ELECTRICAL & COMPUTER ENGINEERING BIO-SEMINAR Spring 2017 | ENGINEERING TEXAS A&M UNIVERSITY

When: **Friday 15:00 – 16:00**
Where: **ETB 1003**

Speaker: **Prof. Weihsueh A. Chiu**

Professor
Department of Veterinary Integrative Biosciences
Texas A&M University

Title: **Computational Methods to Address Challenges in Chemical Risk Assessment**

Date: **03-31-2017**

Abstract: Chemical risk assessment involves characterizing and predicting the potential harm from chemical agents, whether they involve intentional exposures, such as pharmaceutical drugs, or unintentional ones, such as air pollution or food contaminants. The many factors that determine the degree of harm that may be caused by chemical agents can be viewed as a continuum from "source" to "outcome" involving multiple systems at multiple levels of resolution and organization. Chemical risk assessment is therefore an inherently interdisciplinary endeavor, drawing upon both fundamental sciences such as physics, chemistry, and biology as well as applied fields such as engineering, statistics, and toxicology. Chemical risk assessment faces a number of key challenges in the 21st century, such as exposures to complex or varied mixtures of chemicals, lack of toxicity data on many chemicals, poor understanding of population variability in susceptibility to toxicity, inadequate quantification of uncertainty, and lack of integration of data across scales of biological organization. This presentation gives an overview of current work addressing each of these challenges that involve computational approaches, such as machine learning, hierarchical population models, and probabilistic methods.

Biography: Weihsueh A. Chiu, Ph.D. is a professor in the Department of Veterinary Integrative Biosciences at the Texas A&M University College of Veterinary Medicine and Biomedical Sciences. He also has a Research Fellow appointment at the Institute for Science, Technology, and Public Policy at the Bush School of Government and Public Service. He received a bachelor's degree in Physics from Harvard University, and earned a PhD in Physics from Princeton University as well as a Certificate in Science, Technology, and Environmental Policy from the Woodrow Wilson School of Public and International Affairs. Dr. Chiu spent the first 16 years of his career in government service, first at the U.S. Government Accountability Office, and then at the U.S. Environmental Protection Agency. Throughout his career, he has been involved in a diverse span of risk-related topics, such as defense against chemical-biological warfare agents, radioactive contamination in biosolids, human health risks from environmental chemical exposures, and the interface between science and policy. His recent research has focused on human health risk assessment, particularly with respect to toxicokinetics, mechanisms of toxicity, physiologically-based pharmacokinetic modeling, dose-response assessment, and characterizing uncertainty and variability. He has a particular interest in the development and use of Bayesian and probabilistic methods. Much of his research has used the common contaminants trichloroethylene and tetrachloroethylene as model compounds, but recently he has become involved in projects utilizing high throughput in vitro systems addressing over a hundred compound at a time. Dr. Chiu has served on a variety of expert review panels for government agencies, as well as workgroups for the World Health Organization International Agency for Research on Cancer, International Program on Chemical Safety, the Organisation for Economic Cooperation and Development, and the U.S. National Academy of Sciences.