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Nicholas M Ercolani* (ercolani@math.arizona.edu), Department of Mathematics, University of Arizona, 617 N. Santa Rita Ave. P.O. Box 210089, Tucson, AZ 85721-0089. *Cluster Expansions, Caustics and Counting Graphs.*

The main result to be described in this talk is the derivation of universal formulas for the generating functions (that enumerate graphs on Riemann surfaces – g-maps) appearing as coefficients of the large N genus expansion for the free energy of unitary ensembles of Hermetian random matrices. Time permitting we will also describe applications of these results which include new information about the double scaling limit of the free energy for these ensembles and the asymptotics of generating functions for graphical enumeration. (Received September 16, 2010)