

# Harvard-M.I.T. Algebraic Geometry Seminar

## ARITHMETIC SCHUBERT CALCULUS AND APPLICATIONS

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### Abstract:

Let  $G$  be the Grassmannian which parametrizes  $m$ -dimensional subspaces of affine  $(m+n)$ -space for any base field, considered as a scheme over the ring of rational integers. We study the structure of the Arakelov Chow ring of  $G$ , and describe the resulting 'arithmetic Schubert calculus'. The applications include: (i) an explicit formula for the action of the Hodge star operator on the Schubert forms on  $G(\mathbb{C})$ , (ii) a computation of the Faltings height of  $G$  under its Plücker embedding in projective space, and (iii) a proof of the arithmetic hard Lefschetz conjecture and Hodge index inequalities when  $m=1$  or  $2$ . The latter are related to good estimates for a class of special functions called Racah polynomials.

April 16, 2002

3:00 p.m.

Harvard Room 507

<http://www-math.mit.edu/~abuch/seminar/>