



University of New Hampshire and Emulsion  
Polymers Consulting and Education, LLC present:

## ***Core-Shell Latex Particles- Fundamental Aspects of Morphology Control***



***3.5 Day Interactive Workshop  
June 6-9, 2016  
On the Campus of the University of  
New Hampshire  
Durham, New Hampshire USA***

### **Faculty**

***Donald C. Sundberg, PhD  
John G. Tsavalas, PhD  
Jeffrey M. Stubbs, PhD***

**OBJECTIVES** This intensive workshop deals with the basic factors controlling particle morphology in synthetic latices used for coatings, adhesives, impact modifiers and biomedical applications.

Thermodynamic principles are applied to investigate the effect of experimental recipe and process variables. Computer simulations are used to design latex particles and analyze the morphology via TEM. Non-equilibrium morphologies and emulsion polymerization kinetics are treated in detail through experimental design and computer simulation. Participants should be familiar with operating computers in a windows environment.

**INTENDED AUDIENCE:** This workshop is directed towards scientists and engineers involved in product development and latex processing operations, and who produce or use water based latices for architectural and paper coatings, textiles and carpet backings, pressure sensitive adhesives, printing inks, impact modifiers, etc.

**STRUCTURE OF THE WORKSHOP:** This 3.5 day workshop will be conducted in a ***highly interactive manner*** with participants being engaged in discussions, demonstrations, and problem solving.

### **REGISTRATION INFORMATION**

The registration fee includes the full book of slides for the workshop, coffee breaks, lunches and Tuesday evening dinner. It does not include accommodations or travel. Early registration is recommended due to the workshop size limitation of 24 participants.

Registration Fee: \$1900 USD  
***Registration Form*** --> Go to page 4

### **Contact for further information:**

[don.sundberg@unh.edu](mailto:don.sundberg@unh.edu).

### **HOTELS, TRAVEL, LOCAL ATTRACTIONS**

Hotels in the local area are listed on the last page. Each has a link to its website for on-line reservations. The Durham, NH area is well served by Logan Airport in Boston, Massachusetts and Manchester Airport in Manchester, NH. Durham is located in the seacoast region of New Hampshire and many tourist options are available. [www.visitnh.gov/](http://www.visitnh.gov/). Also see the UNH website [www.unh.edu](http://www.unh.edu).

# *Core-Shell Latex Particles- Fundamental Aspects of Morphology Control*

## Day 1

### **AM:**

1. Goals of the Workshop
2. Examples of particle morphologies
3. Equilibrium and kinetic structures
4. Emulsion polymerization principles
5. Preparation of first stage (seed) latex
6. Post-polymerization treatment

### **PM:**

1. Design of seed latex recipe/process
2. Morphology characterization of structured latex particles
3. Determination of particle structure from analytical data

## Day 2

### **AM:**

1. Equilibrium morphologies
2. Free energy concepts/applications
3. Interfacial tensions
4. Effect of cross-linking
5. Effect of functional additives

### **PM:**

1. Use of interactive software for predicting equilibrium morphology
2. Computation of interfacial polymer
3. Morphology predictions through examples
4. Hands-on use of UNHLATEX®  
Eqmorph software – design problem

## Day 3

### **AM:**

1. Kinetic controlled morphology
2. Multi-phase polymerization
3. Phase diagrams
4. Diffusion in polymers
5. Phase separation, latex aging

### **PM:**

1. Use of interactive software for predicting kinetic morphology
2. Morphology predictions through examples
3. Hands-on use of UNHLATEX®  
Kmorph software – design problem

## Day 4

### **AM:**

1. Structural evolution of latex particle morphology during polymerization
2. Interactive session – developing a morphology matrix
3. Multi-lobed particles – a new equilibrium basis
4. Morphology decision matrix and closing comments

## **Faculty Profiles**

**Professor Donald C. Sundberg** has been working in the field of emulsion polymers for 49 years. He received a bachelor's degree in chemical engineering from Worcester Polytechnic Institute (Massachusetts) and his Ph.D. from the University of Delaware. He spent 5 years working on impact modifiers for ABS resins with the Monsanto Company prior to pursuing a career in the university setting. He has extensive research experience in emulsion polymerization and is widely recognized for his work on structured latex particles. This has resulted in nearly 100 peer reviewed publications and he has presented many conference papers. He spent a sabbatical year at the Institute for Surface Chemistry in Stockholm and was Chair of the Gordon Research Conference on Polymer Colloids. He maintains active research interests in emulsion polymerization kinetics, interfacial science and polymer morphology control, diffusion in polymers, microencapsulation, and coatings. He is an Emeritus Professor of Materials Science at the University of New Hampshire and is the founder of Emulsion Polymers Consulting and Education, LLC.

**Professor John G. Tsavalas** is an Associate Professor of Chemistry at the University of New Hampshire, the director of the Nanostructured Polymers Research Center, and the deputy director of an interdisciplinary multi-department research center at UNH centered around Advanced Materials (CAMMI). He received his PhD in Chemical Engineering from The Georgia Institute of Technology (Atlanta, GA, USA) after which he was a Senior Research Scientist in The Dow Chemical Company (Midland, MI USA). In industry he worked on a wide variety of polymer colloid related R&D with particular emphasis on nanostructured latex particles. At the University of New Hampshire, Professor Tsavalas' current active areas of research are colloidal nanostructure morphology development, sustainably derived polymer colloids, the interaction and distribution of water in polymer colloids, and dynamic modeling of interactions, kinetics, diffusion, and phase separation in colloidal systems (*Core-Shell Latex Particles – Fundamental Aspects of Morphology Control & Hybrid Latex Systems*)

**Dr. Jeffrey M. Stubbs** is a Senior Research Scientist at DSM NeoResins in Wilmington, Massachusetts where he works on acrylic latices and polyurethane dispersions. He spent 10 years at the University of New Hampshire with an emphasis on the factors controlling composite particle morphology development. He received his B.S. and M.S. degrees in chemical engineering, and his PhD in materials science from UNH. His areas of active research include control of composite latex particle morphology, emulsion polymerization kinetics, diffusion in polymers and adsorption of surfactants on latex particles. (*Core-Shell Latex Particles – Fundamental Aspects of Morphology Control*)

## Registration Form

### *Core-Shell Latex Particles – Fundamental Aspects of Morphology Control*

Durham, NH 03824 USA

June 6-9, 2016

Name \_\_\_\_\_

Address \_\_\_\_\_

City/State \_\_\_\_\_

Postal Code \_\_\_\_\_

Country \_\_\_\_\_

Position or Title \_\_\_\_\_

Organization \_\_\_\_\_

Phone \_\_\_\_\_

Fax \_\_\_\_\_

E-mail \_\_\_\_\_

#### **Participant Category**

- Standard price for industrial participant: \$1900 (USD)
- Discounted price for additional participant(s) from the same company: \$1800 (USD)
- Academic participant: \$1600 (USD)

***There is a non-refundable fee of \$50 (USD). Cancellation of registration can be made up until May 6, 2016 with a full refund less the \$50 processing fee.***

#### **Method of Payment:**

- Credit Card  
\_\_\_ Visa \_\_\_ MasterCard \_\_\_ American Express

Card # \_\_\_\_\_

**Visa or MC** Security Code # (last 3 digits on back of card) \_\_\_\_\_

**AMEX** Security Code # (4 digits on front of card) \_\_\_\_\_

Expiration date \_\_\_\_\_

Signature \_\_\_\_\_

Credit Card billing address (if different than above):  
\_\_\_\_\_  
\_\_\_\_\_

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- Wire transfer from bank --- Go to [info@epced.com](mailto:info@epced.com) and request banking instructions.

**For a secure eCommerce transaction, FAX this completed form to EPCEd at 1-603-343-4015, or call 1-603-742-3370.**

*This registration form may serve as an invoice for those who register.*

## LODGING OPTIONS

### WALKING DISTANCE TO UNH Conference Site (about 10 min):

Holiday Inn Express  
2 Main St., Durham, NH 03824  
603-868-1234 or 888-465-4329  
[www.hiexpress.com](http://www.hiexpress.com)

Three Chimneys Inn  
17 Newmarket Rd., Durham, NH 03824  
603-868-7800  
[www.threechimneysinn.com](http://www.threechimneysinn.com)

### REQUIRES A VEHICLE:

Comfort Inn & Suites  
10 Hotel Dr, Dover, NH 03820  
603-750-7507  
[www.comfortinn.com](http://www.comfortinn.com)

Dover Days Inn Durham/Downtown  
481 Central Ave, Dover, NH 03820  
603-742-0400  
[www.daysinn.com](http://www.daysinn.com)

Microtel Inns & Suites  
31 Webb Pl, Dover, NH 03820  
603-953-0800  
[www.microtelinn.com](http://www.microtelinn.com)

Silver Fountain Inn  
103 Silver St, Dover, NH 03820  
603-750-4200 or 888-548-6888  
[www.silverfountain.com](http://www.silverfountain.com)

Hilton Garden Inn  
100 High St, Portsmouth, NH 03801  
866-413-1105  
[www.hgiportsmouth.com](http://www.hgiportsmouth.com)

Residence Inn Portsmouth Downtown  
100 Deer St, Portsmouth, NH 03801  
603-968-5095  
[www.marriott.com](http://www.marriott.com)

Sheraton Portsmouth Harborside  
250 Market St, Portsmouth, NH 03801  
603-431-2300  
[www.sheratonportsmouth.com](http://www.sheratonportsmouth.com)

Hampton Inn & Suites Portsmouth  
23 Portwalk Place, Portsmouth NH 03801  
603-431-1499  
[hampton.hilton.com/Portsmouth](http://hampton.hilton.com/Portsmouth)

Residence Inn by Marriott  
1 International Dr, Portsmouth, NH 03801  
868-430-2692  
[www.marriott.com](http://www.marriott.com)

Holiday Inn  
300 Woodbury Ave, Portsmouth, NH 03801  
800-315-2621  
[www.holidayinn.com](http://www.holidayinn.com)