Awards and honors received by Professor Ratner include:

1989 Clemson Award for Contributions to the Biomaterials Literature
1990 Burlington Resources Foundation Faculty Achievement Award for Outstanding Research
1991 Perkin-Elmer Physical Electronics Award for Excellence in Surface Science
1993 Van Ness Lecturer, Rensselaer Polytechnic Institute
1998 C.M.A. Stine Award in Materials Science (AIChE);
1998 American Vacuum Society Distinguished Lecturer;
2000-2001 Joe Smith Distinguished Lecturer, University of California, Davis
2001 Science In Medicine Lecturer, University of Washington
2002 Medard W. Welch Award, American Vacuum Society;
2003-7 Nanyang Professor, Nanyang Technological University, Singapore
2004 Founder's Award, Society For Biomaterials
2006 C. William Hall Award, Society For Biomaterials
2008 BMES' Pritzker Distinguished Lecturer Award

About Bayer

Bayer is a global company with over 95,000 employees worldwide, and is organized as three operating companies-Bayer HealthCare, Bayer CropScience, and Bayer MaterialScience. An important goal of the company is to improve people's lives through a broad range of essential products that help diagnose and treat diseases, protect crops and produce high quality materials for a variety of applications.

Bayer MaterialScience is one of the leading producers of polymers and high-performance plastics with 18,000 employees at 40 sites around the world and 2005 sales of 10.7 billion euros. The company's innovative developments in coating, adhesive and sealant raw materials, polycarbonates, polyurethanes and thermoplastic urethane elastomers enhance the design and functionality of products in a wide variety of markets, including the automotive, construction, electrical and electronics, household and medical industries, and the sports and leisure fields. In addition, the basic inorganic chemicals unit produces chlorine and related essential products for the chemicals industry.

THE UNIVERSITY OF AKRON
DEPARTMENT OF POLYMER ENGINEERING

PRESENTS

BAYER LECTURESHIP

DR. BUDDY RATNER, DIRECTOR UWEB
MICHAEL L. & MYRNA DARLAND ENDOWED CHAIR IN
TECHNOLOGY COMMERCIALIZATION
PROFESSOR OF BIOENGINEERING &
CHEMICAL ENGINEERING
UNIVERSIY OF WASHINGTON

THURSDAY, NOVEMBER 8, 2007
2:00 P.M., PEAC Room 130

"BIOINTERFACE ENGINEERING FOR HEALING & RECONSTRUCTION"

FRIDAY, NOVEMBER. 9 2007
2:00 P.M., PEAC Room 130

"FOUNDATION IDEAS FOR TISSUE ENGINEERING: APPLICATION TO HEART MUSCLE AND ESOPHAGUS"

SPONSORED BY BAYER MATERIAL SCIENCE, PITTSBURGH

BAYER LECTURESHIP IN POLYMER ENGINEERING

Dr. Buddy D. Ratner is the Director of the University of Washington Engineered Biomaterials (UWEB) Engineering Research Center and the Michael L. and Myrna Darland Endowed Chair in Technology Commercialization. He is Professor of Bioengineering and Chemical Engineering at the University of Washington. Dr. Ratner received his Ph.D. (1972) in polymer chemistry from the Polytechnic Institute of Brooklyn. From 1985-1996 he directed the NIH-funded National ESCA and Surface Analysis Center for Biomedical Problems (NESAC/BIO). In 1996, he assumed the directorship of University of Washington Engineered Biomaterials (UWEB). He is the editor of the Journal of Undergraduate Research in BioEngineering, an Associate Editor of Journal of Biomedical Materials Research, on the advisory board of Biointerphases and serves on the editorial boards of ten other journals. He is a past president of the Society For Biomaterials. He has authored over 400 scholarly works and has 17 issued patents. Dr. Ratner is a fellow of the American Institute of Medical and Biological Engineering (AIMBE), the American Vacuum Society, the American Association for the Advancement of Science and the International College of Fellows Biomaterials Science and Engineering (IUS-BSE). Dr. Ratner has served as president of AIMBE, 2002-2003. In 2002 Dr. Ratner was elected a member of the National Academy of Engineering, USA. In 2003 he was elected President of Tissue Engineering Society of North America (TESNA). He is now on the council of the Tissue Engineering and Regenerative Medicine International Society (TERMIS). He has launched two companies and three more companies have come out from his research effort. His research interests include biomaterials, tissue engineering, polymers, biocompatibility, surface analysis of organic materials, self assembly, nanobiotechnology and RF-plasma thin film deposition.

THURSDAY, NOVEMBER 8, 2007

Biointerface Engineering for Healing and Reconstruction

The needs for repair and replacement of damaged and diseased tissues and organs are pressing and imperative. Synthetic biomaterials and medical devices have attempted to address these needs. The use of synthetic materials for medical devices and implants has a modern history extending back some 60 years. The materials used have largely been derived from commercial/commodity materials modified to demonstrate acceptable toxicology. Such materials (examples: silicone elastomers, fluoropolymers, polyurethanes and Dacron) have advantages of desirable mechanical properties and biodurability, though generally their biological performance is suboptimal. Particular problems are chronic (low level) inflammation, fibrosis, thrombosis, calcification and infection. The response of the body to such materials implanted in most tissue spaces is a fibrotic, avascular capsule walling the material from the body. Furthermore, this response is characteristic of chronic inflammatory reaction with activated macrophages, even years after implantation.

More recently, biomaterials design has asked questions about normal biological healing and how surfaces and materials might mimic or attenuate the normal biological processes. Proteins and biomolecules on surfaces and in scaffolds have been explored in biomaterials, tissue engineering and regenerative medicine to induce healing and reconstruction. However, most often, these proteins have been non-specifically immobilized or incorporated into materials with no concern for their orientation or conformational stability. Here we discuss the positive outcomes that come from using engineered surfaces to specifically control protein orientation and conformation with the goal to deliver desired signals to cells. In addition, the use of polymer architecture (precision porosity) to control cells will also be discussed and in vivo healing data presented. These methods offer the potential for much improved healing and integration of prostheses and also directly contribute to tissue engineering.

FRIDAY, NOVEMBER 9 2007

Foundation Ideas for Tissue Engineering: Application to Heart Muscle and Esophagus

This talk will present results from two University of Washington tissue engineering projects focused on heart muscle and esophagus. There are foundation technologies and concepts that underlie the engineering of these two very different tissues (and, in fact, all tissues). These foundations are: angiogenesis, innervation, surgical integration, appropriate biomechanics, inflammation/healing, cell sources and market realities. In the context of heart muscle and esophagus, these necessities will be discussed. In particular, the use of instructive scaffolds and biological surface signals to achieve many of these goals will be presented. Two types of scaffolds will be demonstrated. One is made by sphere-templating and has pores that are uniform in size. The other is made by decellularization of esophagus. Other technologies used in conjunction with the scaffolds to achieve the objectives will be presented. Finally, a discussion of the commercialization aspects of tissue engineering will be made, for unless an appropriate business model is arrived at, there will be little or no clinical application of tissue engineering.