Membrane Separations: New Opportunities in Bioprocessing

Andrew L. Zydney
Department of Chemical Engineering
The Pennsylvania State University

One of the major issues in the production of recombinant therapeutic products is the cost and challenge of the purification. This is of growing concern due to the increase in batch size and dosing required for monoclonal antibodies and for gene therapy products. This talk will examine the use of membrane systems for the purification of high value biological products. Membrane systems are particularly attractive for these applications because they provide very high capacities and throughput and they have the potential to perform simultaneous purification, concentration, and buffer exchange. This talk will examine the basic principles governing the development of these new membrane processes, with particular emphasis on the importance of electrostatic phenomena in generating the high selectivities required for bioprocessing applications. Experimental data will be presented for the application of membrane systems for the purification of a monoclonal antibody, for the separation of product variants that differ at only one out of more than 150 amino acids, and for the purification of pegylated proteins. The high yield and purification factor attained in these systems demonstrate the potential for using membrane systems for high-resolution separations in bioprocessing applications.

Dr. Andrew L. Zydney is currently Department Head and Walter L. Robb Family Endowed Chair in the Department of Chemical Engineering at The Pennsylvania State University. Professor Zydney received his Ph.D. in Chemical Engineering from M.I.T. in 1985, and he was a faculty member in the Chemical Engineering Department at the University of Delaware from 1985 - 2001. Professor Zydney has been actively involved in research and consulting in bioprocessing for the past 20 years, with a particular emphasis on the application of membrane technology to bioseparations. He has published more than 100 articles on these topics, including invited contributions to the Encyclopedia of Bioprocess Technology and the Handbook of Biomedical Engineering. Professor Zydney recently became Editor of the Journal of Membrane Science, and he serves on the Editorial Boards for Separation and Purification Reviews, Separation Science and Technology, and Biotechnology and Bioengineering. He served as President of the North American Membrane Society in 2002 - 2003, he was elected a fellow of the American Institute of Medical and Biological Engineers in 1998, he received the Excellence in Teaching Award from the University of Delaware in 1994, and he is a past recipient of the Distinguished Teacher Award (1999) and the Outstanding Young Faculty Award (1990) from the American Society of Engineering Education.

FRIDAY, September 28, 2007
2:00 – 3:00 p.m.
BOGGS ROOM 122

Refreshments will be served before the seminar.