

"Diffusion Controlled Kinetics in the Emulsion Polymerization of Styrene and Methylmetacrylate," American Chemical Society Symposium Series, 165, 327 (1981).

"An Experimental Study of Ideal and Nonideal Behavior in Styrene Emulsion Polymerization," Journal of Polymer Science, Polymer Chemistry Edition, 18, 903 (1980).

"A Quantitative Treatment of Particle Size Distributions in Emulsion Polymerization," Journal of Applied Polymer Science, 23, 2197 (1979).

"Limiting Conversions in Two Phase Polymer Reactions," Journal of Polymer Science Polymer Chemistry Edition, 16, 523 (1978).

"Experiments in Undergraduate Reaction Engineering: Startup and Transient Response of CSTR's in series," Chem. Engr. Ed., 11, 118 (1977).

"The Prediction of Particle Size and Molecular Weight Distributions in Emulsion Polymerization," Polymer Colloids, page 153, edited by R. M. Fitch, Plenum Press, NY (1971).

### External Funding

<b>FY</b>	<b>Agency</b>	<b>Proposed (\$)</b>	<b>Awarded (\$)</b>
79	NSF	22,100	--0--
80	NSF	134,570	--0—
82	Misc. Industry	5,000	8,000
83	Misc. Industry	14,000	14,000
84	Misc. Industry	10,000	10,439
	Misc. Industry	40,560	12,200
	NSF	23,085	23,085
86	Clarostat Corp.	46,195	46,195
	DOD/Army	55,780	--0—
	Teledyne Waterpik	34,972	38,165
	Fiber Materials, Inc.	22,355	22,355
87	ONR (with Eighmy)	317,387	125,000
88	Clarostat Corp	26,702	26,702
	Polymer Workshops	-----	66,573
	ACS/PRF	51,240	40,000
89	Clarostat Corp.	28,922	28,922
	Industrial Consortium	45,000	52,500
	NOAA (with Eighmy, Weisman)	83,759	83,759
	ONR (with Eighmy)	50,000	50,000
90	Clarostat Corp	24,000	24,000
	Egyptian Consulate	2,425	2,425
	ACS/PRF	40,000	--0—
91	Bailey Corp.	5,686	5,686
	ONR (with Eighmy, Weisman)	423,724	341,013
	NOAA (with Eighmy, Weisman)	49,600	49,600
92	NOAA (with Eighmy, Weisman)	52,999	52,999
	NSF	435,638	--0—
	Rhone Poulenc Corp.	17,000	13,000

	WR Grace, Inc.	3,500	3,500
93	NSF	413,218	--0—
94	ACS/PRF	50,000	50,000
	ONR	419,759	327,159
	NOAA	152,944	--0—
95	Southwest Research Institute	10,820	10,820
	ONR Corp./NHIRC	65,100	65,100
96	Industrial Consortium	360,000	360,000
97	Industrial Consortium	60,000	60,000
	NOAA (Tech. Transfer)	99,000	99,000
98	ITRI (Taiwan)	10,000	10,000
	NOAA (CICEET Admin.)	199,620	199,620
	NOAA (CICEET Board)	14,991	14,991
	NOAA (CICEET Workshop)	49,970	49,970
	NOAA (CICEET Equipment)	284,979	284,979
99	Asahi Chemical Company	12,000	12,000
00	Industrial Consortium	140,000	120,000
01	Industrial Consortium	120,000	100,000
02	Industrial Consortium	100,000	100,000
03	Industrial Consortium	100,000	80,000
	NSF (with Claverie)	750,000	500,000
	ONR (with Claverie, Durant)	2,500,000	2,100,000
05	Industrial Consortium	100,000	60,000
06	Industrial Consortium	100,000	80,000
07	Industrial Consortium	120,000	120,000
	ACS/PRF	135,000	90,000
	ACS/PRF SUMR	5,000	5,000
	BASF	190,000	180,000
08-15	Industrial Consortium	800,000	800,000
	Total		\$7,085,330

### Presentations and Seminars:

“Exploring the evolution of molecular architecture in free radical copolymerizations with divinyl monomers using Monte Carlo kinetic simulations with restricted polymer chain diffusion”, invited paper presented at Pacificchem, Honolulu, HI, December 20, 2015.

*Many* lectures as part of a variety of workshops presented by Emulsion Polymers Consulting and Education, LLC between 2011 and present. Refer to [www.info@epced.com](http://www.info@epced.com).

“Partitioning of Vinyl Acid and Hydroxy Acrylate Monomers in Emulsion Polymerization and Their Subsequent Effects on Radical Entry to Latex Particles”, invited seminar, The Dow Chemical Company, September 2013.



“Structured Latex Particles – Polymer/Polymer Phase Separation During and After Polymerization”, invited seminar, Polymer Science and Engineering Dept., Eindhoven University, Eindhoven, The Netherlands, June 21, 2012.

“Building Chemical and Physical Structure Into Composite Latex Particles – Combining Experimentation, Modeling and Characterization to Determine the Basic Mechanisms Controlling Structure”, invited seminar, BASF Corporation, Wyandotte, MI, December 6, 2010.

“Basic Mechanisms Responsible for Morphology Control in Aqueous Based Polymer Nanoparticles”, invited lecture, Chemical Engineering Department, Queen’s University, Kingston, Ontario, Canada, October 22, 2009.

“Polymer Phase Separation in Composite Latex Particles During and After Polymerization”, Keynote Lecture, Polymer Engineering Symposium, 8<sup>th</sup> World Congress of Chemical Engineering, Montreal, Quebec, Canada, August 24, 2009.

“Polyurethane/Acrylic Hybrid Latex Particles – Morphology Control During Acrylic Polymerization”, invited presentation, Mattiello Symposium, CoatingTech Conference, Federation of Societies for Coatings Technology, Indianapolis, IN, April 28, 2009.

“Multi-Phase Structured Latex Particles – The Role of Polymer Chain Mobility During and After Polymerization”, invited poster presentation, Conference on Polymer Colloids and Nanostructured Materials, Institut de Science et d’Ingenierie Supramoleculaires (ISIS), Strasbourg, France, August 26, 2008.

“Structural Control of Multi-Lobed Latex Particles Formed During Two-Stage Emulsion Polymerization Reactions”, American chemical Society National Meeting, Philadelphia, PA, August 21, 2008.

“Synthetic Control and Analytical Evidence of the Physical Structure of Composite Polymer Nanoparticles”, invited seminar, Department of Chemistry, University of New Hampshire, May 1, 2008.

“Polymer Nanoparticles: Synthesis, Characterizations and Some Applications”, invited lecture to the American Association of Textile Chemists and Colorists, Annual Meeting of the New England Section, Wyndham Hotel, November 30, 2007.

“Nano and Micro-Structured Polymer Systems – From Core-Shell Latex Particles to Self-Healing Coatings”, invited lecture, Arkema, Inc., King of Prussia, PA, November 7, 2007.

“Core-Shell and Other Multi-Phase Latex Particles – Confirming Their Morphology and Relating Those to Synthesis Variables”, invited paper, International Coatings Exposition 2007, Toronto, Ontario, Canada, October 3, 2007.

- “Film Formation in Waterborne Coatings”, ICE 2007 Pre-show Short Course on Emulsion Polymerization and Waterborne Coatings, Toronto, Ontario, Canada, October 1, 2007.
- “Waterborne Polymer Technologies”, ICE 2007 Pre-show Short Course on Emulsion Polymerization and Waterborne Coatings, Toronto, Ontario, Canada, October 1, 2007.
- “Structured Latex Particles – Polymer Diffusion and Phase Separation During and After Polymerization”, invited lecture, Gordon Research Conference on Polymer Colloids, Tilton, NH, June 27, 2007.
- “Controlling Polymer Molecular Weight in Composite Latex Particles and its Consequences for Particle Morphology”, invited lecture, The Dow Chemical Company, Midland, MI, May 19, 2006.
- “Core-Shell Latex Particles – How do They Actually Achieve That Configuration?”, invited paper, Midwest Regional Meeting of the American Chemical Society, Frankenmuth, MI, May 18, 2006.
- “Multi-Component Polymer Latex Particles – The Roles of Reaction Kinetics, Polymer Diffusion and Phase Separation”, invited lecture, Department of Chemical Engineering, University of Minnesota, Minneapolis, MN, February 14, 2006
- “Multi-Component Polymer Latex Particles – Reactions and Phase Separation in Confined Spaces”, invited lecture, Dow Chemical Company, Midland, MI, November 9, 2005.
- “Multi-lobed Latex Particles via Emulsion Polymerization”, poster presentation, Gordon Research Conference on Polymer Colloids, Tilton, NH, July 3-8, 2005
- “Latex Produced with Carboxylic Acid Comonomer for Waterborne Coatings: Particle Morphology Variations with Changing pH”, 82<sup>nd</sup> Annual Meeting of the Federation of Societies for Coatings Technology, Chicago, IL, October 27-29, 2004.
- “Structured Latex Particles – The Roles of Reaction Kinetics Polymer Diffusion and Phase Separation”, invited seminar to the Institute of Materials Science, University of Connecticut, Storrs, CT, October 2004.
- “Water Borne Coatings from Composite Latices”, lecture at Green Chemistry Conference, University of Massachusetts, May 11, 2004.
- “Structured Latex Particles – The Roles of Reaction Kinetics Polymer Diffusion and Phase Separation”, invited lecture, Rohm and Haas Company, Spring House, PA, April 28, 2004
- “Structured Latex Particles – The Roles of Reaction Kinetics, Polymer Diffusion and Phase Separation”, invited seminar to the Polymer Engineering Department, University of Akron, Akron, OH, November 7, 2003.

- “Research and Scholarly Activities at UNH”, invited lecture, UNH Retired Faculty Association, Alumni Center, UNH campus, September 2003.
- “Latex Particle Morphology: Art, Science or Something in Between?”, invited lecture, Eastman Kodak Corporation, Rochester, NY, May 2003.
- “Latex Particle Morphology: Art, Science or Something in Between?”, invited lecture, Solutia Corporation, Indian Orchard, MA, January 8, 2003.
- “Latex Particle Morphology: Art, Science or Something in Between?”, invited lecture, Surface Specialties – UCB, Inc., Brussels, Belgium, December 2002.
- “Latex Particle Morphology: Art, Science or Something in Between?”, invited lecture, NeoResins, Inc., Waalwijk, The Netherlands, December 2002.
- “Latex Particle Morphology: Art, Science or Something in Between?”, invited lecture, Akzo Nobel, Inc., Bergen-op-Zoom, The Netherlands, invited lecture, December 2002.
- “Recent Developments in Research Programs at UNH”, invited lecture, UNH Alumni Association, New London, NH, September 2002
- “Morphology Control in Carboxylated Latices”, Engineering Foundation Conference on Polymer Colloids: Preparation & Properties of Aqueous Polymer Dispersions, Irsee, Germany, July 2002.
- “The Research Enterprise at UNH”, invited lecture, Durham-Great Bay Rotary Club, Durham, NH, June 5, 2002.
- “Improving Waterborne Polymer Latex Dispersions for Coatings and Films”, New Hampshire Industries of the Future and the University R&D Enterprise Conference on Coatings, Composites and Green Chemistry, New England Center, Durham, NH, June 5, 2002.
- “Morphology Control in Carboxylated Latices”, Waterborne Coatings: Meeting the Challenges – Federation of Societies for Coatings Technology, Fort Lauderdale, FL, May 17, 2002.
- “Research at UNH”, invited lecture, UNH Alumni Association, Sarasota, FL, February 16, 2002.
- “Research at UNH”, invited lecture, UNH Alumni Association, Naples, FL, February 15, 2002.
- “Morphology Control of Carboxylated Latices”, Keynote Lecture, Polymer '01: The New Polymers: Design, Development & Applications, University of Bath, United Kingdom, April 2001.
- “University Response to an EPA Hazardous Materials Inspection”, invited lecture, Environment 2000 Summit Conference, New York Association of University Environmental Health and

Safety Organizations, Lake Placid, NY, October 23, 2000.

“Morphology Control in Polymer Latices”, Materials Science Program, UNH, Durham, NH, February 22, 2000.

“Recent Developments in Non-Equilibrium Morphology Development in Latex Particles,” invited lecture and discussion, Gordon Research Conference on Polymer Colloids, June, 1999, Tilton, NH.

“Non-Equilibrium Morphology in Latex Particles – Effect of Seed Polymer Tg,” invited lecture at the International Symposium on Polymers in Dispersed Media, Lyon, France, April 11-15, 1999.

“The State of Research at the University of New Hampshire,” presentation to the UNH Retired Faculty Association, September 16, 1998, Durham, NH.

“Control of Morphology of Latex Particles,” invited paper, American Chemical Society Meeting, August 23, 1998, Boston, MA.

“Models and Experiments for Morphology Development in Polymer Latices,” invited lecture, Elf-Atochem, King of Prussia, PA, March 23, 1998.

“Research and Public Service at UNH,” presentation to the San Francisco section of the Northern California UNH Alumni Club, March, 1998, San Francisco, CA.

“Research and Public Service at UNH,” presentation to the Florida East Coast UNH Alumni Club, February, 1998, Jupiter Beach, FL.

“Research and Public Service at UNH,” presentation to the Sacramento section of the Northern California UNH Alumni Club, November, 1997, Sacramento, CA.

“Advances in the Understanding of Latex Particle Morphology Control,” invited lecture, Industrial Technology Research Institute, Hsinchu, Taiwan, October 21, 1997.

“Advances in the Understanding of Latex Particle Morphology Control,” invited lecture, Mitsubishi Chemical Corporation, Yokkaichi, Japan, October 20, 1997.

“Non-Equilibrium Morphology Development in Latex Particles,” invited presentation, International Symposium on Advanced Technology of Fine Particles (7th Iketani Conference), Yokohama, Japan, October 14, 1997.

“Process Variables and Their Influence on Shell Formation in Latex Particles,” invited paper and presentation, 23rd Annual International Conference on Organic Coatings: Waterborne, High Solids and Powder Coatings,” Athens, Greece, July 8, 1997.

“Connecting with the Corporate World: Partnerships with Industry CAN Work!” invited

presentation and panel session, Society of Research Administrators Eastern Regional Meeting, June 3, 1997, Portland, ME.

“Thermodynamic and Kinetic Aspects of Particle Morphology Control,” invited lecture, NATO Advanced Study Institute, Elizondo, Spain, June 24-July 5, 1996.

“Morphology Control in Emulsion Polymers,” invited lecture, 27 Annual Spring Program in Polymers, “Emulsion Polymers: Mechanism and Kinetics, Surfactant Effects, Latex Characterization and Uses,” Orlando, Florida, March 11-13, 1996.

“The Effects of Copolymerization Variables on the Development of Latex Particle Morphology,” invited paper, Fourth Pacific Polymer Conference, Koloa, Kauai, Hawaii, December 1995.

“Latex Particle Morphology Control - Art, Science or Something In-between?,” invited presentation, Dow Chemical Company, Midland, MI, October 18, 1995.

“Progress in Predicting Latex Particle Morphology and Projections for the Future,” invited presentation, Roy Tess Award Symposium, American Chemical Society Fall Meeting, Chicago, IL, August 20-25, 1995.

“Influence of Seed Latex Crosslinking on the Morphology of Two Stage Polymer Latices,” invited presentation, Polymer Modelling, Colloid and Surface Science Symposium, American Chemical Society, 27th Central Regional Meeting, Akron, OH, May 31-June 2, 1995.

“Free Radical Graft Copolymerization of Styrene, Acrylate and Methacrylate Monomers onto Polybutadiene,” invited lecture, Zeneca Specialty Resins, Runcorn, England, April 7, 1995.

“Latex Particle Morphology: The Effect of Crosslinking and Initiator End Groups”, plenary lecture at Multiple Phase Particles Prepared by Emulsion Polymerization—International Conference, Lancaster, England, April 4, 1995.

"Contemporary Issues in the Area of Indirect Costs", invited lecture, National Association of State Universities and Land Grant Colleges, Annual Meeting, Chicago, November 5-7, 1994.

"Composite Polymer Particles—Controlled Morphology and Controlled Release", invited lecture, Southwest Research Institute, San Antonio, Texas, September 23, 1994.

"Keeping Ships from Fouling Without 'Fouling-Up' the Marine Environment", invited presentation, UNH Alumni Association, June 10, 1994.

"Control of Latex Particle Morphology", invited lecture, National Starch and Chemical Company, Bridgewater, NJ, May 11, 1994.

"Challenges in Predicting in Controlling Particle Morphology in Latices of Commercial Complexity", plenary lecture, International Symposium on Radical Copolymers in Dispersed Media, Lyon, France, April 17-22, 1994.

“Advances in Polymer Colloids/Emulsion Polymers–Control of Latex Particle Morphology”, invited presentation, Workshop in Polymer Colloids/Emulsion Polymers: Polymerization, Characterization and Application, October 28-30, 1991, Orlando, FL.

"Fundamental Studies of the Curing Kinetics of Highly Crosslinking Polymers via Differential Scanning Calorimetry", invited lecture, New England Thermal Forum, Boston, MA, April 11, 1990.

"Morphology Development of Polymeric Microparticles in Aqueous Dispersions", invited Sigma Xi lecture, Uniroyal Chemical Company, Middlebury, CT, March 21, 1990.

"Morphology Development of Polymeric Microparticles in Aqueous Dispersions", invited Plenary Lecture, Pacific Basins Conference, Honolulu, Hawaii, December, 1989.

"Diffusion Controlled Polymerization in Highly Crosslinking Systems - the Curing Kinetics of an Unsaturated Polyester Resin", 18th Annual NATAS Conference, San Diego, CA, September 1989.

"Morphology Development of Polymeric Microparticles in Aqueous Dispersions", invited lecture, Institute for Polymer Science, University of Waterloo, Waterloo, Ontario, September, 1989.

"Morphology Development in Polymer Microparticles", Gordon Research Conference on Polymer Colloids, Andover, NH, July, 1989.

"Morphology Development of Polymeric Microparticles in Aqueous Dispersions", invited lecture, 3M Corporation, St. Paul, MN, May 17, 1989.

"Morphology Development of Polymeric Microparticles in Aqueous Dispersion", invited lecture, S.C. Johnson & Sons, Inc., Racine, WI, May 16, 1989.

"Diffusion Controlled Polymerization in Highly Crosslinking Systems - The Curing Kinetics of Unsaturated Polyester Resin", invited lecture, University of Sydney, Sydney, Australia, February 1989.

"Morphology Control in Polymer Colloids", invited keynote speaker, Australian Polymer Symposium, Brisbane, Australia, January, 1989.

"Morphology Development of Polymeric Microparticles in Aqueous Dispersions", invited lecture, The Glidden Company, Strongsville, OH, December 1988.

"Effect of Particulate Fillers on Free Radical Polymerization Kinetics", American Chemical Society Meeting, Los Angeles, September 1988.

"Morphology Development in Polymeric Microparticles", NATO Advanced Study Institute,

Strasbourg, France, July 1988.

"Emulsion Polymerization", McMaster University, Hamilton, Ontario, May 1988, May 1987.

"The Control of Morphology in Polymeric Microparticles and Latices", Polysar Limited, Sarnia, Ontario, Canada, October 1987.

"The Curing Behavior of Highly Crosslinked Polymers", invited lecture, Symposium on Polymer Production Technology, Annual Meeting of the Chemical Institute of Canada, Quebec City, Quebec, June 1987.

"Morphology Development in Polymeric Microparticles", invited lecture -  
Institute for Polymer Research, University of Waterloo, May 1987  
University of South Florida, March 1987  
Rohm & Haas Company, Springhouse, PA, Sept. 1986

"Microencapsulation of Emulsified Oil Droplets by In-Situ Polymerization", American Chemical Society Meeting, New York, April, 1986.

"Diffusion Controlled Polymerization in Highly Crosslinking Systems - The Curing Kinetics of Unsaturated Polyester Resin; Miami Beach ACS Meeting, April 1985.

"Interfacial Aspects of the Formation of Heterogeneous Polymer Colloids by Emulsion Polymerization", Nordic Industrial Symposium on Surface and Colloid Chemistry, Stenungsund, Sweden, November 20-21, 1984.

"Homogeneous and Heterogeneous Polymer Particles by Emulsion Polymerization", Department of Chemical Technology, Lund University, Lund, Sweden, October, 1984.

"Emulsion Polymers", Sweden Institute for Surface Chemistry, Stockholm, Sweden, September 1984.

"The Effect of Polymer Molecular Weight Upon Reaction Rates in Emulsion Polymerization", Philadelphia AIChE Meeting, August 1984.

"Grafting of Glassy Polymers onto Synthetic Rubber Latices", Emulsion Polymers Institute, Lehigh University, June 1988, June 1987, June 1986, June 1984.

"Reaction in Two-Phase Emulsion Polymers", Monsanto Company, Springfield, MA, May 1984.

"A Kinetic Model of the Styrene Crosslinked Polyester Reaction", Atlanta AIChE Meeting, March 1984.

"Kinetics of Two Phase Emulsion Polymerization", Houston AIChE Meeting, March 1983.

"Grafting of Styrene onto Polybutadiene Latices in Batch and Semi-Continuous Reactors", Houston AIChE Meeting, March 1983.

"Diffusion Controlled Vinyl Polymerization", Department of Chemical Engineering, Washington State University/University of Idaho, October 1982.

"Computational Aspects of Chain Length Dependent Termination Reactions in Vinyl polymerization", American Chemical Society Meeting, New York, August, 1981.

"Emulsion Polymerization Kinetics at Moderate to High Conversion", Emulsion Polymers Institute, Lehigh University, June 1981.

"Diffusion Controlled Kinetics in the Emulsion Polymerization of Styrene and Methylmetacrylate", American Chemical Society Meeting, Las Vegas, August, 1980.

"Structure-Property Relationships in ABS Polymers", Material Science Department, Washington State University, May 25, 1977.

"A Chemical Engineering Course for Non-Chemical Engineers", Rocky Mountain Region ACS Meeting at Laramie, Wyoming, June, 1976.

"Emulsion Polymerization Technology for ABS Polymers", Monsanto Company, Addyston, Ohio, December, 1974.

"The Prediction of Particle Size and Molecular Weight Distributions in Emulsion Polymerization", Symposium on Polymer Colloids, American Chemical Society Meeting, Chicago, September, 1970.

### **Intensive Short Courses Directed and Presented:**

"Latex Particle Morphology – Fundamental Aspects", University of New Hampshire, June 2010, June 2009, June 2008, June 2007, June 2006, June 2005, June 2004, June 2003, May 2002

"Basic Concepts of Interfacial Science," Heidelberg-Harris Corporation, Durham, NH, April 1993.

"Introduction to Polymer Science and Technology", New England Center, Durham, NH, October 1992, 1991, 1990, 1989, 1988, 1987, November 1986, January 1986, June 1984.

"A Short Course in Polymer Science and Technology", Kingston-Warren Corporation, Newfields, NH, May 1986.

"A Short Course in Emulsion Polymerization", Nashua Corporation, Nashua, NH, April 1982.



"Emulsion Polymerization Technology", Monsanto Company, Addyston, OH, December 1974.

**Research Interests:**

Emulsion Polymers and Latex Particle Morphology  
Phase Separation during Polymerization Reactions  
Diffusion Controlled Polymer Reactions  
Reactive Processing of Polymers  
Property Development in Polymer Composites  
Microencapsulation Technology

[Last Revised on April 6, 2021]