



Department Project Information

Department Name	<i>Insert your department name here</i> MEES	Date Submitted	07/14/2025
Project Title	<i>Single Vittrification and rewarming device for cell therapeutic products (UNCC_ME_WARM3)</i>	Planned Starting Semester	Fall 2025

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
Mechanical	4-5	Electrical	1
Computer	1	Systems	
Other ()			

Project Overview:

Cryopreserving cell therapeutic products can provide on-demand availability of large quantities of cell products. Vittrification and rapid rewarming is one technology that can achieve this goal.

Project Requirements:

Design and build a standalone single vittrification and rewarming device that can cryopreserve and rewarm 50-100g of cell products for cell therapy.

1. A single device will provide more portability as the device will be used in clinical environment
2. Cooling and rewarming components must be interchangeable
3. Device must be reliable for 10 cooling and rewarming procedures
4. The device must be user-friendly as bioscience individuals will be operating it
5. Data must be displayed in real-time to ensure the device can achieve the required cooling and warming rates

Expected Deliverables/Results:

- Standalone single vittrification and rewarming device for 50-100g of cell products
- Automated/semi-automated device with manual override
- User friendly interface that can provide real-time temperature and cooling/warming rates
- Portable system for ease of transport

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. Please confirm your expectation in this section. SD team will return the device after Expo to 465 Woodward Hall. The device will be used for research purposes.

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

- Machining skills
- 3-D printing skills
- Electrical control capabilities
- Computer interface and control