Faculty Member Contact Information

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<thead>
<tr>
<th>Name</th>
<th>Dr. Amardeep Kaur</th>
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<td>Contact Info</td>
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<td>Department</td>
<td>Electrical and Computer Engineering</td>
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1 Funded, 1 Unfunded URCA Assistant

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<th>Project</th>
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<tr>
<td>This position is ONLY open to students who have declared a major in this discipline.</td>
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<tr>
<td>This project deals with social justice issues.</td>
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<td>This project deals with sustainability (green) issues.</td>
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<td>This project deals with human health and wellness issues.</td>
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<td>This project deals with community outreach.</td>
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<td>This mentor’s project is interdisciplinary in nature.</td>
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Are you willing to work with students from outside of your discipline? If yes, which other disciplines?
- Yes, ECE, Physics, Chemistry

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)
- 6-8 hours

Will it be possible for your student(s) to earn course credit?
- Yes, 492-016 or an independent study course
Location of research/creative activities:
- EB 3032 and STEM center when needed

Brief description of the nature of the research/creative activity?
This is a research project and will be part of a larger project that will take over a year. The project is to develop a specific type of optical fiber sensor for concrete structure evaluation. Specifically, the URCA student will be trained to achieve the following specific outcomes.

1. Make an optical fiber cavity sensor and optimize it for reliable performance. The student will be trained to use the equipment needed for this. There may be a need to use HCl under a chemical hood for safety. All safety protocols will be observed.

2. Test and characterize the sensor for repeatable performance.

3. Test the sensor and gather data on strain and temperature response.

4. Put the sensor in a concrete mixture with help from the construction management lab and under supervision, obtain data from the sensor as the concrete sets. The student will be trained on the measurement instruments needed for this experiment.

Brief description of student responsibilities?
The student/s will have the following deliverables after they get proper safety and equipment training.

1. Fabricate the sensors, and document all steps taken. Document different approaches that were tested and identify successes, and challenges.

2. Obtain and tabulate sensor testing data for temperature and strain response. Analyze this data in Excel, numbers, sheets, or similar tools to find linearity fit and general sensor response including a comparison of applied temperature (or strain) and sensor-measured temperature (or strain).

3. Apply this sensor to perform concrete set testing under supervision. The student will only be responsible for the sensor part of the test.

4. For the concrete test, obtain and tabulate sensor testing data for strain response. Analyze this data in Excel, numbers, sheets, or similar tools to find linearity fit and general sensor response including a comparison of applied strain and sensor-measured strain.

5. At the end of the work, prepare a written report and poster to summarize the work done and present the data gathered.
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?

Student/s would have gained the following skills by the end of their URCA experience.

1. The student will gain highly specialized training on optical equipment. This training is highly desirable in semiconductor tech. and communications industry. The specific equipment training will include, optical sources, optical spectrum analyzer, fusion splicer, couplers, etc.

2. The student will learn to work independently and hopefully develop critical and organized research methodology skills.

3. The student will learn valuable technical documentation skills. Students will also gain scientific information presentation skills.

4. The student would have gained experience working in an interdisciplinary setting with electrical and computer engineering, and construction management.

5. The student will have the opportunity to contribute, as a co-author, to a technical paper that will result from this work.

6. The student will engage in active learning and will gain other engineering skills that will add to their resume in technical and professional development skills.

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:

- Work hours are flexible, weekly meetings will be discussed and planned during the times when the student and mentor are both available. Student can set their own work hours, they will have access to lab and other facilities that they need.

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

- The work will only be done on-campus.

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

- Students with physics and chemistry will have some skills that will play to their advantage. These skills or knowledge would have been gained through first/second-year physics and chemistry courses and labs. Students in 3rd year or above in these programs will make good candidates.

- Students with electrical and computer engineering students will make good candidates if they have finished their lower-level physics courses and have finished ECE 210. If you
are enrolled in ECE 340 during next semester or have completed it, that will help but this is not required.

Other requirements or notes to applicants:

- Past experience in technical documentation or good professional writing skills will be beneficial but are not required.