

Biosystems and Agricultural Engineering  
University of Kentucky  
Implementation Plan Report  
Update 2013 – 2014

1. Devise a plan to support machine systems automation engineering in the long run.

**Assessment method:** The faculty will devise and implement a plan to support machine systems automation engineering.

**Results:** We held interviews in January 2013, with the intent to have a new machine systems engineer faculty member in the department by fall '13. The machine systems engineer faculty position was advertised in November 2012; Michael Sama, Ph.D., joined the BAE faculty as Assistant Professor in July 2013.

**Analysis of results and reflection:** We followed our plan to support machine systems automation engineering in the long run. Dr. Sama will teach machine systems engineering classes; in FA 13 he will teach BAE 400 Senior Seminar.

**Ongoing improvement actions:** In 2014, we hired a faculty member in food engineering (candidate began work July 3, 2014). We are currently recruiting a bioprocessing engineer faculty member. Four candidates will be interviewed in spring, 2015. While these positions are not in the machine systems area, additional faculty members over which to distribute the departmental required teaching load frees up our machine systems faculty to teach technical electives to our machinery students, thus providing the desired support to this area.

2. Determine future department direction based on current areas with strong faculty support and identify areas that need more support.

**Assessment method:** Faculty members will determine the future direction of the department and identify areas that need more support

**Results:** The BAE Department held faculty meetings in August 2012 to agree on faculty hiring order. The course at issue was our senior design course BAE 427: Structures and Environment Engineering. This course was not taught for three years because there was insufficient faculty support to teach it. The larger question was whether or not our department wants to continue to support the structures and environment sub-specialization. Our discussion at the faculty retreat (see below) confirmed that we want to keep offering this course.

In addition we held a faculty retreat this summer (16 hours) where we discussed future departmental direction. BAE may have up to 5 retirements in the next 5 years, and replacing these faculty members provides an opportunity to redirect our department, if desired. The faculty voted overwhelmingly to focus on

fewer areas and have more faculty members within each area. Currently, we have many areas and a few faculty members in each area.

**Analysis of results and reflection:** The discussion we've begun having within the department is a healthy one, and one that is necessary. We will likely have many more discussions before coming to consensus, but we have solved our immediate concern regarding offering the BAE 427 course.

**Ongoing improvement actions:** We are developing a long-term hiring plan to focus on fewer areas, but with more depth in each area. This was begun at the retreat (summer, 2014) and is continuing throughout the year at faculty meetings.

We hired one of our PhD students with extensive industrial experience to teach BAE 427 Structures and Environment Engineering for the spring 2015.

3. Publications or building plans that still have some value should be considered for revision if faculty with expertise in the area are still an active part of the department. Original authors should be a consideration for making a revision, if available. Web links should be reviewed so that the number of broken links to internal publications and plans are resolved.

**Assessment method:** The departmental determination of the future of outdated publications and building plans, as well as review and correct any broken links on the Website.

**Results:** In February, 2013, Karin Pekarchik, was hired as an Extension Associate Senior, to coordinate this effort along with our faculty Extension Coordinator. Revising our Extension web page and publications was a goal on both of their 2013 work plans.

An extensive overhaul of the website, including Extension pages, was undertaken during 2013 and into 2014. Broken links were corrected, and page navigation was redesigned to allow for easier access by users. Once the basic mechanisms of the website were corrected, an archive project of outdated plans and publications was initiated. Outdated materials —plans and publications over five years old—were moved to an archive page on the website. In addition to moving the older publications and plans to the archive, a warranty disclaimer was added to each individual plan or publication. The warranty disclaimer is found both on the webpage and then on the first page of the PDF, in instances where there is an attachment that can be downloaded. The archive can be found at <http://www.bae.uky.edu/ext/Plans/default.shtm>.

**Analysis of results and reflection:** BAE has wrestled with this issue of maintaining older publications and building plans for several years due to differing opinions among the faculty members regarding the usefulness of older extension publications. In the end, the Extension faculty felt that these publications serve a purpose, and that with an appropriate warranty disclaimer,

the older material would continue to benefit the public. Much care was taken in crafting the warranty disclaimer to ensure that the public would understand that these archived items are conceptual plans only. Every effort has been made to ensure that the warranty disclaimer is prominent and, even if the plan or publication is downloaded, that it remains with the publication/plan as the first page of the document.

**Ongoing improvement actions:** The entire website will continue to be regularly reviewed, with an eye toward usability, accessibility, and elimination of broken links. Plans and publications will continue to be moved into the archives when they reach five or more years since publication date in instances when it is not appropriate to update them or the author has chosen not to do so. When they are moved to the archive, the warranty disclaimer is added.

4. Lab facilities are an asset to the department, and a mechanism should be adopted for better coordination of labs and equipment.

**Assessment method:** The departmental faculty will devise and implement a mechanism to better coordinate labs and equipment.

**Results:** This topic was brought to a faculty meeting in the spring of 2013. We have improved the coordination of equipment by creating a lab manager position who oversees equipment use. Labs are being better utilized. We have designated some of our underutilized labs to be shared-use facilities so that projects which need more space intermittently will have room to expand temporarily. We also use the shared-use lab for teaching, because with our increased enrollment we need additional space for student laboratories.

**Analysis of results and reflection:** The situation has improved, however we continue to work on freeing up space for new activities. Being an engineering department, our faculty members build equipment, and storing these innovations is proving increasingly challenging.

**Ongoing improvement actions:** Our facilities supervisor works with the other managers in BAE to identify and discard items that are no longer in use. We are slowly decreasing our inventory of stored innovations.

5. Growth areas in general should be evaluated to determine the level of support and specialty courses needed to accommodate students.

**Assessment method:** An increase in enrollment in targeted growth areas.

**Results:** During the summer of 2013 we determined, as a department, what our ideal enrollment growth would be. This was followed by (SU/FA 2013) the development of a recruitment plan to encourage students to major in under-populated specializations. We continue to have lower enrollment in our

Controlled Environment area; however there are 4 students in the freshman class who list this as their area of interest.

**Analysis of results and reflection:** This is the first year we have seen freshman interested in Controlled Environment, so our recruitment plan is beginning to show results.

**Ongoing improvement actions:** We will continue with our recruitment plan and monitor the results.

6. The department should help students to develop ways to market themselves by using more recognizable terms for résumés and other forms of communication with prospective employers.

**Assessment method:** The implementation of a student-based marketing message in key BAE courses, as well as on the Website.

**Results:** Both BAE 102 and BAE 400 have incorporated “BAE elevator speeches” into their courses, so we are beginning earlier to encourage the students to develop their marketing message and then reinforcing this again in their senior year.

**Analysis of results and reflection:** BAE is a fairly unique major, especially within Engineering, because there is only one program per state which is associated with the Land Grant system only. Another challenge is that BAE keeps reinventing the profession to attract more students, which is working. Considerable effort should be made to promote the department in a consistent way to as many arenas as possible. Our goal is to educate our students to market themselves clearly and accurately.

**Ongoing improvement actions:** We will devise a simple, clear, consistent marketing message regarding our department and will display this message on the web page to educate our students. The department will use that description consistently and will continue to work with the students.

7. Extension specialists need to explore current options for program delivery that could reduce unnecessary travel and that would accommodate teaching schedules.

**Assessment method:** This department will implement procedures to reduce unnecessary travel and accommodate teaching schedules.

**Results:** On February 11, 2013, BAE hired an Extension Associate Senior, Karin Pekarchik, to assist with distance learning and web delivery pedagogy and technology. Five distance learning Extension videos were produced in FY 2013-2014.

**Analysis of results and reflection:** The departmental objective is to use departmental resources as efficiently as possible, including program delivery. To

this end, the department wants to provide support to faculty members who want to deliver programs from a distance. The department response was strong, with 5 videos being produced. Ag com has assisted with filming of the webinars.

**Ongoing improvement actions:** During Fall 2014, BAE will debut a series of “train-the-trainer” webinars, designed to transfer engineering information to Extension agents. Beverly Miller will present Control Overhead through Building Energy Management in November 2014; Richard Warner – Home Drip Irrigation Systems; Mike Montross – Measuring Grain Bin Capacity Using GPS and GIS; John Wilhoit and Larry Swetnam – Labor-Saving Methods for Tobacco Warehousing and Matt Dixon – Agricultural Features of the Ag Weather Center’s New Website. The department will continue to think of creative ways to reach our extension clientele.

8. The department needs to strongly encourage publication as a visible way of documenting activity. The department should send a consistent message to graduate students regarding publication of their work and explore a publishing incentive program like that used by the UK Entomology Department as long as funding sources are available.

**Assessment method:** Increased publications by faculty and graduate students within the BAE Department. Our goal is for every active scientist (faculty, staff, or student) to contribute at least 2 papers per year to the department (one per year for newer graduate students).

**Results:** During spring 2013 evaluations, each faculty member determined their publication goals for 2013-2014-2015. From December 2013 through December 2014, people were held accountable for the goals they set. According to reported figures for the 126<sup>th</sup> KAES Annual Report for calendar year 2013, the UK Department of Biosystems and Agricultural Engineering has eighteen faculty plus three emeriti for a total of twenty-one faculty members. According to enrollment statistics from the UK College of Engineering, there were twenty-eight graduate students (twenty-two masters, six PH.D. candidates) in the BAE program in spring 2014, see [http://www.engr.uky.edu/enrollment-stats/files/2013/02/EnrollmentStats-Spring2010-to-Fall2014-v2\\_2.pdf](http://www.engr.uky.edu/enrollment-stats/files/2013/02/EnrollmentStats-Spring2010-to-Fall2014-v2_2.pdf). Three books or book chapters were reported as being published by a BAE faculty member. In addition, forty-two refereed journal articles plus thirteen other research publications were published with BAE authors, for a total of fifty-eight publications for the 2013 calendar year. Using the eighteen active faculty and six PH.D. graduate students, the fifty-eight publications are spread among twenty-four scientists for an average of 2.42 publications per scientist per year.

**Analysis of results and reflection:** We met our goal of 2 papers per scientist for the latest reporting period.

**Ongoing improvement actions:** The department will continue to reward graduate students with money for publishing, as an ongoing incentive. It will also continue to monitor progress in publications, possibly tracking on a graph, so scientists have a visual encouragement to continue to publish. Ideally, publishing is an on-going part of the departmental culture.

9. Movement of equipment needs to be monitored to reduce inventory burden. All faculty and staff are encouraged to keep inventory requirements in mind to reduce current problems locating equipment and computers.

**Assessment method:** The creation of an accurate database of our capital and departmental equipment (with a value of \$500-\$2000), complete with a photograph and location for each item by 2013 and to keep the database continuously updated.

**Results:** The November 2012 inventory went much more smoothly than did the November 2011 inventory, thanks to the database developed and populated by Alex Fogle, with Julie Tolliver's assistance. In August 2013, faculty and staff were educated about inventory protocol, and the department now conducts this training annually for new employees through an informal training session.

**Analysis of results and reflection:** Our departmental database is current, and includes a location and photograph for each item. We are working with PPD to correct our inventory list. This takes persistence because we have sent in the required paperwork several times for the same items, but they have not yet been removed from our inventory.

**Ongoing improvement actions:** We upgraded to the bar code scanner to perform inventory. This works for 2/3 of our tagged items, however the old tags do not scan. Alex Fogle has requested new tags for our older-tagged items to make our entire inventory to enable us to scan our entire inventory.

10. Labs should be maintained in a presentable manner (while maintaining consideration for the need to be productive) so that they serve as a safe environment and are not a detriment to student recruitment.

**Assessment method:** The maintenance of productive, safe, and orderly laboratories.

**Results:** Alex Fogle initiated a major clean-up of the labs in August 2012 with the intention of eliminating items that have not been used in the last 5 years. We will save analytical samples until the data are published or for 5 years, whichever comes first. Apparatus that have not been used for the past year or so will go to long-term storage, and be disposed of, if not used within 5 years. In August 2014, a dumpster was filled to overflowing during clean up.

**Analysis of results and reflection:** We are consistently making progress towards changing the lab culture and people are beginning to think of needed storage time and space when planning experiments. This is a change of culture for the department and will require consistent vigilance to reinforce our new culture.

**Ongoing improvement actions:** Labs are reviewed annually for accumulated clutter, and these areas are cleaned up as appropriate. Alex Fogle, BAE's facilities manager, reports that storage space is currently limited and is in need of being cleared out. He has identified outdated equipment that will be sent to the UK auction in spring 2015. We intend to make "Dumpster Day" an annual event, so people get in the habit of a yearly lab clean-up.