

STATISTICS COLLOQUIUM

WEDNESDAY, APRIL 16, 2014

TALK: 9:45 AM — SCIENCE CENTER RM. 705

RECEPTION: 9:30 AM — SCIENCE CENTER, 7TH FLOOR

“Dilemmas in Design: Partial Aliasing, Hidden Projection, and Algebraic Properties of the Linear-Quadratic System”

**Arman Sabbaghi
Department of Statistics
Harvard University**

Advisors: Donald B. Rubin and Tirthankar Dasgupta

ABSTRACT

The linear-quadratic (LQ) system for three-level fractional factorial designs is important in applications because it yields partially aliased and interpretable interaction contrasts for quantitative factors. However, its mathematics are not yet transparent, and this inhibits a simple understanding of its partial aliasing, hidden projection, and other algebraic properties. A better understanding is achieved with indicator functions, and we develop the theory of indicator functions under the LQ system. New algebraic operations for calculating indicator function coefficients are defined that facilitate derivations of partial aliasing relations and hidden projection properties for large classes of designs. They also yield a new connection between design constructions and their analyses under this system. Ultimately, these operations and results can be extended to more general experimental scenarios. Time permitting, the extension for mixed two- and three-level designs will be outlined.