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Optimal Designs in High-Throughput Screening

High-throughput screening (HTS) is a large-scale process that screens hundreds of thousands to millions of compounds in order to identify potentially leading candidates rapidly and accurately. There are many statistically challenging issues in HTS. In this talk, I will focus the spatial effect in primary HTS. I will discuss the consequences of spatial effects in selecting leading compounds and why the current experimental design fails to eliminate these spatial effects. A new class of designs will be proposed for elimination of spatial effects.

The new designs have the advantages such as all compounds are comparable within each microplate in spite of the existence of spatial effects; the maximum number of compounds in each microplate is attained, etc. Optimal designs are recommended for HTS experiments with one and multiple controls.