THE UNIVERSITY OF
CHICAGO

Departments of Mathematics and Statistics

**ALGEBRAIC GEOMETRY SEMINAR**

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# Real Symmetric Tensor Decomposition

**TUESDAY, December 4, 2012, from 4:30–6:00 PM**

312 Eckhart Hall, 5734 S. University Avenue.

## ABSTRACT


Symmetric tensor decomposition (also known as the Waring problem for forms) asks for a minimal decomposition of a symmetric tensor in terms of rank 1 tensors. Equivalently the Waring problem for forms asks for a minimal decomposition of a form of degree d as a linear combination $d$-th powers of linear forms. These problems are usually studied over complex numbers, while it is of definite interest to only consider real decompositions for real tensors (or equivalently real forms). I will explain several ways in which the situation is different for real tensors. For instance, a generic form with complex coefficients has a well-defined unique rank, which is given by the Alexander-Hirschowitz theorem. This is no longer the case over real numbers and there can be several "typical" ranks, while no generic rank exists. I will show how classical tools, such as the Apolarity Lemma can be used to study the typical ranks of real tensors.


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**Organizers:**

For further information on this event, please email Lek-Heng Lim at lekheng@galton.uchicago.edu or Madhav Nori at nori@math.uchicago.edu.

UCAGS Seminar URL: `http://www.stat.uchicago.edu/~lekheng/ag.html`