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**Hal Schenck, Alexandra Seceleanu and Javid Validashti\*** (jvalidas@illinois.edu). *On Syzygies and Singularities of Tensor Product Surfaces.*

Let  $U \subseteq H^0(\mathcal{O}_{\mathbb{P}^1 \times \mathbb{P}^1}(2, 1))$  be a basepoint free four-dimensional vector space. We study the associated bigraded ideal  $I_U \subseteq \mathbb{k}[s, t; u, v]$  from the standpoint of commutative algebra, proving that there are exactly six numerical types of possible bigraded minimal free resolution. These resolutions play a key role in determining the implicit equation for the image of the projective surface in  $\mathbb{P}^3$  parametrized by generators of  $U$  over  $\mathbb{P}^1 \times \mathbb{P}^1$ . This problem arises from a real world application in geometric modeling, where one would like to understand the implicit equation and singular locus of a parametric surface. This talk is based on a joint work with H. Schenck and A. Seceleanu. (Received September 04, 2012)