

**COLLOQUIUM**  
**UNIVERSITY OF PITTSBURGH**  
**FRIDAY, JANUARY 18, 2008**  
**704 THACKERAY HALL**  
**4:00 P.M.**

**PROFESSOR ALEXANDER YONG**  
**DEPARTMENT OF MATHEMATICS**  
**UNIVERSITY OF MINNESOTA**

**SCHUBERT COMBINATORICS & GEOMETRY**

**ABSTRACT:** The Littlewood-Richardson rule computes many things, including:

- decomposition of symmetric group representations under symmetric sub groups
- decomposition of tensor products of  $GL_n$  representations
- intersection theory on Grassmannians  $GL_n/P$ .

while their positivity controls other things such as eigenvalue inequalities on the sums of Hermitian matrices and short exact sequences of finite abelian groups.

The problem of finding a purely combinatorial rule for flag manifolds  $GL_n/B$  remains unsolved despite the attention of many people. Hugh Thomas and the speaker have recently shown that a different generalization of the problem, to (co)minuscule flag manifolds  $G/P$ , is as tractable as, and shares many features with the Grassmannian case.

Understanding the singularities of the Schubert varieties (rather than their intersections, as was the focus above) also has had considerable interest. We describe work with Alex Woo, which constructs a combinatorial model for this study, leading to new geometric results and further questions, being approached using algebraic, geometric and combinatorial methods.

**Refreshments served at 3:30 p.m.**  
**in the Math Dept. COMMON ROOM, Thackeray 705**

\*The speaker is a candidate for a position in the Department.