

Seminar AGCO

Speaker: Gwen McKinley, UC San Diego

Title: Counting integer partitions with the method of maximum entropy.

Abstract: The problem of asymptotically counting integer partitions has a long and storied history, beginning with the pioneering work of Hardy and Ramanujan in 1918. In the work presented here, we give a probabilistic perspective on this problem, and use this approach to prove an asymptotic formula for the number of partitions of an integer n where the sums of the k th powers of the parts are also fixed, for some collection of values k . To obtain this result, we reframe the counting problem as an optimization problem, and find the probability distribution on the set of all integer partitions with maximum entropy among those that satisfy our restrictions in expectation (in essence, this is an application of Jaynes' principle of maximum entropy). This approach leads to an approximate version of our formula as the solution to a relatively straightforward optimization problem over real-valued functions. To establish more precise asymptotics, we prove a local central limit theorem.

A large portion of the talk will be devoted to outlining how our method can be used to re-derive a classical result of Hardy and Ramanujan, with an emphasis on the intuitions behind the method, and limited technical detail. This is joint work with Marcus Michelen and Will Perkins

Wednesday, December 9, **15:00 hrs (Chilean time)**.

Link: <https://zoom.us/j/98543137164?pwd=M1lUaUNPcm1LcnFocEZhRXMvWDRKQT09>