

Anthony Almudevar, Ph.D.

Department of Biostatistics and Computational Biology  
University of Rochester Medical Center

*On the Density of the Solution to a Random System of Equations*

A general form of the density  $f$  of the solution  $\hat{\theta}$  to a system of equations  $\Psi(\theta) = 0$  which is in some sense random was considered by Skovgaard (1990), Jensen and Wood (1998) and Almudevar, Robinson and Field (2000). The motivation of this work was largely to provide a rigorous justification for a number of specialized approximations of  $f$ , such as Barndorff-Nielsen's  $p^*$  formula (1983) and the tilting procedure of Field (1982).

In this talk I will give a review of these results, and discuss some new applications. This will include a general higher order approximation method suggested by the exact form of  $f$ . Further applications deal with nonlinear regression as well as problems concerning the roots of random polynomials.