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Jed Yang* (jedyang@umn.edu). *Tiling by triangles and rhombi is hard.*

In 2001, Knutson, Tao, and Woodward introduced puzzle pieces: two triangles and a rhombus (with edge labels). They proved that tilings by these puzzle pieces (allowing rotations) of triangular regions (with edge labels) are counted by Littlewood–Richardson coefficients. These numbers appear naturally in many contexts, including multiplication of Schur functions, intersection of Schubert varieties, and tensor products of irreducible representations of general linear groups.

Together with the saturation conjecture, proved by Knutson and Tao in 1998, this means, in particular, that tileability of triangular regions by puzzle pieces can be decided in polynomial time. In this talk, we will discuss the problem of tiling arbitrary regions with these puzzle pieces, which is NP-complete. If time permits, we will also consider tilings where reflections are allowed.

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