



UNC CHARLOTTE

The WILLIAM STATES LEE COLLEGE of ENGINEERING

## UNC Charlotte – Lee College of Engineering Senior Design Program Company Information

|                      |   |                                  |            |
|----------------------|---|----------------------------------|------------|
| <b>Company Name</b>  | MEES-Bio Engineering                            | <b>Date Submitted</b>            | 07/05/2022 |
| <b>Project Title</b> | Spheroid vitrification device<br>(BIO_SPHEROID) | <b>Planned Starting Semester</b> | Fall 22    |

### Funding:

What is the source of funds that will be used to cover all of the direct costs of this project?

The ME department will provide \$500 for the project and Dr. Lee will supplement any costs over that amount.

Is this source of funds already secured? Yes   x   No \_\_\_\_\_

### Technical Contact(s)\*

|                      | Technical Contact 1    | Technical Contact 2 | Grader |
|----------------------|------------------------|---------------------|--------|
| <b>Name</b>          | Charles Lee            |                     |        |
| <b>Phone Number</b>  | 704-687-8367           |                     |        |
| <b>Email Address</b> | <u>cyclee@uncc.edu</u> |                     |        |

\*We would like to have more than one technical contact, so there is a back-up in case of travel, sickness, job reassignment, etc.

### Personnel

Typical teams will have 3-4 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      | Electrical |        |
| Computer   |        | Systems    |        |
| Other ( )  |        |            |        |

**Project Overview and Requirements:**

Spheroids are organoids that can provide both therapeutic and diagnostic outcomes. Hepatocyte spheroids are liver organoids that can be used to treat both acute and chronic liver diseases. Preserving them in large quantities is needed for therapeutic applications. We currently have a prototype vitrification device that can be use for one bag of spheroids at a time. This project will look to expand this capability and also make the device more user friendly and more automated.

**Requirements:**

Construct a device that is more user-friendly, quickly adjustable, real-time temperature monitoring semi-automated for vitrifying a broad range of volumes of spheroids.

**Expected Deliverables/Results:**

- Project A:
  1. Device can vitrify 2-4 bags of spheroids at a time
  2. Device can be quickly adjusted to vitrify volumes ranging between 15-150ml.
  3. Real-time temperature monitoring of the device and samples.
  4. Automation of the device for vitrification.

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

1. Proficient working with LabView
2. Design and build devices
3. Numerical modeling and simulations
4. Comfortable working with solutions, chemicals, tissues