



QMC Opening Workshop August 28-September 1, 2017

Lecture: *Support Points - a new way to compact distributions, with small-data and big-data applications*

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Abstract:

This talk introduces a new way to compact a (possibly non-uniform) probability distribution “ F ” into a set of representative points, called *support points*. These point sets can have important uses for both small-data problems, such as experimental design and uncertainty quantification in engineering applications, as well as big-data problems, such as the optimal reduction of large datasets in Bayesian computation. We first present support points as the minimizer of a powerful goodness-of-fit test called the energy distance, and discuss why such point sets are appealing to use for simulation and integration. An extension of this point set, called *projected support points*, is then introduced for high-dimensional integration under non-uniform “ F ”. We show that support points (and its variants) can provide good solutions to the aforementioned small-data and big-data problems. This talk concludes with some new ideas and ongoing work on experimental design, potential theory and robust optimization.