



## CAPSTONE SENIOR DESIGN

To our industry partners,

We are pleased to introduce a new opportunity to actively collaborate with the students and faculty in our department: industry sponsorship of the **2018-2019 Capstone Senior Design Program**.

Our design experience challenges students to find solutions to real problems while providing them with a strong background in intellectual property, engineering economics, federal regulations, reimbursement principles and business planning. Previous design projects have tapped into the UF Health network and paired student teams with physicians at UF Health Shands Hospital to design and build prototypes that address outstanding clinical needs. These projects have generated new collaborations with the department, new intellectual property for the University of Florida and start-up opportunities for our students and faculty.

As we expand our program, we wish to invite you to join in the success of our design program and actively collaborate with our students to address the important needs of your company. In addition to the design of new technology and processes, this partnership will allow you to identify and recruit new employees from our diverse and talented pool of engineering students. We recognize the value to our students and program of strong ties to industry, and we hope you consider becoming a sponsor to help us prepare our students for careers in biomedical engineering.

Respectfully,  
*Stephen Hugo Arce, Ph.D.*  
Lecturer and Senior Design Course Instructor

## **INDUSTRY SPONSORSHIP**

### **Capstone Senior Design Course Sequence:**

At the University of Florida, Senior Biomedical Engineers are required to complete a set of project-based capstone design courses (BME 4882, Senior Design, Professionalism and Ethics I, and BME 4883, Senior Design, Professionalism and Ethics II). The objectives of this course sequence are to:

- Apply the design process in a project resulting in a prototype medical device, circuit, system, process or algorithm with commercial potential.
- Learn the methods of identifying unmet clinical needs.
- Demonstrate the process of inventing, designing, and commercializing new medical devices and instruments.
- Learn to give effective, objective, and clear presentations.
- Learn to communicate design through efficient and effective technical writing.
- Understand the regulatory framework for medical devices and biologics.
- Understand the professional and ethical obligations of a biomedical engineer.

### **The Senior Design Project:**

A multidisciplinary team of four to six students manages the design project over the course of an academic year. They are tasked with identifying customer needs, developing designs, constructing and testing prototypes, and delivering a final design to their project sponsor.

Teams develop project timelines, maintain project notebooks, conduct economic and risk analyses, and present written and oral proposals of their design solutions and final reports. Teams are advised by a biomedical engineering faculty member and a representative from the sponsoring company.

*The Foundation for The Gator Nation*

An Equal Opportunity Institution

### **Benefits of Becoming a Sponsor:**

- Additional resources at little to no cost for the company. Four to Six students are committed to the project for two semesters. These students have access to campus resources including the Herbert Wertheim College of Engineering Research Service Centers at student rates.
- Involvement and participation in the training of new biomedical engineers and potential employees.
- On-campus advertisement of the sponsoring company. Involvement in a capstone design project grants access and higher visibility to graduating seniors.

### **Benefits to Students of Industry-sponsored Projects:**

- The opportunity to work on real-world problems important to industry.
- Exposure to the biotech industry and market.
- Experience with project management and product development.
- Familiarity with requirements and constraints of biomedical design.
- The opportunity to learn best practices directly from professional engineers with experience in the field.

### **Types of projects appropriate for industry sponsorship:**

- Lower-priority projects for which the company lacks resources.
- Projects that can be completed in nine months or less.
- New products (hardware or software) or product improvements (new features, packaging or materials).
- Development of a testing procedure and/or testing equipment.

## INDUSTRY SPONSORSHIP

### Requirements of Industry Sponsorship:

- **Personnel** – Sponsoring companies must identify at least one liaison to act as an industry advisor to the project team. The industry advisor would be the company contact for the project team, advise students on issues involving customer needs, provide technical expertise and advice, and approve design concepts and prototypes. Faculty advisors will be responsible for administrative issues (grading, meeting deadlines, monitoring the progress of the team, dealing with team personnel issues, etc.) and providing guidance to the team.
- **Time** – Industry advisors must be available to discuss project requirements, customer needs, and potential designs. Communication can be in-person or by phone, e-mail or video conference. The advisor determines the frequency of communications.
- **Travel** – The sponsoring company determines the need for travel.
- **Funding** – A fund of \$5,000 covers the cost of prototype development and testing. Industry partners have a reduced financial commitment of \$3,000.
- **Other** – Students have full access to the University of Florida’s computer network, libraries, faculty expertise and engineering laboratories including the Department’s Cellular Engineering Laboratory, Biomedical Instrumentation Laboratory and Capstone Design Maker Space. Sponsors may wish to provide additional resources if desired.

### Protection of Proprietary Information:

Sponsors can request that members of their project team sign non-disclosure agreements to protect confidential and trade secret information.

#### To sponsor a project:

Contact Dr. Stephen Hugo Arce at (352) 246 6433 or [sarce@bme.ufl.edu](mailto:sarce@bme.ufl.edu) with any questions about our capstone senior design program or if you are interested in sponsoring a project.

## Overview of UF BME Capstone Projects

### Academic Year 2015 - 2016:

- **Anthony Bavry, MD, MPH** –  
*Department of Medicine*  
The need to reduce reoccurrence of plaque after balloon angioplasty.
- **Paul Carney, MD** –  
*Department of Pediatrics*  
The need for improved feedback in transcranial brain stimulation.
- **Christopher Hess, MD** –  
*Center for Movement Disorders and Neurorestoration*  
The need for improved assessment of movement disorders.
- **Stephen Vose, MD, MS** –  
*Department of Anesthesiology*  
The need for a smarter local anesthetic pump.
- **Stephen Hugo Arce, PhD** –  
*J. Crayton Pruitt Family Department of Engineering*  
The need for customized implants for pediatric reconstructive surgery.

### Academic Year 2016 - 2017:

- **Nikolaus Gravenstein, MD** –  
*Department of Anesthesiology*  
The need for improved surgical lighting.
- **Jasenska Zubcevic, PhD** –  
*College of Veterinary Medicine*  
The need for improved non-invasive Vagus nerve stimulation.
- **Victoria Bird, MD** –  
*Department of Urology*  
The need to improve detection of catheter-associated urinary tract infections.
- **Stephen Vose, MD, MS** –  
*Department of Anesthesiology*  
The need for a smarter local anesthetic pump.
- **Heather Vincent, MD, FACS** –  
*Department of Orthopaedics and Rehabilitation*  
The need for improved synovial space localization.

- **Tammy Euliano, MD** –  
*Department of Anesthesiology*  
The need for alarm detection and identification.
- **Justin Kinney, PhD** –  
*LeafLabs, Boston, MA*  
The need for real-time spike sporting.

### Academic Year 2017 - 2018:

- **Jasenska Zubcevic, PhD** –  
*College of Veterinary Medicine*  
The need for improved non-invasive Vagus nerve stimulation.
- **Victoria Bird, MD** –  
*Department of Urology*  
The need to reduce reoccurrence of kidney stones.
- **Stephen Vose, MD, MS** –  
*Department of Anesthesiology*  
The need for a smarter local anesthetic pump.
- **Justin Kinney, PhD** –  
*LeafLabs, Boston, MA*  
The need for real-time spike sporting.
- **Mike Walsh, DVM** –  
*College of Veterinary Medicine*  
The need to redesign Winter the Dolphin's prosthetic tail.
- **Justin Deuerling, PhD** –  
*RTI Surgical, Gainesville, FL*  
The need to improve delivery of biologic products.
- **Greg Hudalla, PhD** –  
*J. Crayton Pruitt Family Department of Engineering*  
The need for improved functionalization of a novel molecular drug therapy.