STANFORD UNIVERSITY

DEPARTMENT OF STATISTICS

DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, January 9, 2001
Sequoia Hall Rm. 200
(Cookies at 3:45 in 1st Floor Lounge)

Steven N. Evans
Statistics and Mathematics
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DNA, Family Trees, Elimination Ideals, Groups, and Z-Modules

The method of invariants is an approach to the problem of reconstructing the evolutionary family tree for a number of species using DNA sequence data. In order to apply this method, one needs to solve a problem in commutative algebra: how to find all the algebraic relationships between a certain collection of polynomials in a large number of variables. We show how some simple finite group Fourier analysis reduces this problem to one of linear algebra that can be solved by efficient algorithms. We also indicate how these ideas can be used to show that the method of invariants can always distinguish between different family trees. This is joint work with Terry Speed and Xiaowen Zhou.