

## **Back Track on Dual Track**

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The May 2004 issue of *Resource* had been lost on my desk. After liberating it from beneath unruly and obsolescent detritus, I read with interest the interview with ASAE Past President Harmon Towne. Asked what he would do if he were chairperson of an agricultural engineering department and had to plan for the change to biological engineering. Towne responded that he would propose parallel tracks of agricultural engineering and biological engineering. Coincidentally, in the same issue was an article by Ajit Srivastava in which he discussed agricultural engineering at Michigan State University. One of the lessons learned from his MSU experience was that “a department cannot be everything to everybody”. Another was that a transformation of agricultural engineering into a biology-based discipline was underway. It seems to me that these two lessons auger against the parallel track approach.

Although there are universities that maintain dual tracks of agricultural and biological engineering, there is also indication that such dual tracks are part of the transition from one to the other, and that the one will supplant the other in many locations. In these days of limited resources, and with the need to have an easily identifiable identity on campus, agricultural engineering departments simply cannot afford to maintain dual-track diversity.

If we truly believe that agricultural engineering is an application of biological engineering, then agricultural engineering should be a graduate-level option just as other applications are. At the graduate level, specialized knowledge is absorbed and small class sizes are expected. There is the possibility that specialized agricultural engineering classes could be given in the last year or two of the undergraduate curriculum, but graduate-level offerings could be attractive for students coming from other degree programs.

There is nothing like farm experience for an agricultural engineer. For years, agricultural engineering programs assumed that their students had farm experience. That experience contributed to educational efficiency, because practical aspects of crop handling, animal husbandry, irrigation, and machinery did not have to be taught at the elementary level. That efficiency is rapidly being lost as smaller proportions of matriculating students possess practical farm experience. So, even if ag engineering were maintained as an undergraduate track, courses would have to change to accommodate backgrounds.

One important attribute of the old ag engineering curricula, and one I appreciate to this day, is the range of technological topics. That same broad outlook is what makes agricultural engineers well suited as biological engineers. There is nothing as broad and pervasive as the field of biology. There are no more diverse opportunities than those ranging from electrophysiology of individual cells, to toxic reactions, to environmental contaminants, to prosthetic limbs. From imaging to harvesting, from swarm intelligence

to bioreactors, from individual strands of DNA to macroecological systems, there is diversity, if nothing else. No matter what strengths or interests are expressed by a student, there is a biological engineering topic that can fit, and agricultural engineers should be able to appreciate that better than anyone else. We should be careful to maintain that broad and fundamental view as the transition to biological engineering unfolds.

Assuming the role of biological engineers means much more than just a shift of technical focus, we must embrace many potential applications areas traditionally ignored. Fortunately, many departments are doing just that by including human medicine, biotechnology, and ecology within their domains. We must also reach out to new associates and encourage new approaches. While we maintain our ties with traditional agricultural organizations and personnel, we must also find opportunities with those working in other applications of biological engineering.

Perhaps the most radical change of association will be the colleges administering our departments. As long as we are administered in colleges of agriculture, we will be agricultural engineers. Our transition will not be complete until we change our affiliation to the colleges of engineering where our fellow engineers are all located. This change does not mean abandonment of ag engineering, but establishing new ties and accommodation to new educational cultures. This will not be an easy transition, but it will be necessary. Without it, the transition to biological engineering will be stuck halfway, and we know from biology that organisms that cannot adapt are eventually replaced and forgotten.

If I had been coaching Mr. Towne, I would have urged him to consider all of the above. Unfortunately, his answers would not have fit in the required space. But, then again, how can you explain a vision in a few short words?