Faculty Member Contact Information

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<thead>
<tr>
<th>Name</th>
<th>Dr. Arman Dabiri</th>
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<td>Mechanical and Mechatronics Engineering BOX</td>
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<td>Department</td>
<td>Mechanical and Mechatronics Engineering</td>
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1 Funded, 1 Unfunded URCA Assistant

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<tr>
<th>X</th>
<th>This position is <strong>ONLY</strong> open to students who have declared a major in this discipline.</th>
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<tr>
<td></td>
<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?
- 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, 4xx MRE (2-3 credit hours)
Location of research/creative activities:

- Robotic Lab EB1036

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

The ESP32 family of microcontrollers is widely recognized in developing smart wireless devices. These microcontrollers are distinguished for their exceptional wireless capabilities and extremely low power consumption. However, the experimental data associated with their characteristics is currently dispersed and lacks consistency. Therefore, it is crucial to comprehensively characterize them for applications wherein their exact parameters matter.

In this project, our primary aim is to systematically collect and organize experimental data related to several ESP32 boards, i.e., S3, C6, and H4 families. This dataset will encompass various characteristics of ESP32 performance, including power consumption across different modes, signal strength analysis, and elevated operating temperature variations during distinct operating modes.

Brief description of student responsibilities?

In our lab and research group, we are looking for a dedicated undergraduate student to work closely with our graduate students and contribute to this exciting project. As our undergraduate research partner, the student will have the following responsibilities:

- Setup: Given that these microcontrollers operate within the range of micro-watts, it is critical to meticulously design their experimental setup. The student will be responsible for ensuring that the setup can accurately measure current and voltage within these micro-range values.

- Data Collection and Organization: The student's primary task will involve collecting experimental data related to ESP32 board performance across different modes. This includes precise measurement of power consumption, monitoring BLE communication, assessing signal strength, and recording temperature variations. It is essential to maintain meticulous labeling and thorough documentation of the dataset for easy access and analysis in future projects.

- Data Analysis: The student will have the opportunity to engage in data analysis, where they can identify trends and patterns within the collected 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?

By the end of this experience, our student(s) should have achieved the following learning outcomes:
- Technical Proficiency: The student will gain technical expertise in designing and setting up experiments for microcontrollers with low power consumption.

- Data Handling Skills: The student will become skilled in collecting, organizing, and documenting experimental data, ensuring it is easily accessible for future research.

- Data Analysis: The student will develop the ability to analyze data effectively and identify meaningful patterns and trends.

- Research Collaboration: The student will experience collaborative research in a laboratory setting, enhancing their teamwork and communication 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:

- The student will be required to attend regular meetings with the research team in the robotics lab to discuss progress and activities every week.

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

- No transportation is required.

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

- While there are no strict prerequisites, we recommend selecting a student with a major in Mechanical and Robotics Engineering (MRE) and preferably one who has completed MRE 320 as it will provide a solid foundation for the project's technical aspects. However, a strong commitment and enthusiasm for the project are equally important.

Other requirements or notes to applicants:

- N/A