Lattice Points and Simultaneous Core Partitions

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For an integer $t$, $t$-core partitions are a subclass of partitions that appear naturally in representation theory, number theory, and geometry. More recently, in connection to rational Catalan combinatorics there has been active study into partitions that are simultaneously $a$-core and $b$-core, for $a$, $b$ relatively prime.

After a gentle introduction to core partitions, we will explain our recent work connecting simultaneous core partitions with the geometry of lattice points, that in particular allows us to prove a conjecture of Armstrong about the average size of simultaneous core partitions.