Faculty Member Contact Information

Name	Debanjana Ghosh
Contact Info	
SIUE Email	dghosh@siue.edu
Campus Box	1652
Department	Chemistry

1 Funded, 5 students Unfunded URCA Assistant

	This position is **ONLY** open to students who have declared a major in this discipline.	M
	This project deals with social justice issues.	
	This project deals with sustainability (green) issues.	
X	This project deals with human health and wellness issues.	
	This project deals with community outreach.	
	This mentor's project is interdisciplinary in nature.	I

Are you willing to work with students from outside of your discipline? If yes, which other disciplines?

Yes

How many hours per week will your student(s) be required to work in this position? (Minimum is 6 hours per week; typical is 9)

9

Will it be possible for your student(s) to earn course credit?

CHEM 296, CHEM 396, and CHEM 496 CHEM 296 (0-1 cr), CHEM 396 (2cr), and CHEM 496 (2 cr)

Location of research/creative activities:

Department of Chemistry, Science West, Room 3270

Brief description of the nature of the research/creative activity?

Exploring the fluorescence properties of bioactive molecules in bio-/biosimulating environments:

The efficiency of drug delivery can be increased by using systems that improve drug stability and localization yet require lesser dosage to reach target concentration. Many nanomedical strategies have been investigated, including micellar drug delivery. Micelles can act as a vessel to carry hydrophobic molecules through the body while better solubilizing the molecule in its core during transport. The release of the drug can be easily regulated in this way, which lessens side effects and makes for a more efficient use of pharmaceutical materials. The cationic surfactant investigated in this study is alkyltrimethylammonium bromide, which self-assembles into micelles in an aqueous media to enhance the solubility of a 1,2,3-triazole prodrug molecule. The colloids created by the surfactants are small-scale biomimicking environments. The behavior of the molecules in the microheterogenous environments was investigated using UV-Vis absorption and fluorescence spectroscopy, where photophysical trends involving the triazole component were detected. Amplified emission of thetriazole and increased quantum yield were observed suggesting successful encapsulation of themolecule within micelles. This research provides an avenue for the physiological use of compounds that are insoluble in aqueous conditions.

Brief description of student responsibilities?

Role of the Research Scholar:

1. During their time, the researcher will review the relevant literature to plan out the methodology.

2. They will be working towards generating pilot data on this research to:

(a) understand the fluorescence properties of the molecules under study in a micellar environment,

(b) assess the binding mechanism of the molecule with the micelles using UV-Vis and fluorescence spectroscopy, and

(c) plan a systemic route to understand the drug delivery mechanism.

URCA Assistant positions are designed to provide students with *research or creative activities* experience. As such, there should be measurable, appropriate outcome goals. What exactly should your student(s) have learned by the end of this experience?

The researcher working on this project will receive training in both qualitative and quantitative research methodology. They will be able to:

a) gather literature, explore and cite any previous work,

b) prepare appropriate concentration micelle solutions of different categories based on theirdiameter and functional groups,

c) encapsulate bioactive organic molecules in such colloidal environment (micelles) and analyze the movement molecules using different spectroscopic techniques such as absorption, steady-state fluorescence, and fluorescence anisotropy,

d) disseminate research output through conference presentations and publish articles in highly impactful peer-reviewed journals.

e) The pilot data generated will help in developing a proposal for external funding agencies.

Requirements of Students

If the position(s) require students to be available at certain times each week (as opposed to them being able to set their own hours) please indicate all required days and times:

I will work inclusively with students to set their timings. Given the safety of the students in a chemistry lab, the recommendation is adjusted times on weekdays (M- F) between 8 am and 5 pm.

If the location of the research/creative activities involves off campus work, must students provide their own transportation?

A part of the research project will include the use of testing outside of the facility in the building. The students must be able to provide their own transportation in such circumstances.

Must students have taken any prerequisite classes? Please list classes and preferred grades:

Completed CHEM 121 A & 125A, 121B & 125B.

Other requirements or notes to applicants:

Completing CHEM 121 A & 125A, and taking CHEM 121B & 125B in their current semester.