A central problem in algebraic combinatorics is to provide an algorithm for calculating the coefficients arising in the decomposition of a tensor product of two simple representations of the symmetric group. The coefficients in such a decomposition are known as the "Kronecker coefficients"; these coefficients include the Littlewood—Richardson coefficients as a special case. In this subcase, the solution to the problem takes the form of a tableau counting algorithm known as the Littlewood—Richardson rule.

The ultimate goal in this area is to generalise the Littlewood—Richardson rule to the general case. We shall discuss recent work with Maud De Visscher and John Enyang in which this problem is solved for Kronecker coefficients labelled by "co-Pieri triples" of partitions. This, in some sense, solves half of the Kronecker problem.