

Department Project Information

Department Name	<i>MEES</i>	Date Submitted	<i>04/28/2021</i>
Project Title	<i>Rapid vitrifying and rewarming device for large quantities of cells (BIO_VITRIFY)</i>	Planned Starting Semester	<i>Fall 2021</i>

Senior Design Project Description

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Biomedical Eng	<i>3</i>		
Other ()	<i>0</i>		

Project Overview:

Vitrifying and rewarming large quantities of cells is a challenge due to high critical cooling and warming rates needed to avoid crystallization. This project will build a device that can vitrify and rewarm large quantities of cells in suspension for therapeutic and pharmaceutical purposes.

Project Requirements:

The device will need to hold approximately 200-400g of cell mass in suspension. Rates of cooling should be able to achieve 5C/min or faster and rewarm at >50C/min with temperature variation less than 20C.

Expected Deliverables/Results:

- *A device that can achieve cooling rate of 5C/min*
- *Add-on device that can achieve warming rates of >50C/min with variation in temp <20C.*
- *Device needs to hold 200-400g of cell mass in suspension*
- *Warming needs to be computer controlled*



Disposition of Deliverables at the End of the Project:

Hardware developed is the property of the mentor and department. Typically, the work product is displayed at the last Expo then immediately handed over to the mentor. This device could have immediate clinical use.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

- Labview
- Heat Transfer
- 3-D printing