






**Faculty Member Contact Information**

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<b>Department</b>	Physics

**1 Funded, 1 Unfunded URCA Assistant**

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

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

- No

**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)

- 8 hours

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

- Yes—PSYC 297 or 397 (2 to 3 credit hours)

**Location of research/creative activities:**

- Dr. Hamad's Laser and Photonics Lab, Science East, SE 0276

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

In previous URCA projects my group studied the formation of holographic gratings in Europium (Eu) and Praseodymium (Pr) doped Zinc Telluride glasses. During the formation of the grating by crossed laser beams, we noticed that the fluorescence from these glasses decreases as the grating strength increases. This information could be an important clue on the mechanism responsible for the formation of the gratings in these glasses. Therefore, in this project we will systematically study these changes in the fluorescence and absorption spectra before and after the glass samples are exposed to blue laser, which typically what we use to write the gratings, as a function of Eu and Pr concentrations and laser power. The difference between the spectra before and after the laser exposure will reveal the formation of any bands related to induced defects due to the laser glass interaction. We have several glasses doped with Eu and Pr from previous URCA projects. We may need to make new samples with other Eu or Pr concentrations if needed.

**Brief description of student responsibilities?**

- 1- Student will be responsible of making the glasses with supervision.
- 2- Student will help in preparing the glasses by polishing them.
- 3- Student will help in obtaining the fluorescence and optical absorption data of the samples.
- 4- Student will help in the analysis of the data.

**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?**

- 1- The student will learn the process of making glass via the melt-quenching traditional method
- 2- The student will learn how to use polishing machine and materials
- 3- The student will learn how to experimentally measure absorption and Fluorescence for any material.
- 4- The student will learn how to operate lasers and acquire skills of handling and building optics setups.

## **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:**

- Will arrange times and days with the student

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

- ON campus

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

- Preference will be to students who finished Phys 201.

**Other requirements or notes to applicants:**

- N/A