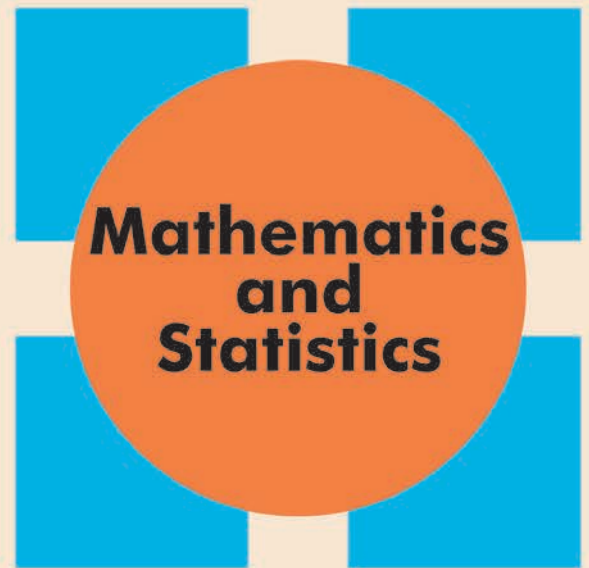


COLLOQUIUM

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**“I almost wish I hadn’t
gone down that
rabbit-hole . . .” -
alternating sign matrices
and related things**



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Abstract: Our story starts in 1773, with an observation by Lagrange on 3 by 3 determinants. In 1833 the corresponding statement was proved by Jacobi for all square matrices, and it is now known as the Desnanot-Jacobi identity. It is the basis for Dodgson’s Condensation Algorithm of 1866, which is a scheme for computing determinants by repeatedly replacing contiguous 2 by 2 submatrices by the corresponding minors. More than 100 years later, the insertion of an experimental tweak to the definition of a 2 by 2 determinant in the condensation formula led to an adaptation of the determinant in which distinct products of matrix entries are indexed not by permutations but by more general objects known as alternating sign matrices (ASMs). This talk will present some of the surprising but compelling connections between ASMs and permutations, and mention some apparent connections to other structures from combinatorics and graph theory.