## Faculty Member Contact Information

<table>
<thead>
<tr>
<th>Name</th>
<th>Dr. Jagath Gunasekera</th>
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<tbody>
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<td>Contact Info</td>
<td><a href="mailto:jgunase@siue.edu">jgunase@siue.edu</a></td>
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<td>SIUE Email</td>
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<td>Campus Box</td>
<td>1805</td>
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<tr>
<td>Department</td>
<td>Mechanical and Mechatronics Engineering</td>
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</tbody>
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### 1 Funded, 2 Unfunded URCA Assistants

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<tr>
<td>This position is <strong>ONLY</strong> 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, but similar fields.

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 hours

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

- No
Location of research/creative activities:

- School of Engineering, Prototyping Lab, EB0036

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

3D printing, an additive manufacturing method that is widely used in industry, healthcare, academia, aerospace, and many other fields. It is very cost effective and powerful technique compared to traditional machining methods. In the School of Engineering, we use a host of 3D printers for various student needs. Unfortunately, all the printers we have are limited in size and the capacity.

In this research project, the student will design, analyze, program, build and test a large-scale 3D printer that will immensely help our students. Through a recent donation we have all the material and electronic components needs to build a large-scale 3D printer.

Brief description of student responsibilities?

First, the student will do literature review on the different types of 3D printing techniques and finalize on a technique they are going to implement.

Then, the student will begin designing a 3D model of the 3D printer.

After that, they will select and finalize the material and electronic components need to build the printer.

Afterword, they will begin assembling and manufacturing the printer.

Programming and assembling all the electronic components and sensors will be the next step.

Finally, they will perform a series of tests to verify the accuracy of the prints and make final adjustments to satisfy the accuracy standards.

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 student will learn, how to conduct a literature review.

How to perform 3D modeling and engineering drafting of a product.

Experience on material selection.

They will gain skills on machining metals and assembling them.
How to assemble electronic component, wiring them and finally how to program them do execute series of commands. They will learn how to program Arduino controller boards to work with stepper motors.

Finally, how to perform testing and evaluation of the final product.

**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:

- N/A

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

- N/A

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

- N/A

Other requirements or notes to applicants:

- Some experience using 3D printer will be helpful.