

# COLLOQUIUM

DEPARTMENT OF MATHEMATICS AND STATISTICS

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## **Hindu/Jain Yantrams, Greek Mythologies And Some New Mixture Designs for Interior**

### **Abstract**

What do the Hindu/Jain *Yantrams*\* and Greek mythologies have to do with industrial experimentations? Apparently, ideas from these can be used to generate some rich classes of complete-mixture experiments, where sum of the ingredients/components /explanatory variables must add to 1. The requirement of sum being 1 implies that all design points must be on the simplex and a complete mixture requires that all ingredients are used with nonzero proportions and hence all design points must lie in the interior of the simplex. We provide details of how to construct these designs, illustrate their wide applicability and their flexibility to adapt to the constrained feasible regions. Not only do these designs work well within interior of the simplex, they can also be easily refined to satisfy the constraints, if there were any, on the mixture components. Leverage values for such designs are more evenly distributed among interior points compared to simplex-lattice or simplex-centroid designs which tend to place higher leverages on the vertices or edge design points where the experiments may not be feasible. Finally, based on the idea of *procrustation*, we provide an approach alternative to extreme vertices designs.

\*Yantrams are essentially numeric configurations used in Vedic/Jain religious practices and are closely related to magic squares.

**Tuesday, September 22, 2015**

**3 - 4 PM**

**Room 135 Dodge Hall**

(Refreshments at 2:30-3:00 PM in the kitchen area adjacent to 368 MSC)