

## ***ALGEBRAIC GEOMETRY AND COMMUTATIVE ALGEBRA SEMINAR***

**Speaker: Claudia Polini**  
**University of Notre Dame**



**Date:** Wednesday, February 12, 2020

**Time:** 3:00 PM

**Location:** 258 Hurley Hall

**Lecture Title:**

**Blowup algebras of ideals of minors of sparse matrices**

**Abstract**

The study of rings and more generally of varieties that are defined by determinantal ideals of generic matrices has been a central topic of commutative algebra and algebraic geometry. We consider the ideal  $I$  generated by maximal minors of sparse matrices of size  $2$  by  $n$ . Using the theory of Sagbi bases we describe the defining equations of the Rees algebra of such ideals. In particular we show that  $I$  is of fiber type and the special fiber ring is defined by the Plucker relations. We obtain many consequences: the Rees algebra of  $I$  has rational singularities if the field has characteristic zero and is  $F$ -rational if the field is of positive characteristic. In particular, the Rees algebra is a Cohen-Macaulay, normal domain. In addition, the Plucker relations form a Groebner basis for the defining ideal of the Rees ring, hence the latter is Koszul and  $I$  has linear powers. This is joint work with Ela Celikbas, Emilie Dufresne, Louiza Fouli, Elisa Gorla, Kuei-Nuan Lin, and Irena Swanson.