

# **PURSuing BIOMEDICAL OPPORTUNITIES WITHIN THE DEPARTMENT OF MECHANICAL AND AEROSPACE ENGINEERING AT THE UNIVERSITY OF DAYTON**

## **Two Main Focus Areas within Mechanical Engineering:**

- **Biomechanics** – Dr. Kim Bigelow
- **Biomaterials** – Dr. Margie Pinnell

## **Completing the School of Engineering BIOENGINEERING MINOR is the formal way to pursue your interest.**

Your academic advisor can help you declare the Bioengineering Minor by completing a minor declaration form listing the classes you plan to take. You may want to take this form with you to your next advising appointment. The Bioengineering Minor is currently overseen by the Department of Chemical Engineering. Questions about substitutions, etc. will need to be directed there (currently Dr. Robert Wilkens oversees the bioengineering minor).

The most common way mechanical engineering students complete this minor is:

- BIO 151 – Biology Fundamentals I – 3 cr. (Can count as MTH/SCI elective)
- CME 490 – Intro to Bioengineering – offered Fall semester - 3 cr. (Required; Counts as an Open Elective)
- MEE 430/530 – Biomechanical Engineering – offered Spring semester – 3 cr. (Counts as an MEE Elective)
- MEE 499 – Special Topics: Biomaterials – offered Fall semester – 3 cr. (Counts as an MEE Elective); this course will likely not be listed on the approved minor list but will count if a modify form is completed

Many other electives are available to complete the minor if it is not important for you that they also count as MEE technical electives. If you are unable to take MEE 430/530 or MEE 499-Biomaterials but for graduation purposes must take courses that count for both MEE Electives and toward the minor, the following may be courses that you talk with Dr. Wilkens to see whether he would approve as acceptable electives:

- MEE 545. Computational Methods for Design
- Any MEE upper-level kinematics course, generally offered by Dr. Murray or Dr. Myszka

Courses to consider in place of your second Open Elective:

- HSS 305 Human Anatomy
- HSS 307 Human Physiology
- MTH 367 Statistical Methods I
- MTH 527 Biostatistics

## **OTHER WAYS TO PURSUE YOUR BIOMEDICAL INTEREST WHILE AT UD:**

- **Course Projects** – Select courses like EGR 103 Engineering Innovation and MEE 341 Engineering Experimentation will require students to complete projects, which can often be catered to your area of interest. Past EGR 103 projects have involved designing assistive devices for farmers with disabilities for AgrAbility and designing pressure and weighted garments for children with autism for SouthPaw Industries. Past MEE 341 projects have involved evaluation of the effects of various backpack loading on posture and balance and comparison of barefoot and shod running kinematics using wearable sensors.
- **Senior Design Project** – MEE 431L and 432L allow students to prioritize which projects they would most like to work on. Each semester several projects related to biomedical applications are offered ranging from medical devices to assistive aids to tools that can be used for medical assessment and training.
- **Co-op Positions** – A number of companies in the biomedical field seek to recruit our students for co-op positions and this number has grown in the last five years. Some of these companies have included Ethicon Endo-Surgeries, Prosthetic Design Inc., Midmark, Dayton Artificial Limb, Cook Medical, Cincinnati Sub-Zero Medical, Battelle (medical division), and *more*.
- **Biomedical Engineering Society** – The University of Dayton has a student chapter of the national Biomedical Engineering Society. The goal of this student organization is to provide professional development opportunities to students interested in biomedical engineering through industry tours, speakers, networking events, and design opportunities. Contact the current President, Eric Oberwise, or incoming President Robyn Kerley for information on how to get involved. The society also has a Facebook page.
- **Honors Thesis** – Students wishing to do an honors thesis should consider choosing a topic that aligns with their area of interest. Students interested in biomedical applications should talk with Dr. Pinnell or Dr. Bigelow. There may also be an opportunity for students to be co-advised so that they can carry out some of their thesis work with the Doctorate of Physical Therapy faculty and use their motion analysis laboratory.
- **Undergraduate Research Opportunities** – The Engineering Wellness and Safety Laboratory directed by Dr. Bigelow offers opportunities for undergraduate students wishing to gain research experience. Interested students should contact her. There may also be other opportunities with Dr. Pinnell's research or ongoing research in the Doctorate of Physical Therapy's Motion Lab directed by Dr. Joaquin Barrios.
- **Bachelor's + Master's** – Obtaining a master's degree can open up significantly more opportunities in the biomedical field. UD students might consider applying for the BS + MS program, to obtain stay at UD and obtain a master's degree in either mechanical engineering (biomechanics/biomaterials focus) or bioengineering (biomechanics/biomaterials track). Speak with your advisor to learn more about this program.