

Department of Biomedical Engineering in the College of Engineering

Overview and Advantages

A new Department of Biomedical Engineering, housed within the College of Engineering, is proposed. The rationale for this new department is as follows:

- Demand for biomedical engineers is growing, at the graduate and especially undergraduate levels. BME graduates can serve the expanding Arizona biotech and medical industries.
- A new department will facilitate creation of a biomedical engineering undergraduate program and enhance the graduate BME interdisciplinary program.
- Availability of research dollars in the bio and medical fields continues to be strong. A department of BME can further catalyze small and large BME-related grants.
- BME Department will provide a supportive, mentoring environment for junior faculty in BME-related fields, who have current appointments throughout CoE.
- Top engineering colleges throughout the US have made B(M)E departments a priority (there exists a strong correlation between highly ranked B(M)E programs and highly ranked universities).

The proposed department will consist of current ARL division of BME faculty and other faculty in CoE, CoM, CALS, and CoS who will have their appointments moved to the new department, split between their existing and new department, or will retain their current appointment and have a joint appointment in the new department. For the new department to succeed, about 12 faculty (at least 9 FTE) with primary or split appointments are required. Appointments in BME will be determined through discussions with faculty and department heads. The ARL division of BME faculty who will definitely be affected are listed below:

Name	Current appointment	Proposed % in BME Dept
Jennifer Barton	ARL-BME	100
Ali Bilgin	ARL-BME/ECE	67 (split-primary)
Erika Eggers	Physiology/ARL-BME	50 (split-secondary)
Marty Pagel	ARL-BME/ Chemistry	50 (split-primary)
Marek Romanowski	ARL-BME research prof	100
Ted Trouard	ARL-BME	100
Urs Utzinger	ARL-BME	100

Changes in Undergraduate and Graduate Programs

The BME department will offer an undergraduate program in Biomedical Engineering, in close cooperation with the Agriculture and Biosystems Engineering department, and based largely on the current Biosystems Engineering degree. The exact mechanism for this program needs to be determined. Typically, students in undergraduate BME programs are among the brightest and most gender-balanced in engineering.

The current biomedical engineering graduate interdisciplinary program is highly collaborative and efficient. It serves as a nexus for bioengineering interests across campus and relies on a large cross-section of faculty for student mentoring and teaching. Therefore it is recommended that the GIDP remain the program for graduate biomedical engineering education.

Strengthening of Teaching and Research

An undergraduate program will strengthen our teaching. The BME GIDP already reaches out to undergraduate student through an undergraduate Specialization (directed technical electives) and an accelerated masters program . An undergraduate program is the logical next step. The GIDP will

benefit from the student pipeline and teaching assistant opportunities provided by an undergraduate program. In turn, the GIDP will enhance a department by facilitating interdisciplinary activities.

The proposed department is expected to increase research productivity by fostering interdisciplinary research collaborations. Departmental activities with a larger faculty will lead to more intradepartmental collaborations, and the department will serve as a "center of gravity" for interdepartmental biomedical and engineering research throughout the university. This increase in synergistic research activities is expected to lead to the development of large program project grants and center grants. A department provides the unity for developing a long-term plan for cohesive research space that is integrated with the CoE and CoM. A department can also foster the long-term acquisition and management of shared research equipment. Finally, a department can develop and maintain a long-term vision for strategic hires and developments of thrust areas in biomedical engineering research that will further enhance the international reputation of the CoE and the University of Arizona. The immediate thrust areas of the new department will be:

- Biomedical Imaging
- Nanomedicine
- Cardiovascular and Neural Engineering

A strong relationship with College of Medicine is crucial to the success of the BME department and undergraduate degree program. Immediately, the relationship will be fostered by 1) joint appointments of CoM faculty, 2) cooperation on graduate student teaching (GIDP) and possibly medical student training, 3) seeking funding for undergraduate research opportunities, 4) strengthening of the pre-med undergraduate option, 5) continuation and expansion of research collaborations, and 6) cooperation on research infrastructure including equipment and space.

Ranking improvement

Top ranked BME graduate programs are at universities that have BME departments located in the college of engineering or medicine or both. The University of Arizona is one of the only top-50 BME graduate programs at a university that does not have a BME department or a BME undergraduate program. The formation of a department and undergraduate program will bring additional visibility and resources to biomedical engineering, thus improving national rankings.

Discussion meetings and comments

Multiple meetings have been held with the ARL Division of BME faculty and staff, the faculty, staff, and students of the BME GIDP, the faculty of the Agricultural and Biosystems Engineering department, the department heads of the College of Engineering, and the deans of CoE, CALS, and ARL Director. Several configurations have been discussed, including the cross-college School of Biological and Biomedical Engineering that was submitted as a white paper. The final proposed configuration of the Department of Biomedical Engineering in the College of Engineering, with a new undergraduate degree in Biomedical Engineering was voted upon and passed unanimously by the faculty of the ARL Division of BME in February 2009. Discussions have been ongoing with other faculty in CoE, CALS and CoM who may wish to have a full, split or joint appointment in the new department. A wider group of faculty have been involved in planning the undergraduate curriculum.

Budget impact

The proposed plan in isolation (i.e. not viewed within the broader CoE reorganization) results in a slight increase in spending. A new department head would replace the current ARL Division head. ARL-BME currently has .4 FTE administrator; this would need to be increased to at least one full time administrator. Administration of the new undergraduate program would need to be provided. CoE would need to provide business, administrative, and technical support services currently performed by ARL. However, increased student enrollment would be expected due to the BME undergraduate program (expectation of 200 students in combined BME and BE, compared to 80 currently in BE).