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**Jose Israel Rodriguez\*** (jo.ro@nd.edu). *The maximum likelihood degree for rank 2 matrices via Euler characteristics.*

The maximum likelihood degree (ML degree) measures the algebraic complexity of a fundamental computational problem in statistics: maximum likelihood estimation on a statistical model. Work by June Huh, relates the ML degree of an algebraic variety (statistical model) to an Euler characteristic in the smooth case. More recent work by Nero Budur and Botong Wang relate a weighted sum of ML degrees to an Euler characteristic in the singular case. The new work presented here proves a closed form expression for the ML degree of  $3 \times n$  rank at most 2 matrices (this variety corresponds to a mixture of 2 independence models in statistics). This result solves a conjecture by Hauenstein, [], and Sturmfels based on computations with the numerical algebraic geometry software Bertini. The talk will have a running example based on “DiaNA’s dice” to bridge statistics, Euler characteristics, combinatorics, and applied algebraic geometry. Joint work with Botong Wang. (Received August 11, 2015)