Cedars-Sinai Research Internship Program
Request for a Research Internship Opportunity

1. Department Information

Department: Regenerative Medicine Institute

Area/Division/Lab (if applicable): Sareen Lab

PI/Mentor: Dhruv Sareen

Contact: Name and Email:
To apply, submit an application and resume via email to: Andrew Gross at andrew.gross@cshs.org

Research Type: Lab Based

2. Internship Details

Term: 2018-19
Spring; Summer; Fall or All: All

Number of Internships Available: 1

Track: Academic Credit (requires enrollment in a course which provides academic credit for internships).

Pay Rate (if applicable)*: na
* Current minimum wage is $12.00/hr. Starting July 1, 2018, minimum wage will increase to $13.25/hr.

Level of Education Preferred: Undergraduate

How will the candidate be identified?
☒ Post on Website ☐ Pre-identified

Requested Start Date: 1/14/2019 Requested End Date: 12/31/2019

3. Overview of Research Area/Mentor

Please provide an overview or description of the Department, Research Area, and PI/mentor:

The Sareen laboratory uses stem cells to study diseases and cellular behavior which cannot be effectively observed in living humans or animal models. Additionally, the Sareen lab explores new methods in stem cell culture and gene editing to advance what is possible in research and the disease treatment. In addition to directing the research of his lab, Dhruv Sareen is the director of Cedars-Sinai’s Stem Cell Core and Cedars-Sinai’s emerging Biomanufacturing Center. The Sareen lab is seeking an ambitious and creative intern to help optimize its current iPSC differentiation protocols and 3D bioprinting strategies for creating new research tools and potential sources for transplantable materials.

4. Internship Summary

Provide a brief summary of the internship: (e.g. This internship will provide...) if possible include specific project, and the skills or techniques.

The Sareen lab is looking for a resourceful candidate to assist in the current iPSC differentiation protocols, especially differentiation of iPSCs into pancreatic beta cells, as well as maturation of our 3D bioprinting approaches. The ideal candidate would be resourceful and possess a basic familiarity and enthusiasm for 3D printing/additive manufacturing. The intern’s day to day tasks would include culturing iPSC cells, preparing defined cell culture media, printing synthetic tissues and components of synthetic tissues under the instruction of a researcher for the purpose of identifying the ideal conditions and materials. Printing tasks could include the printing of neurons, cardiomyocytes, endocrine tissues, as well as composite structures in order to replicate tissues, organs, and organ systems. The intern would perform cell culture work, bench work qualifying molecular properties of synthetic tissues, as well as imaging and analysis.
### 5. Internship Goals and Objectives

Specify the goals and objectives of what the intern will learn during the course of the research internship. (*e.g. At the end of the internship, the intern will be able to...*)

1. Perform basic tasks in 3D bioprinting
2. Design printable models using computer aided design (CAD) software
3. Understand the effects of various print settings on synthetic tissue quality
4. Culture cells and 3D bioprinted synthetic tissues
5. Summarize methods and results and draw conclusions
6. Culture iPSC cells.
7. Prepare defined cell culture media.
8. Help to analyze differentiation of cells outcome through Flow Cytometry and ICC techniques.
9. 
10. 

### 6. Intended Activities and Timeline

Provide an intended curriculum detailing the activities and timeline through which each of the goals and objectives identified above will be met. Please attach a separate Word document if additional space is needed: (*e.g. Weeks 1-2 cover X..., Week 3 covers Y..., Weeks 4-6 cover Z...*)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Select Weeks or Months for timeline below depending on internship duration:</th>
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</thead>
<tbody>
<tr>
<td>1. Learn how to prepare bioinks and reagents</td>
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<td>1-2</td>
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<tr>
<td>2. Learn how to operate a 3D bioprinter</td>
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<td>3. Perform experiments to understand how to best colonize cavities with blood vessel cells</td>
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<tr>
<td>4. Learn how to image printed constructs and optimize imaging techniques</td>
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<td>5. Review literature and summarize developments in 3D bioprinting</td>
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<td>6. Summarize research and communicate findings</td>
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<tr>
<td>7. Learn how to culture cells.</td>
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<tr>
<td>8. Analyze differentiation of cells outcomes.</td>
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7. Education and Experience Requirements

- Must be 18 years of age or older.
- Applicant must enroll in a course which provides academic credit for the duration of the internship, which might require re-enrollment in the course for subsequent terms.
- Must be available to attend the mandatory full-day of orientation.
- Selected candidate will be required to provide evidence they are eligible to work or intern in the US.
- Ability to read and comprehend written and verbal instruction in English.
- Ability to function in a team environment and use interpersonal skills to communicate effectively.
- Basic computer skills including Excel and Word.
- Able to lift up to 25 lbs and walk four city blocks.
- Able to sit, stand, and walk for prolonged periods of time.
- Ability to exercise physical ability and perspective acuity to satisfactorily perform essential functions.

8. Preferred Requirements

Please identify any preferred requirements you may have for the internship: (e.g. The student must have completed a basic biology and chemistry course, etc...)

1. Basic familiarity with 3D printing is strongly preferred
2. Creativity and trouble-solving skills are required
3. Experience with electronics and or computer aided design are preferred