WangHee graduated from Seoul National University in South Korea with a B.S. in Agricultural Engineering in 2004. He earned his Master of Science from the Agricultural and Biological Engineering at Purdue University in August of 2006. WangHee started his Ph.D. at Purdue, to work in the field of modeling and analysis of calcium metabolism under Dr. Martin Okos, Dr. Connie Weaver and Dr. Meryl Wastney. His primary foci were modeling and analyzing calcium and bone metabolism in biological systems using kinetic, statistical, and mechanistic modeling. In addition to the primary research work, WangHee helped a research and education in computer-aided design and analysis of food processing system for Dr. Okos.

Agricultural & Biological ENGINEERING

Thesis Defense

Speaker: WANG-HEE LEE

Title: ANALYSIS OF CALCIUM METABOLISM IN BIOLOGICAL SYSTEMS USING DIFFERENT MODEL-BASED APPROACHES

Major Professors: Dr. Martin R. Okos

Date: June 15, 2011

Time: 10:00 am

Place: ABE 301

Abstract:

Calcium metabolism has been addressed as an important topic due to its essentiality in human health. Mathematical modeling has been one of the main tool for studying calcium/bone metabolism and its regulatory network including vitamin D and parathyroid hormone as well as the effect of intrinsic and/or extrinsic factors. Herein, three types of modeling approaches are illustrated, focusing on calcium metabolism. Statistical approach, particularly multiple regression, has been used to indentify relationship between major calcium metabolic pathways and system variables which influence calcium metabolic status. Calcium kinetic modeling is widely used to estimate calcium metabolism, and is suitable to evaluate the effect of specific interventions that perturb calcium metabolism. Finally, mechanistic model, largely associated with mathematical equations, can illustrate dynamic responses in mechanisms involved in calcium/bone metabolism under various conditions. We use the mechanistic model to analyze bone cell dynamics and to propose a prospective research for developing a mechanistic model of whole calcium metabolism. Hence, cross-linkage between calcium metabolism and mathematical modeling enables us to evaluate the calcium metabolic processes so that we can understand underlying mechanisms and interactions of various intrinsic/extrinsic conditions.