

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

### Senior Design Project Description

<b>Company Name</b>	<i>Discovery Place Science Center – sponsored by the Bosch Community Fund</i>	<b>Date Submitted</b>	08/22/2019
<b>Project Title</b>	<i>Design and Develop an Interactive Knowledge Center for the Natural History Exhibit Space</i> <b>(DP_EXHIBIT)</b>	<b>Planned Starting Semester</b>	Spring 2020

### 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:

<b>Discipline</b>	<b>Number</b>	<b>Discipline</b>	<b>Number</b>
Mechanical	2	Electrical	1
Computer	2	Systems	
Other ( )			

### Company and Project Overview:

The Discovery Place Science Center (DPSC) was founded in 1946 and is incorporated as a 501 (c) 3 non-profit with a mission of changing lives of children to inspire learning through science and wonder.

Through a network of four hands-on museums in three different cities, educational outreach programs and professional development for pre K - 12 teachers throughout the region, Discovery Place is a leader in STEM education in the Carolinas.

DPSC aspires to be at the forefront of transforming the way science, technology and nature are explored and learned to inspire dreams, raise aspirations and motivate people of all ages to develop a lifelong love of learning.



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During the most recent fiscal year, ending June 30, 2018, Discovery Place Science Center hosted 763,729 individuals through on- and off-site programs. Within this number were 132, 214 students and 3,849 educators.

More information about the history of the museum can be found at the Museum's website which is <http://discoveryplace.org/>

Discovery Place Science Center is seeking new exhibits that continue to excite children about science and place them on the pathway to a fulfilling science career. The UNC-Charlotte Senior Design project will provide a new STEM (Science, Technology, Engineering and Mathematics) exhibit.

### **Project Requirements:**

The project will explore ways to invite visitors to participate in exploratory science through more advanced engagement methods than currently used in Discovery Place Science Center's existing exhibits.

The exhibit the students will design will be for the Natural History section of the Museum. In this area, student visitors have the opportunity for hands-on interaction with fossils, rocks, minerals, birds, reptiles, insects, plants, mammals and other items found in the Natural History exhibit area. Currently, student visitors can hold and look at objects, but they may not get more educational information about the particular object. The tool that the UNC Charlotte team will develop will allow a greater transfer of knowledge in an interactive way that is interesting for the student visitors.

The idea for the exhibit will be to be a stand-alone unit located in the middle of the Natural History center that will serve as a knowledge center. Student visitors will pick-up different exhibit objects, and carry it to the "Knowledge Center". They will place the object into the Knowledge Center and displays will come to life and begin to provide information about the object. For example, if the students picked up a preserved bat specimen and placed it on the table, the display screen would



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activate and display what the species name is for the object. Several menu tabs would appear and upon being touched by the student, would display additional information. One tab may be for where are the native region for the species, one tab may display information about what their prey is and another, what preys on this animal. Other tabs could cover physical characteristics and capabilities, endangered status if applicable, migration characteristics and perhaps videos that show the animal in motion. Student designers will use their creativity in developing the appearance of the Knowledge Center and what information should be displayed based on each object.

### **Expected Deliverables/Results:**

- A stand-alone Knowledge Center that will be placed in the middle of the Natural History section of the museum
- Unit to be solidly constructed to be able to withstand 10 years of use by thousands of children each year.
- Educational material to be targeted at grades 2-8.
- Unit to be safe to operate with children and not pose any physical risk.
- Unit interface to floor to be developed based on Museum direction (ie. Mounted to floor, mounted on casters, etc.
- Size to be determined by discussions with museum but expected to be in an envelope of 5 ft wide by 3 foot deep by 5 foot high.
- Display interaction to be initiated by physical proximity of the object to the knowledge center. This is to be automatic with no initiation required by the student visitor. This can be done in a variety of ways using technology such as RFID.
- A standard design format will be developed for the information displays, location and a format for the touch screen tabs which are touched for additional information. The system should be demonstrated and preloaded with 25 – 50 items within the Natural History center.
- A video will be prepared to show step by step examples for how museum staff can add the functionality and information for additional natural history objects in the exhibit area. As part of verification testing, this video will be tested by uninitiated museum staff, to verify they can add exhibit items to the Knowledge Center with no interaction with the UNC students. This item is critical to ensure the Center can be expanded in the future by Museum staff.
- Maintenance guide – listing sources for where spare parts can be source and how any element can be repaired or replaced. At handover, Museum staff to be fully capable of operation, uploading and maintenance for the Knowledge Center.

### **Disposition of Deliverables at the End of the Project:**

Hardware developed will be delivered, installed and training performed within 5 days of the Expo.

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

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