Friend E. Clark Lecture Series

The Friend E. Clark Lecture Series is co-sponsored by the Tau Chapter of Phi Lambda Upsilon Chemistry Honorary and the C. Eugene Bennett Department of Chemistry of West Virginia University and was initiated in 1950. A list of the past speakers for this Lecture Series is tabulated below and includes a number of Nobel Laureates and prominent research scientists. The original purpose of this activity, as proposed by Charles Wheeler, then President of Tau Chapter of PLU in 1948, was to bring an outstanding research scientist annually to campus for two days to share his or her research interests and accomplishments with the students and faculty at the University. The department did not have a formal departmental seminar program until 1969. His idea is now a tradition.

The past Clark Lecturers include W. Conard Fernelius (Penn State), C. C. Price (Notre Dame), Ludwig F. Audrieth (Illinois), Herbert C. Brown (Purdue), Peter J. W. Debye (Cornell), Joel H. Hildebrand (California-Berkeley), N. Howell Furman (Princeton), H. G. Drickhamer (Illinois), John C. Bailar, Jr. (Illinois), Louis F. Fieser (Harvard), Max Lauffer (Pittsburgh), Robert A. Alberty (Wisconsin-Madison), Eugene G. Rochow (Harvard), Richard S. Brokaw (NASA), Daryl Busch (Ohio State), Ernest L. Eliel (Notre Dame), Charles N. Reilley (North Carolina-Chapel Hill), Edward C. Lingafelter (Washington), Ronald J. Gillespie (McMaster), Roald Hoffmann (Cornell), L. B. Rogers (Purdue), Harry B. Gray (Cal Tech), W. Albert Noyes (Texas), Frank H. Westheimer (Harvard), Herbert A. Laitinen (Florida), Fred Basolo (Northwestern), R. Bruce Merrifield (Rockefeller), Orville Chapman (Iowa State), Dudley Herschbach (Harvard), Theodore L. Brown (Illinois), Velmer A. Fassel (Iowa State), Nicholas J. Turro (Columbia), Richard N. Zare (Stanford), F. Albert Cotton (Texas A&M), Allen J. Bard (Texas), John D. Roberts (Cal Tech), John Ross (Stanford), R. Graham Cooks (Purdue), Richard H. Holm (Harvard), Barry Trost (Stanford), Jerome and Isabella Karle (Naval Research Laboratory), James Jorgenson (North Carolina - Chapel Hill), Louis S. Hegedus (Colorado State University), Maurice S. Brookhart (North Carolina - Chapel Hill) and Eric Heller (Harvard).

46th Friend E. Clark Lecture Series

sponsored by

Phi Lambda Upsilon Chemistry Honorary,
C. Eugene Bennett Department of Chemistry and
Mylan Pharmaceuticals

presents

Professor Robert T. Kennedy

Department of Chemistry, Pharmacology
University of Michigan

"Chemical Analysis of Living Cells"
April 21, 2005, 5:00 p.m., Clark Hall 208

and

"Life in the Fast Lane: High-speed Chemical Separations Gives New Opportunities from Biochemistry to Neuroscience"
April 22, 2005, 4:30 p.m., Clark Hall 208

Professor Robert T. Kennedy

Robert T. Kennedy is the Hobart H. Willard Professor of Chemistry and a Professor of Pharmacology at the University of Michigan-Ann Arbor. Professor Kennedy earned a B.S. in Chemistry at the University of Florida in 1984 and a Ph.D. from the University of North Carolina in 1988. After a two year stint as a NSF post-doctoral fellow, also at North Carolina, he served as a professor of chemistry at the University of Florida for 11 years. He has served on the editorial board of several journals including the *Journal of Chromatography*, *The Analyst*, and *Electrophoresis*. He has received several awards including the Presidential Faculty Fellowship, ACS Findeis Award, Benedetti-Pichler Award of the Microchemical Society, NSF National Young Investigator Award, Beckman Young Investigator Award, Lilly Analytical Research Award, College of Liberal Arts and Sciences Teacher of the Year Award, and Alfred P. Sloan Fellowship.

Research Interest

His research interests lie in the area of analytical chemistry and its application to pharmacology. His group has pioneered the use of capillary electrophoresis (CE), capillary liquid chromatography (LC) and microelectrodes for the study of neurotransmitters and hormones at single living cells and *in vivo*. An important accomplishment was the development of a microelectrode that allowed insulin release to be monitored at single pancreatic beta cells. This method has since been used to study the mechanisms of secretion and its relationship to diabetes. Recently, a method for imaging secretion based on confocal fluorescence microscopy has been developed. Dr. Kennedy's group has also developed instrumentation that couples *in vivo* sampling methods with CE. This technique has allowed significant improvements in the *in vivo* detection of neurotransmitters. This development has opened the door to numerous studies on how chemical substrates influence behavior. As part of this project, the group invented the CE-based immunoassay and a variety of other affinity based methods which have been used in clinical as well as basic research applications. More recently, his group has developed a highly sensitive LC-MS method that has allowed neuropeptides to be discovered and monitored in the brain of living rats.

"Chemical Analysis of Living Cells"

Dr. Kennedy will describe the use of several novel analytical techniques based on microfluidics, sensors, and imaging to study insulin secretion from pancreatic beta cells. These new tools allow the dynamics of secretion, metabolism, and cell-cell interaction to be observed and quantified. The methods have yielded insights into complex phenomena such as oscillations in secretion and root causes of diabetes.

"Life in the Fast Lane: High-Speed Chemical Separations Gives New Opportunities from Biochemistry to Neuroscience"

Capillary electrophoresis can be used to perform separations on the order of seconds with high resolution. Such rapid separations have allowed this technique to be used for monitoring chemical reactions and dynamics in complex environments. The theory and instrumentation for rapid electrophoresis will be presented. Biochemical applications will be discussed including detection of protein-protein interactions (SH2 domains to phosphoproteins) and enzyme kinetics (G protein activation). Such methods will have application in biochemistry and possibly drug discovery. When rapid CE is coupled with sampling techniques, the method can be used to monitor neurotransmitters *in vivo*. Instrumentation and applications for such measurements will be presented.