**Computational Systems Biology and Dose Response Modeling Short Course**

**Date:** May 11-13, 2015 (2.5 days)

**Location:** Food Safety and Toxicology Building, Room 162

**Instructors:** Qiang Zhang, Ph.D. and Sudin Bhattacharya, Ph.D., Center for Dose Response Modeling, The Hamner Institutes for Health Sciences; Rory B. Conolly, Sc.D., US Environmental Protection Agency

**PHM 980, Section 301, 1 credit**
*(fulfills the EITS Topics in Toxicology requirement)*

**Course Description:** This short course will cover current computational modeling techniques for quantitative investigation of how biological systems respond to perturbations at the cellular level. The course will consist of lectures and hands-on computer modeling of:

- Common network motifs in signal transduction and gene regulatory networks that underlie systems-level cellular behaviors including homeostasis, adaptation, threshold response, binary and irreversible cell fate decisions, and oscillations.

- How molecular circuits comprising genes and proteins give rise to various dynamic and dose-response behaviors. Examples include cellular stress response, cell differentiation, and cell cycle and checkpoint control, etc.

- Use of these techniques to develop computational models for understanding and predicting nonlinear dose response behaviors of drugs and environmental toxicants.

Students will be required to bring a PC laptop computer each day to the course to run the computer simulation exercises.

Please visit [http://www.thehamner.org/about-the-hamner/education-training/dose-response-modeling/](http://www.thehamner.org/about-the-hamner/education-training/dose-response-modeling/) for full descriptions of previous courses offered by The Hamner Institutes. Contact Dr. Qiang Zhang (QZhang@thehamner.org) if you have questions regarding the course.

Please contact Steve Stofflet, Stephen.Stofflet@hc.msu.edu, in the Department of Pharmacology and Toxicology for course registration/override. Note: While the course is offered during Summer Semester, you will have to actually enroll in it for Fall Semester 2015.