

**Department of Chemistry
COLLEGE OF ARTS & SCIENCES**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2010

The Department of Chemistry is pleased to offer the following research project for the summer of 2010. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and, if possible, develop a timetable for the twelve-week research period.

PROJECT TITLE: SEQUENCE CHARACTERIZATION OF MODIFIED RNAs

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Project Description

RNAs are involved in key cellular functions in all living cells. Among all known bio-organic molecules within living cells, RNA molecules are the only ones that store genetic information and act as catalysts. A nonexclusive list of significant cellular RNAs includes mRNAs, which are translated into proteins, and the ncRNAs such as miRNAs, siRNAs, tRNAs, rRNAs, snRNAs and snoRNAs. Our group is interested in characterizing the sequence of various ncRNAs and determining whether the extent of post-transcriptional modification to these RNAs. We use modern biochemical and bioanalytical techniques to address these research questions. The goal of this particular research project is to develop new immobilized enzymes that allow for the manipulation of RNAs prior to characterization by methods such as gel electrophoresis, HPLC or mass spectrometry. In this research project, a student would be exposed to a number of state-of-the-art research techniques including cell culturing, RNA isolation, enzymology, chemical derivatization, separations, and mass spectrometry.

A student working on this project will learn how to chemically immobilize enzymes and oligonucleotide probes to magnetic beads, confirm the enzymatic activity of immobilized enzymes, and then process nucleic acids isolated from various organisms. She will specifically be working with existing research group members to optimize the immobilization of various enzymes and oligonucleotide probes to the magnetic beads. Then, she will use these magnetic beads to isolate and process ncRNAs from bacterial and eukaryotic organisms. The student does not need any prior experience in biochemistry for this project.