From multiplicities to random matrices and back again.

We will introduce the joint eigenvalue distribution for a sum of two random Hermitian matrices with prescribed eigenvalues. This distribution is of interest beyond random matrix theory, as it encodes combinatorial data related to representation theory and symplectic geometry. After reviewing how the joint density can be obtained from the semiclassical asymptotics of Littlewood-Richardson coefficients, we will discuss new methods for recovering these coefficients from the density, effectively inverting the semiclassical limit. The results presented include individual work of the author as well as joint work with Robert Coquereaux and Jean-Bernard Zuber. (Received August 31, 2019)