DATE: October 1, 2008

TO: George Flowers,  
Dean, AU Graduate School

FROM: Steve Taylor  
Dept. Head, Biosystems Engineering

SUBJECT: Proposal for Graduate Programs in Biosystems Engineering

Through this memorandum, the faculty in Biosystems Engineering are hereby transmitting a proposal for the creation of new graduate programs in Biosystems Engineering. The following text provides background and introductory information for the program proposal. Because of the unique contribution of Biosystems Engineering to agriculture and engineering, the new graduate programs are being proposed as interdisciplinary programs between the College of Agriculture and the Samuel Ginn College of Engineering.

The Department of Biosystems Engineering currently has no graduate degree programs. Previous M.S. and Ph.D. programs in Agricultural Engineering were eliminated by the university in 1998. At that time and in subsequent years, retirements of faculty members led to a drop in faculty numbers to a level of seven total faculty members. Beginning in 2002, two new faculty members were hired and in 2003, a new department head was selected and four additional faculty were hired. In addition, a new faculty member was hired in 2008. Therefore, as of August of 2008, 12 total faculty members are in the department, nine of which have teaching and research appointments. The department has maintained its criteria for graduate faculty status despite the program changes in 1998 and today, all of those Biosystems Engineering faculty members with the teaching or research appointments have either Level 1 or Level 2 graduate faculty status.

Faculty in Biosystems Engineering have been successful in recent years in rebuilding a strong extramurally funded research program. Research focus areas include ecological engineering, bioenergy and bioproducts, biological engineering, bioprocess and food engineering, and off-highway vehicle engineering. These programs are well positioned to address today’s major university initiatives of water and energy. Fiscal year 2007 saw average extramural awards of approximately $158,000 per faculty member in the department. To accomplish the research outlined in these grant projects, for faculty to successfully attain tenure and promotion to higher faculty ranks, and to be able to continue to recruit and retain high quality faculty members, graduate student involvement is a critical component.
The department currently has several graduate research assistants working on funded research. These graduate students have been enrolled in several different programs on campus that are similar in areas of subject matter including civil engineering, chemical engineering, electrical engineering, agronomy and soils, fisheries and allied aquacultures, horticulture, and mechanical engineering. The students’ assistantships are paid through grant funds in Biosystems Engineering while they are enrolled in other programs. Currently, there are 20 graduate students working under this relationship.

While the faculty in Biosystems Engineering appreciate greatly the assistance provided by the collaborating departments, this collaborative arrangement is only partially successful in providing graduate study opportunities for students interested in graduate research in Biosystems engineering. The current graduate program arrangement that allows graduate students to function in Biosystems Engineering is problematic in many ways. First, it is much more difficult to recruit students into the arrangement because there is uncertainty in who really provides the primary advising to the student; students with undergraduate degrees in Biosystems engineering may be required to take lower level courses in the host program that will not count toward their graduate degree (e.g. a student pursuing a degree through Chemical Engineering will be required to take several lower level chemical engineering courses before taking any graduate courses in chemical engineering); and Biosystems engineering student interests frequently do not map well into the other cooperating programs course offerings. As mentioned previously, there are currently 20 students working on M.S. or Ph.D. degrees with Biosystems Engineering research topics, but enrolled in other programs. The current level of extramural funding will support additional graduate assistants, but faculty are experiencing difficulty in recruiting these additional students. This hindrance to recruiting students is currently limiting the productivity of our faculty as they endeavor to meet the obligations of their externally-sponsored research.

Secondly, the research areas of Biosystems engineering faculty do not match well with those of other graduate programs. For example, a Biosystems engineering faculty member working on food engineering research needs a student with expertise in selected topics that might be found partially in chemical engineering, mechanical engineering, and food science, but not in one single program. With a graduate program in Biosystems engineering, our faculty member would be able to work with the student and design the plan of study to include those necessary topics from Biosystems engineering along with specialty technical competencies from other programs. This situation is particularly problematic for many of our research areas in light of the requirements set by the cooperating programs for the students to complete mainly courses in that program. Without graduate programs in Biosystems engineering, we are unable to provide the proper educational and research opportunities for students interested in continuing in the profession of Biosystems engineering.

Finally, the current cooperative arrangement does not allow for complete professional development of faculty members in Biosystems engineering. Currently, Biosystems engineering faculty members serve as co-chairs of students’ supervisory committees. Since they are not allowed to serve as a sole committee chair, faculty members do not have the ability to gain full experience in advising and mentoring graduate students. For our department to provide a complete opportunity for professional development of our faculty and graduate students, we must develop both M.S. and Ph.D. programs in Biosystems Engineering.
This letter of transmittal will not be complete without highlighting some of the uniqueness of proposed graduate program in the state of Alabama. The Biosystems Engineering Department at Auburn University is the only department in the state that has the mission to develop and disseminate engineering knowledge to solve problems in agriculture, food, fiber, bioenergy and bioproducts, water and other resources, forestry and the environment. The Biosystems Engineering professions is particularly relevant to the current world situation that shows that without human intervention, the world (including the State of Alabama) is gradually reaching the limits of the finite amount of natural resources that are available to support our existence. This will require that the world’s natural resources be utilized in a sustainable manner. Biosystems Engineers are uniquely trained to solve problems dealing with the production, collection and conversion of natural resources that are vital to the necessities of life in a manner that sustains the environment. Obtaining renewable energy from our natural resources, and utilization and protection of water resources are two of the most critical natural resource issues that currently face the world. The Biosystems Engineering profession therefore fits into the mission of the two centers of Auburn University’s Natural Resources Management and Development Institute – i.e. the Center for Bioenergy and Bioproducts; and the Water Resources Center. The proposed graduate program will be crucial to the success of these centers. More importantly, the protection and/or the sustainable utilization of the natural resources in the nation (including the State of Alabama) will require specialists with expertise in alternative energy and ecological engineering that can only be obtained from the proposed graduate programs in Biosystems Engineering.

Attached to this memorandum is accompanying information for our request for the creation of new M.S. and Ph.D. programs in Biosystems Engineering. This information includes a detailed proposal for the two degree programs suitable for submission to the Alabama Commission on Higher Education, which includes information on existing and proposed graduate courses in Biosystems Engineering, collection assessment for the proposed graduate programs made by the library of Auburn University, curriculum vitae of current Biosystems Engineering faculty, sources and amount of extramural funds secured by Biosystems Engineering faculty in the last 5 years, projections for needs for graduates with M.S. and Ph.D. degrees in Biosystems Engineering, and other needs for such programs to be successful. Please feel free to contact me if we can provide additional information related to the request. We appreciate your consideration of our proposal.

cc: Dr. Joe Morgan, Ginn College of Engineering
     Dr. David Williams, College of Agriculture