

## ASABE as the Biosystems Engineering Society

Arthur T. Johnson

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Dear Editor,

Regarding the article by Jeong-Yeol Poon in the May/June 2012 issue of *Resource* (Who We Are and What We Can Do), much of what he writes is right on the mark. ASABE has a very strong history of dealing with biological systems. As agricultural engineers, we had been educated to view the entire system of inputs and outputs, mostly biological in nature, but not always. We had courses in machinery, but those courses were different from machinery courses taken by mechanical engineering students; they included mechanical properties of plants and animals. We had courses on soil and water topics, but these were different from water courses taken by civil engineering students; they included water needs of plants growing in soils. We took courses in structures and environment, but these courses were different from structures and environmental courses taken by mechanical engineers or civil engineers; they included environmental interactions between plants, animals, and physical conditions.

There is need for a society, some society, to represent the field of engineering related to biological systems at all levels. The best positioned society to fill this need is ASABE. We have people who are experts in plant modeling, animal modeling, and insect modeling, all related to environmental conditions of the real world. There is no other society that has as large a concentration of expertise in engineering of the complete system of biology as has ASABE.

There are three other primary societies with the words “biology” and “engineering” in their names (not counting AIMBE, which is a secondary society). The first is the Institute of Biological Engineering (IBE). IBE was formed as a community of ASAE (as was its name at the time), but differences arose between the ASAE Board of Directors and the IBE Council, so IBE split from ASAE. Some hope that IBE could one day reconcile with ASABE, but that is not going to be possible. Despite having foundational statements that it serves biological engineering in the broadest possible sense, the strength of IBE papers and publications is in biological engineering at the cellular and tissue level, areas that do not significantly overlap those of ASABE, and certainly not the engineering of biological systems of interest in ASABE.

The society with interests closest to IBE, and the second society with the words “biological engineering” in its name is the Society for Biological Engineering (SBE), a society formed by chemical engineers with interests in biomolecular, cellular, and tissue engineering. It is federated with the American Institute of Chemical Engineers (AIChE) as a technical community. Despite the name of SBE, its interests do not include the engineering of biological systems at all hierarchical biological levels, as they do in ASABE.

The third society is the Engineering in Medicine and Biology Society (EMBS), part of the Institute of Electrical and Electronic Engineers (IEEE). EMBS is federated very closely with IEEE, and is almost exclusively concerned with engineering related to human medicine. EMBS does not represent the broad perspectives that are found within ASABE.

Of all the societies with engineering related to biology, the only one representing a broad, all-encompassing perspective of engineering related to biological systems at multiple biological levels is ASABE. That is our strength, and that is what we should promote.

At one time, engineering in agriculture was the keystone of our society, and we did it well. Times have changed, however, and agricultural research has metamorphosed into biological systems research. Funding sources reflect this change. At the same time, our society has changed, our students have changed, and the word “agriculture” is no longer attractive. It certainly is not as attractive as “biology” or “medicine”. If we are honest about it, it wasn’t even as attractive as a field of employment to us. Fred Wheaton, our former and late department chair, who grew up on a dairy farm on Michigan’s Upper Peninsula, used to tell me, “I’ve had good days as department chair, and I’ve had bad days, but I’ve never had a day so bad that I wanted to put up hay”

Our problem in ASABE is letting go of “traditional interests” and positioning ourselves for a future that attracts the new breed of student, that feeds on the strengths that we have built over the years, and that positions ourselves as the go-to society for understanding the interconnectiveness of biological systems, environment, and human activities. We have promised our students that they will learn about engineering, learn about biology, and be able to deal with interesting challenges when the two are put together. They don’t want to be labeled as agricultural engineers, and they see little reason to associate with agricultural engineers. If ASABE is to have a strong future, which it most certainly can have, it needs to begin to seriously attract graduates of the new academic programs and give them what they need. There is no reason to abandon traditional interests of ASABE, but they do need to be de-emphasized and made subordinate to the more inclusive term of “biological engineering”.

As to whether we should permanently banish biomedical engineering from the interests of ASABE, the response needs to be nuanced. Let the engineering of diagnosis, prognosis, and treatment of human medical needs be recognized as the purview of EMBS and BMES. But we cannot abandon human interests entirely. Let us embrace human safety, preventative health measures, and human interests in environmental preservation. The human being was, is, and always will be the motivation for much of what we do. Besides, looking at biology as a whole means that we cannot ignore the human as an important source of biological research information. It is appropriate that we recognize the human element in engineering related to biological systems.

This country and the world need a professional group with expertise concentrated at the overall, global, systems level. Someone needs to understand how everything fits together.

This is an exciting prospect for ASABE; it could be exciting for its present and future members, for funding agencies, and for society as a whole. We have this strength, and it is time. As Dr. Yoon has said, “What are we waiting for?”