KENNESAW STATE UNIVERSITY
COLLEGE OF SCIENCE AND MATHEMATICS
Department of Chemistry and Biochemistry

The **Chemistry and Biochemistry Departmental Seminar Series** covers a broad range of fields in the Chemical and Biochemical Sciences. In past seminars, scientists from Academia, Government, and Industry have presented their most recent discoveries and contributions in their respective areas. This Seminar Series offers students and faculty the opportunity to interact directly with other leaders in their specializations and to gain a good overview of the entire range of fields in Chemistry and Biochemistry.

Fall 2019

Seminars are held on Tuesdays in CL 1009 (Clendenin Building, Room 1009 on the Kennesaw Campus), 12:30 - 1:30pm, unless otherwise noted with special day/time/location information. All are invited to attend.

***SPECIAL DAY/TIME/LOCATION*: Friday, September 20, 2019 – 2:30pm in CL 2003**

Dr. Jeffrey I. Seeman, Department of Chemistry, University of Richmond

Title: *Was Plagiarism Involved in the Conceptualization of the Woodward-Hoffmann Rules?*

Abstract: In 1981, Roald Hoffmann and Kenichi Fukui shared the Nobel Prize in Chemistry “for their theories, developed independently, concerning the course of chemical reactions.” Had Robert B. Woodward (1917 – 1979) lived two years longer, he would surely have received his second Nobel Prize in Chemistry for his contributions to the Woodward-Hoffmann rules. In the March 29, 2004 issue of Chemical & Engineering News, E. J. Corey wrote in his Priestley Medal Address, “On May 4, 1964, I suggested to my colleague R. B. Woodward a simple explanation involving the symmetry of the perturbed (HOMO) molecular orbitals for the stereoselective cyclobutene/1,3-butadiene and 1,3,5-hexatriene/cyclohexadiene conversions that provided the basis for the further development of these ideas into what became known as the Woodward-Hoffmann rules.” Letters between Corey and Hoffmann in 1981 and 1984 and other relevant information will be shown and discussed. This seminar will focus on responsible conduct of science and the practice of science in today’s complex and fast moving scientific, academic, and political environments.

Tuesday, October 1, 2019

Dr. Konstantinos D. Vogiatzis, Department of Chemistry at the University of Tennessee, Knoxville

Title: *Coupling Quantum Chemistry with Machine Learning*

Abstract: The current post-combustion carbon capture process at coal plants uses aqueous amine solvents, such as monoethanolamine (MEA), to effectively bind CO2. Regenerating the solvent is energetically expensive, and it is estimated that this process would utilize nearly 20-30% of the power that a coal plant produces, increasing energy prices by as much as 90%. Passive non-porous polymeric membranes offer an alternative, cost-effective technology for CO2 capture. Unlike solvents, dense polymeric membrane gas separations utilize much weaker physisorption interactions.

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***SPECIAL DAY/TIME/LOCATION*: Thursday, November 21, 2019 – 2:00pm in SC 213**

Ms. Adriana Lozoya-Colinas, Hud Lab, School of Chemistry and Biochemistry, Georgia Institute of Technology

Title: *Replication of nucleic acids enabled by non-aqueous environments*

Abstract: The origin of life is possibly one of the biggest mysteries in science. Researchers have been trying to answer many questions related to this topic for many years. One of the core problems in the area involves the replication of information, now contained in DNA and RNA and copied with the aid of enzymes. However, how did this process occur before the emergence of polymerase enzymes still remains one of the fundamental questions in origins of life research. Different approaches have been taken to answer this question, for example, RNA has been proposed to be one of the first polymers to emerge due to its ability to store information and catalyze chemical reactions (ribozymes). Therefore, it has been hypothesized that RNA could have played a key role in the replication process. Nonetheless, different challenges arise from this approach. First, active sequences are highly structured, thus preventing them from serving as good templates for replication. Second, once a template directed synthesis from a template is produced, a duplex is formed. To continue further with the replication process, the two strands of the duplex need to be separated, however, this is not thermodynamically favored in aqueous solutions, a problem known as strand inhibition. We propose the use of viscous environments to overcome these challenges and promote the replication of gene-length DNA and RNA sequences. Such viscous solvents could have been generated on the early Earth by water evaporation through day/night or seasonal cycles, providing a prebiotic environment that favors replication of informational polymers.