**4 Protein and Amino Acid Concepts and Use in Swine Nutrition: Gary Allee's Contributions to the Swine Industry.** Robert D. Goodband[1], [1]*Department of Animal Sciences & Industry, Kansas State University*

I was very fortunate to meet Gary Allee in 1984 when I began my M.S. degree at Kansas State University. I'll remember Gary most in that he cared about people and truly wanted to serve humanity and make the world a better place through animal agriculture. He helped develop scholars, both nationally and internationally, that would be the future of our industry. Gary was proficient in seeking a solution to a problem and finding the experimental resources to explain it. Very early in his career, he helped verify the concept of a lysine:calorie ratio as a means of explaining the previously varied and inconsistent response to added fat in swine diets. Early research outlined the order of limiting amino acids in various feed ingredients. Gary's research also focused on determining the nutritional value of protein sources for weanling pigs, such as dried whey, fish meal and dried skim milk that ultimately led to phase feeding strategies for early weaned pigs that are the backbone of our industry. Gary and his students determined lysine and other amino acid requirements for growing pigs and sows under field conditions. He helped elucidate the effects of low-protein, amino acid fortified diets under heat stress environments. As market weights increased, his research was instrumental in determining how to feed heavy weight pigs as well as those fed ractopamine. Gary grasped concepts and applied them into practical solutions in swine nutrition. He was a strong believer and leader in cooperative research among universities but also, at that time, a novel concept of university-industry partnerships. Those of us that can say they knew Gary Allee, are very fortunate and better because of it.

**Keywords:** amino acids, Gary Allee, swine

**2 A Metabolic Understanding of Nutrition.** Brian J. Kerr[1], [1]*USDA-ARS*

Optimal nutrition is essential to support growth and development of farm animals, and in combination with costs, is essential in maintaining economical animal production. Simplistically nutrition involves physiological and biochemical processes whereupon feedstuffs are consumed for energy and nutrient purposes, and through the myriad of digestive and metabolic mechanisms, provides the energy and nutrients to be used and/or deposited for productive purposes (e.g., bone, lean, and fat). While the individual parts of metabolism, and therefore nutrition, must add up to the animal as a whole, in the long-term energy and nutrients cannot be evaluated strictly on a reductionist basis. Thus, while research is conducted using methods to control outside and confounding effects, it is these influences and interactions that must be researched and understood in order to support optimal animal production in an economical and environmentally sustainable manner. Therefore, understanding basic mechanisms is critical in providing a scientific basis as to why a nutrient, feed additive, or feedstuff may 'work', but it does not guarantee such. As exhibited in Dr. Allee's publications, development of students, and outreach activities, he often conducted basic research from which to use this knowledge in relationship to the whole animal on an applied basis. Portions of this presentation will discuss some specific areas (e.g., lipids and amino acids) of Dr. Allee's career whereupon research was conducted to scientifically understand how and why energy and nutrients (feedstuffs) may improve animal productivity and efficiency on a real-world basis.

**Keywords:** amino acids, metabolism, physiology, pigs