2010 PMSE Fellow Ceremony

The American Chemical Society Division of Polymeric Materials: Science and Engineering (PMSE) has just completed its process to select a new class of PMSE Fellows for 2010 and the following distinguished PMSE members have been chosen:

- Benny D. Freeman
- Jeffrey S. Moore
- Judy S. Riffle

They will be inducted as the tenth class of PMSE Fellows at the San Francisco ACS Meeting during the joint PMSE/POLY Awards Reception on Wednesday evening, March 24, 2010. PMSE is pleased to welcome this distinguished group of polymer scientists and engineers to the ranks of fellows.

A short description of their work up to the point of the induction as a PMSE Fellow is on the following pages.

DIVISION OF POLYMERIC MATERIALS: SCIENCE & ENGINEERING

2010 PMSE Fellow Induction Biographies

2010 PMSE Fellow

Benny Freeman

University of Texas at Austin

Professor Benny Freeman is the Kenneth A. Kobe and Paul D. and Betty Robertson Meek & American Petrofina Foundation Centennial Professor of Chemical Engineering at The University of Texas at Austin. He has been a faculty member for more than 20 years. He completed his graduate training in Chemical Engineering by earning a Ph.D. from the University of California, Berkeley in 1988. In 1988 and 1989, he was a postdoctoral fellow at the Ecole Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (ESPCI), Laboratoire Physico-Chimie Structurale et Macromoléculaire in Paris, France. Dr. Freeman's research is in polymer science and engineering and, more specifically, in mass transport of small molecules in solid polymers. He currently directs 18 Ph.D. students and 2 postdoctoral fellows performing fundamental research in gas and liquid separations using polymer membranes and barrier packaging. His research group focuses on include structure/property correlation development for desalination and vapor separation membrane materials, new materials for hydrogen separation and natural gas purification, nanocomposite membranes, reactive barrier packaging materials, and new materials for improving fouling resistance and permeation performance in liquid separation membranes. His research is described in more than 250 publications, and he has co-edited 4 books on these topics.

He has won a number of national awards, including the ACS Award in Applied Polymer Science (2009), the AIChE Institute Award for Excellence in Industrial Gases Technology (2008), and the Strategic Environmental Research and Development Program Project of the Year (2001). He has served as chair of the Polymeric Materials: Science and Engineering Division of the American Chemical Society, chair of the Gordon Research Conference on Membranes: Materials and Processes, President of the North American Membrane Society, chair of the Membranes Area of the Separations Division of the American Institute of Chemical Engineers, and he is currently First Vice Chair of the Separations Division.

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2010 PMSE Fellow

Jeffrey Moore

University of Illinois

Professor Jeffrey Moore was born outside of Joliet, IL in 1962. He received his B.S. in chemistry (1984) and Ph.D. in Materials Science and Engineering with Samuel Stupp (1989), both from the University of Illinois. He then went to Caltech as an NSF postdoctoral fellow working with Robert Grubbs. In 1990 he joined the chemistry faculty at the University of Michigan in Ann Arbor, and then in 1993 returned to the University of Illinois where he is currently the Murchison-Mallory Chair in the Department of Chemistry. In 1995 he became a part-time Beckman Institute faculty member. His awards include an Alfred P. Sloan Fellowship, Arthur C. Cope Scholar Award, and Fellow of the American Association for the Advancement of Science, the Royal Society of Chemistry, and the American Academy of Arts & Sciences. He has served as an Associate Editor for the Journal of American Chemical Society since July of 1999.

Professor Moore is internationally recognized for his work in the field of organic materials and polymer chemistry. His early work established the utility of the phenylacetylene moiety in the construction of a broad range of important nanoscale structures, including macrocycles, dendrimers, and abiotic mimics of protein secondary structure. Working with colleagues in engineering, he played a central role in the development and demonstration of a self-healing polymeric material and has shown recently that mechanical energy can be used to direct chemical reactions.

Professor Moore has published more than 260 manuscripts, he holds 19 patents, and has been an invited guest speaker to over 275 national and international lectures.

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2010 PMSE Fellow

Judy Riffles

Virginia Tech

Professor Judy Riffle is a professor of Polymer Chemistry and the Director of Macromolecular Science and Engineering education at Virginia Tech. Her career has included ~5 years of industrial research at Union Carbide and at the Thoratec Corporation in Berkeley, CA, then ~25 years in academia. The common research thrust throughout her career has been the synthesis of precise polymeric materials and the development of multiphase block copolymers and nanostructures, and she works with researchers in a broad range of disciplines to tailor the materials for biotechnological applications. Her research has been of interest in both academia, as well as in industrial applications. She has more than 250 contributions to the literature including refereed publications, conference proceedings, and U.S. patents.

Some of her most visible research has included functional polydimethylsiloxane (PDMS) oligomers, their incorporation into multiphase, linear block copolymers and thermosets and investigations of their surface and bulk morphologies. She recognized early on that surface and bulk structure could be accessed independently by blending minor concentrations of surface-active, multiphase segmented copolymers with polymer matrices, and this concept led to the strong, elastic, biocompatible poly(urethane-urea)s that today comprise the blood contacting materials for Thoratec's platform of cardiovascular products. Prof. Riffle later conceptualized a co-continuous morphological structure involving polysiloxanes incorporated into otherwise hydrophilic thermosets, wherein the PDMS would allow for rapid oxygen permeation through a soft hydrophilic matrix, and these thermosets now form the basis for commercial extended-wear, soft contact lenses. More recently, she has developed biocompatible PDMS magnetic fluids for potential treatments of retinal detachment. For the past few years, Prof. Riffle's research has focused on the design and synthesis of amphiphilic block copolymers and their assembly into core-corona nanostructures that contain image-enhancing agents or drugs in their cores. This approach allows for the independent molecular design of cores that interact with the therapeutic molecules or imaging agents and coronas that interact with physiological and cellular environments. She has discovered that coronas comprised of amphiphilic polyethers with select block lengths can induce small (colloidally stable) controlled clusters of nanoparticles with magnetite cores. The transverse NMR relaxivities of these materials are ~3X faster than presently-used relaxivity agents, so they have potential as MRI agents that

are more sensitive than current materials. She has also synthesized core-corona assemblies containing antibiotics in the cores for treating bacterial pathogens that reside within cells. Again, amphiphilic block copolyether coronas that contain flexible polyether blocks large enough to span lipid bilayer membranes are rapidly taken up by the macrophages that house these difficult-to-reach pathogens. As always, Prof. Riffle focuses on the molecular design and assembly of well-defined macromolecules and collaborates closely with others in the biological sciences, physics and engineering to understand how the properties of her materials relate to societal needs.

Dr. Riffle has also led the initiation and growth of interdisciplinary, interdepartmental graduate degree programs in Macromolecular Science and Engineering at Virginia Tech, which began the first class in Fall, 2001, and she has been the program's Director since its inception. The program now comprises ~50 graduate students spanning 9 departments and 3 colleges.