THE WILLIAM STATES LEE COLLEGE OF ENGINEERING

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

Company Name	MEES	**Date Submitted**	*23 Nov 2021*
Project Title	Mechanical communication between mobile robots in a shared aquatic medium **(UNCC_ME_AQUATIC)**	**Planned Starting Semester**	Spring 2022

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	3	Electrical	1
Computer	1	Systems	
Other ( )			

Project Overview and Requirements:

Marine animals use tactile as well as visual means to sense their surroundings. It's been observed that even blind fish can assemble into swimming schools, demonstrating that information about the locations and movements of solid bodies can be transmitted mechanically through a dynamically evolving aquatic medium and decoded accurately by animals with appropriate sensors. Students participating in this project will investigate the feasibility of similar information exchange among biologically inspired aquatic robots. A pair of simple mobile robots will be developed, one designed to operate at the surface of a body of water and the other to operate at depth, with mechanical sensory capability mimicking that of fish. These will be deployed in a large laboratory water tank in which experiments will be conducted to assess the ability of each device to extract information from their shared medium concerning the other's movements.

Expected Deliverables/Results:

Deliverables will include the physical apparatus described above and data from laboratory experiments, the latter acquired iteratively throughout the project to inform design decisions. The physical apparatus will include both hardware and software components.

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

Members of the project team should have experience with the design, manufacture, and assembly of basic mechanical parts and with the programming of microcontrollers (like the Arduino) and computers with general-purpose input/output capability (like the Raspberry Pi). Members of the project team should have performed well in a course in fluid mechanics; additional familiarity with control theory would be a plus but isn't required.