

The University of Chicago
ALGEBRAIC GEOMETRY SEMINAR

Wednesday, March 4th, 2015
4:30 – 6:00 pm, Eckhart 312

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**Semi-invariants of quivers, cluster algebras and the
hive model.**

The saturation theorem for Littlewood-Richardson coefficients was a fashionable subject about a decade ago. There are two completely different proofs of the theorem: the original one by Knutson-Tao based on their hive model, and a proof based on quiver representations given by Harm Derksen and myself. So far there was no link between these two proofs.

Recently Jiarui Fei discovered a remarkable cluster algebra structure on the ring $SI(T_{n,n,n}, \beta(n))$ of semi-invariants of a triple flag quiver, whose weight spaces have dimensions that are Littlewood-Richardson coefficients.

In proving his result he uses both the hive model and the quiver representations. It turns out that the link between the two approaches is the quiver with potential underlying the cluster algebra structure. The combinatorics of g -vectors for this quiver with potential turns out to be identical to the hive model.

In my talk I will explain the notions involved and basic ideas behind Jiarui Fei's proof.