



Sara S. Haque
Senior
Centre College
Major: Mathematics

Faculty Advisor: Alex McAllister

Program:
Research Alliance in Math & Science

Email: haquess@ornl.gov
Home: sara.haque@centre.edu

Research Area: Computational Sciences and Engineering

ORNL in collaboration with the Obesity Research Center at the University of Tennessee Medical Center in Knoxville is developing a mathematical model of the biochemical cross-talk between adipose cells and skeletal muscle cells. Obesity is a growing problem in the United States because it affects the overall health of individuals and increases health care costs. If we can understand the complex processes that increase fatty acid oxidation, then we may be able to control some of the factors affecting obesity. In my project I will develop a mathematical model of the balance between fatty acid oxidation and fatty acid synthesis in adipocytes and skeletal muscle cells. The model will look at how these processes change in relation to the synthesis by the cells of adiponectin, interleukin-6, and interleukin-15. In addition, the model will look at how the syntheses of these three biochemical proteins are affected by concentrations of leucine and calcitriol which have an exogenous source. The biological simulation codes SBW/ JDesigner and/or JSIM will be used in designing the mathematical model from experimental data and in performing computational simulations of the mathematical model.

Research Mentor:

Kara Kruse, M.S.E
Computational Sciences and Engineering Division
Oak Ridge National Laboratory

(865) 5745154
krusekl@ornl.gov