JOHN CAMPBELL, York University
New techniques for evaluating series involving squared central binomial coefficients and harmonic-type numbers

Recently, there has been much interest in the evaluation of series containing expressions such as $\binom{2n}{n}^2 H_n$ and $\binom{2n}{n}^2 H_{2n}$ as factors in the summand for $n \in \mathbb{N}$, letting $H_m = \psi_0(m+1) + \gamma$ denote the harmonic number function, where ψ_0 denotes the digamma function. A variety of integration methods have been introduced recently for symbolically computing such series, which often have interesting evaluations involving $\frac{1}{\pi}$ that are reminiscent of Ramanujan's series for $\frac{1}{\pi}$; this has led to new areas of research investigating connections between Fourier-Legendre theory, the complete elliptic integrals, and the evaluation of binomial-harmonic sums. In this talk, we describe some of the recent advances concerning these new subjects of research.