Department of Chemistry
COLLEGE OF Arts and Sciences

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 1, 2014

The Department of Chemistry is pleased to offer the following research project for the summer of 2014. 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: Development of Nanoscaled Drug Delivery Systems for Novel Cancer Chemotherapeutic Agents

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Project Description

Chemotherapy remains a major path for treating most types of cancer. One of its major challenges is the delivery of effective doses of drugs to the tumor site while keeping the harmful side effects to a minimum. Therefore, there is a critical need to develop a suitable drug delivery system that prevents premature dissociation of the active agent during blood circulation, yet provide expedient release in tumors.

The studies will include covalent attachment of newly developed in Litosh laboratory base-modified nucleoside analogs with high anti-cancer activity to β-cyclodextrin, an oligocarbohydrate, a single drug delivery unit, *via* an acid-labile linker, followed by examination of pH-responsive drug release from the conjugate. Further effort will be focused on integration of these conjugate into water-soluble polymers capable of self-assembly into nanoparticles, functionalized with targeting ligands. The resulting conjugates will be screened *in vitro* against the specific cancer cell lines to examine the effect of the conjugation and targeting ligand attachment on activity and cellular membrane permeability.

The participants will receive training in synthetic organic chemistry, chromatography purification techniques (both straight and reverse phase), and running bioassays under the supervision of all Litosh group members currently involved in the project, including the PI.