Title: Undergraduate Research at the Interface of Chemistry and Biology

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Executive Summary:

Participation in undergraduate research can increase a STEM student’s interest in pursuing a scientific career. We propose three research projects supervised by Chemistry Lecturers that allows students to explore how modern experimental and computational chemistry is applied to problems of biological interest. Students gain skills in synthesis, isolation and characterization, and explore interactions between small molecules and proteins using absorption, nuclear magnetic resonance and fluorescence spectroscopy.

Dr. Ray’s project involves molecular modeling study of redox active heme proteins, and characterization of bio-mimetic manganese porphyrins complexes for catalyst development. UV-Vis and paramagnetic $^1$H-NMR spectroscopy is used to determine basicity and binding affinity of ligands that facilitate substrate oxidation. Dr. Comar’s project focuses on bio-assay guided chromatographic isolation and characterization of biologically active chemical constituents of medicinal plants, with the goal of identifying new antibiotics. Dr. Navarro’s project involves the synthesis of polyhydroxyl chalcones to search for insulin-like activity. Biomolecular interactions with blood proteins are examined by UV-Vis and fluorescence spectroscopy. Faculty work one-on-one with undergraduates to help them transition from laboratory coursework to independent research. Students learn to analyze the literature, design projects, and communicate their results. Collective biweekly group meetings will allow a means to evaluate the student’s scientific growth.