UTC INSTITUTE FOR
ADVANCED SYSTEMS ENGINEERING

SEMINAR SERIES

Efficient Bayesian Optimal Experimental Design for Physical Models

Optimal experimental design is the key to improve data quality in engineering. Its application on real problems lags behind mainly due to the involved computational costs. We develop a series of methods to accelerate the computations of the utility function (expected information gain) under rigorous error control. Specifically, we extend the applicable domain of Laplace methods from the asymptotic posterior Gaussianity, to where the shape of the posterior is characterized by non-informative manifolds. While Laplace methods require a concentration of measure, multi-level Monte Carlo method can be used to efficiently compute the nested integral of the expected information gain with a reduction of the computational complexity, even when the randomness of data dominants the shape of the posterior distribution. The developed methodologies have been applied to various engineering problems, e.g., impedance tomography, seismic source inversion and parameter inference of combustion kinetics.

Quan Long

Quan Long is a staff engineer at the Systems Department of UTRC. He received his PhD in Computational Mechanics from the University of Cambridge (Trinity College), UK in 2010. Before that he obtained his Master's degree from the National University of Singapore and Bachelor's degree from the Tianjin University, China. He was a joint postdoctoral fellow with the Institute for Computational Engineering and Sciences, University of Texas at Austin and King Abdullah University of Science and Technology from 2010 to 2014, and a research scientist at KAUST from 2013 to 2015. His research focuses on optimal experimental design, Inverse problem, model calibration and validation, computational mechanics, solids and structures. He has over 30 publications in peer reviewed journals and conferences.

Tuesday, April 19, 2016
11:00 am- 12:00 pm

UConn, Storrs Campus – ITE Building 336

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Upcoming Distinguished Lectures

04/26/16 – Christos Georgakis Data Driven Modeling: Two Methodological Generalizations

05/19/16 – Krithi Ramamritham Being Smart: The Role of Timely Analytics

10/06/16 – Olivier de Weck When is complex too complex? Graph energy, proactive complexity management and the first law of systems engineering

10/17/16 – Wei Chen Design under uncertainty; multidisciplinary design optimization; simulation-based design

Upcoming Seminars

05/03/16 – Calin Belta Formal Methods for Dynamical Systems

09/08/16– Chris Ha Think Like a Customer, Act like a Startup in Analytics Space

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