

CALIFORNIA STATE UNIVERSITY, LONG BEACH

# THE MATHEMATICS COLLOQUIUM

presents

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speaking on

*Can we detect significant genes of complex diseases?*

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12:00PM-1:00PM

FO3-200A

**Abstract:** A Single Nucleotide Polymorphism (SNP) is a small genetic change that can occur when a single nucleotide (A, C, T, or G) replaces one of the other three nucleotides in a person's DNA. For example, a SNP might change the DNA sequence TGCATTGC to TGCCATTGC. Scientists believe that SNP maps will help them identify the genes associated with complex diseases such as cancer or diabetes. Transmission Disequilibrium Test (TDT) is a nonparametric test that can detect the markers (genes) in linkage disequilibrium with a disease in the presence of association; TDT is applied on SNP data. The classical TDT uses complete genotype information from trios. Genotyping errors or disease with late onset may cause missing genotypes in SNPs. It is common to exclude families when at least one of the genotypes is missing. Several approaches have been proposed to handle missing genotypes of parents, but not much attention has been given to that of children. In this talk, we propose a robust TDT (rTDT) that handles missing genotypes on any trios. The rTDT produces minimum and maximum values of the TDT statistics consistent with all possible completions of the missing data. We apply rTDT to identify markers of susceptibility to Crohn disease which is a serious inflammatory disease of the gastrointestinal tract.