

# Joint CHEMISTRY & BIOLOGY SEMINAR

## *Bacterial Chemotaxis, a Paradigm for Studying Biological Signaling Mechanisms at the Molecular Level*

**Gerald Hazelbauer of the University of Missouri**

Friday, September 25, 2009  
4:00 pm, Graves 112 (Winants Aud.)

### ***Abstract***

A fundamental property of life is the ability to sense and respond to changes in the environment. This property is mediated by sensory systems in which receptors are linked to effectors by signaling pathways. Receptors detect features of the environment. Signaling pathways send informational signals from receptors to effectors. Investigation of the molecular mechanisms of receptors and signaling is a major focus in current research in the life sciences and at the chemistry/biology interface. Among the many sensory and signaling systems in biology, the most extensively characterized at the molecular and mechanistic level is the one that mediates bacterial chemotaxis, specifically in *Escherichia coli*. This high-performance chemosensory system can detect changes as small as 0.1% and perform such detection over a dynamic range of 10<sup>5</sup>. The sophisticated signaling system has a molecular memory that compares the present and the past, integrates multiple inputs and acts cooperatively in a "biological CPU" consisting of thousands of transmembrane chemoreceptors in complex with signaling enzymes. This seminar will review our understanding of this fascinating biological system and touch on current areas of active research.

### ***Biography***

*Gerald Hazelbauer received his undergraduate degree in biology from Williams College, a Master's degree from Case-Western Reserve University and a 1971 doctorate from the University of Wisconsin-Madison. He was a postdoctoral fellow at the Pasteur Institute in Paris, France and a research fellow at the University of Uppsala, Sweden before becoming a faculty member at Uppsala in 1975. In 1981 he moved to Washington State University where he was appointed full Professor in 1985 and Chair of Biochemistry and Biophysics in 1994. In 2000, he assumed his current position as Professor and Chair of the Department of Biochemistry at the University of Missouri. Hazelbauer has been a pioneer the study of biological molecules that enable living things to detect their surroundings and respond effectively. He is internationally known for his research on molecular mechanisms of bacterial sensory systems and has published more than 100 articles in major scientific journals. His work has been funded by multiple national granting agencies, including the National Science Foundation, the American Cancer Society and, for over 30 years, the National Institutes of Health. He has been an officer and board member of prominent scientific societies. Dr. Hazelbauer has been honored for his research accomplishments by private foundations, scientific societies and academic institutions.*