

Statistical Design and Multiple Testing Analysis of Microarray Experiments

Dr. Jane Chang

ASSISTANT PROFESSOR
APPLIED STATISTICS AND OPERATIONS RESEARCH
BOWLING GREEN STATE UNIVERSITY

Abstract:

Microarray experiments are no longer for discovery only. There are microarray-based products marketed for cancer recurrence prognosis. Microarrays for clinical use should meet FDA joint CDRH/CDER statistical requirements. But it has been observed that reported sensitivity and specificity of biomarker-based cancer prognostics from even major studies are not necessarily reproducible.

We will first describe DESIGN of microarrays and sample hybridization toward reproducible results, using the concepts of randomization, replication, and blocking.

Multiple testing's ANALYSIS issues of gene expression levels will then be discussed. Relevant issues include conditions required for step-down testing as a shortcut to closed/partition testing, and inflation of error rates of permutation tests for equality of means.