Daryl Sauer, Ph.D.

**Award:** Research Infrastructure Program; $10000.00

**Title:** Assistant Professor, Chemistry

**Project:** The Development of an Electrochemical Flow Reaction System for Extraterrestial Organic Synthesis

**Abstract:** (First Paragraph of Proposal)A key need for long term space exploration and long-term colonization will be synthetic organic chemistry capabilities to produce small amounts of needed materials, prepare biological reagents for experimentation and culturing, nutrients, fuel, and perhaps most importantly, for creating any needed medicines via a “drug-on-demand” approach. The ability to manufacture synthetic drugs to combat disease (both known and not yet identified), radiation damage and the effects of reduced gravity will be critical to the success of any long-term space mission. Such a system will be critical for astronaut’s health and welfare, as once embarked a crew will need to be self-sufficient and flexible enough to adapt to changing and unforeseen circumstances. Efforts to battle cancer tumors are particularly important in the light of the substantial space radiation that astronauts are exposed to on long-duration missions, coupled with their lack of access to traditional care because of travel distance and the unacceptably excessive weight of treatment equipment. To this end, the development of a “drug-on-demand” system is imperative (1) (2) (3), and notably has corresponding applications back on Earth in resource poor settings, for the military, etc. Space radiation also induces accelerated pharmaceutical drug expiration dates (4) (5), and thus a system that will allow astronauts to produce needed drugs in real time is another vital aspect of this medical need.

**Biography:** Dr. Sauer currently is an Assistant Professor of Chemistry at the University of Wisconsin-Parkside. His research focuses on natural product isolation, microwave accelerated organic synthesis, flow chemistry and electrochemistry. Prior to joining Parkside he worked at Abbott Laboratories/AbbVie for 25 years in roles in as a medicinal chemist in the Cancer Research area, leader of the Abbott High-Throughput Organic Synthesis group which developed tools, methods, and facilities for increasing the efficiency of the drug discovery process, and as a Senior Manager in the Scientific Assessment – Discovery Licensing and Acquisition organization responsible for identifying, evaluating and implementing technologies to enable the drug discovery process for Global Pharmaceutical Research & Development. Dr. Sauer received his B.S. in chemistry from the University of Wisconsin-Parkside and completed his doctoral at the University of South Florida. His thesis work focused on the utilization of the 1,3-dipolar cycloaddition reaction to synthesize novel  
 nucleoside analogs. Following completion of his graduate studies he joined The Ohio State  
 University as a National Science Foundation post-doctoral fellow where he worked on the total synthesis of biologically interesting natural products. He is an author on 30 peer-reviewed publications and named inventor on 30 U.S. and International Patents.

**Congressional District**: 1

**Congressional Representative**: Paul Ryan