

REQUEST FOR CLINICIAN PARTICIPATION

The Department of Biomedical Engineering at the University of Michigan is seeking practicing clinicians interested in participating in the Graduate Innovative Design Class. This class encourages students to create new biomedical solutions to current clinical problems. Clinicians are asked to guest lecture during the fall semester and discuss the *current state of the art, technical challenges, methods of addressing those challenges and current limitations*.

Commitment: The level of commitment for this class ranges from:

Minimum Commitment – Guest Lecturer: The minimum requested commitment involves:

- A 1 hour lecture and 1 hour brainstorming session with the graduate students during class time. During this session, students brainstorm solutions to the clinical challenges presented during the lecture, and interact with the clinical lecturer to assess clinical feasibility of the ideas.
- Supplying 3 background readings on the proposed topic for students to read prior to the guest lecture.

Maximum Commitment – Clinical Mentor: If students choose to pursue a solution developed during a speaker's lecture, the students may ask the speaker to be a clinical mentor for their team. Clinical mentors offer clinical advice and input to the students as they develop their prototype designs during the second semester. Students are instructed to be respectful of the mentor's time and understand that the mentor's role is to provide guidance, and not necessarily to "sponsor" the project. Typically, clinical mentors meet with the student teams a few times per semester, and make themselves available by phone and email to guide the team. The primary objective of a clinical mentor is to ensure that design is completed with input from the user community of clinicians.

Course Description: Graduate Innovative Design is a two semester course that stimulates students to explore their own solutions to biomedical challenges. Students experience the entire spectrum of innovative design, from concept generation through design validation to prototype fabrication. The course challenges students to learn about the current state of the art, explore the technical needs and current challenges, and brainstorm new solutions with members of the medical community.

This first semester is dedicated to needs assessment through a series of lectures by practicing physicians who describe challenges they face in the clinic. Students formulate a set of possible solutions, evaluate each solution, and then assemble into design teams to work on selected solutions. The focus of the second semester is on product prototyping, validation, and commercialization strategy. Each team participates in a series of design reviews that highlight key aspects of product development. Guest lecturers in key areas of medical technology commercialization provide guidance. Students are encouraged to participate in national and local design and business competitions throughout the year. Successful designs compete to represent the University of Michigan in a national design competition at the end of the second semester.

Intellectual Property: The objective of this course is to challenge students to be innovative in technology development. All intellectual property developed in the class will be owned by the individuals that contribute to the design development, according to established conventions. Therefore students and clinical mentors may share inventorship. Clinical mentors own a portion of the intellectual property when they make an inventive contribution to the design, but note that identifying a need does not by itself constitute intellectual property. Clinicians participating in the course should not discuss intellectual property that they are not interested in disclosing (e.g. if they have prior intellectual property not developed in class). It should be noted that in most cases, the University of Michigan (UM) owns intellectual property developed by UM faculty (this is not the case for non-UM faculty). In the case of sponsored projects, the sponsor may have the first right to license intellectual property generated as part of the sponsored project.

BME 599: Graduate Innovative Design in Biomedical Engineering

APPENDIX: Course Information, Clinician Participation, and Design Projects

→ BME599 Graduate Innovative Design has been offered since 2007.

→ The class typically involves: 20-30 students (mainly Masters level)
 8-10 clinical faculty
 3-4 course faculty
 4-7 design teams

→ A sample listing of example clinical mentors in the past is provided in the table below:

Clinical Mentor	Title/Department
Herb Aronow, MD	Interventional Cardiologist, Michigan Heart St. Joseph Mercy Health System
Timir S. Baman, MD	Fellow, Department of Cardiology University of Michigan Medical School
Michael S. Berlin, MD	Professor of Clinical Ophthalmology Jules Stein Eye Institute, UCLA
Robert Bettendorf, MD	Clinical Lecturer, Anesthesiology University of Michigan Medical School
Scott Dulchavsky, MD, PhD	McClure Chairman of Surgery and Surgeon in Chief Henry Ford Hospital
Laurel Fisher, MD	Clinical Assistant Professor, Gastroenterology University of Michigan Medical School
Sanjaya Gupta, MD, MBA	Fellow, Department of Cardiology University of Michigan Medical School
Peter D. Higgins, MD, PhD	Assistant Professor, Gastroenterology University of Michigan Medical School
Jennifer Hirsch, MD	Assistant Professor of Cardiac Surgery University of Michigan Medical School
John Kao, MD	Assistant Professor of Internal Medicine University of Michigan Medical School
Seema Kapur, MD	Staff Surgeon, General Surgery St. Joseph Mercy Hospital
Bruce Miller, MD	Assistant Professor of Orthopaedic Surgery University of Michigan Medical School
Aditya S. Pandey, MD	Assistant Professor, Neurosurgery University of Michigan Medical School
Parag Patil, MD, PhD	Assistant Professor of Neurosurgery University of Michigan Medical School
Gregory Thompson, MD	Professor of Neurosurgery University of Michigan Medical School

→ A sample listing of example project teams in the past is provided in the table below:

Team Name	Project Title
Emboless	Ischemic stroke treatment using mechanical clot removal
Gutbusters	Localization and blood detection for video capsule endoscopy
Sure Secure	Pacemaker and ICD anchor
UMGlaucoma	2 nd generation glaucoma treatment
UMVAST	Early detection of vascular access site internal bleeding
ENTool	ENTool for improving visualization and access in trans-oral surgery
GERD	Esophageal prosthesis for refractory GERD
Stroke	New interventional therapy for ischemic stroke
Tendgineers	Challenges in rotator cuff surgery
DDO	Tendon integration into prosthetics
FlexiClip	Flexible clip for hemostasis in the GI tract
GastroInnovations	Endoscopic placement of nasoenteric feeding tubes
iArthro	Intraoperative 3D joint modeling for surgical evaluation
Intubation Innovations	Maneuverable endotracheal intubation
SecuraStim	Neural stimulation lead stabilization
SynCardio	Pediatric cardiac suction catheter

→ Project teams have won a variety of local, regional, and national competitions and awards. A sample listing of successes is provided below:

Award / Competition
1000 Pitches (Healthcare Category)
ASME Innovator's Showcase (Pittsburgh, PA)
BMEIdea National Competition Winner
Dare to Dream Venture Shaping
Design of Medical Device Conference Paper (Minneapolis, MN)
National Collegiate Innovators and Inventors Association BMEIdea Stipend Awards
Ross School of Business ZLI Dare to Dream Grant
Tech Arb Grant