1145-65-1428 **Miandra Ann Ellis*** (mellis5@asu.edu) and **Rosemary Anne Renaut** (renaut@asu.edu).
Image deblurring using higher order Galerkin approximations with domain stretching. Preliminary report.

Image deblurring may be modeled via the convolution $g(s) = \int K(s-t)f(t)dt$ for the shift invariant kernel operator $K(\cdot)$. Typical approaches for image deblurring apply a Galerkin method to discretize the integral equation, using the zeroth order indicator functions as a basis for the solution and the operator. This requires a basis of length N for a signal of N measurements in one dimension. The Chebyshev basis offers the potential to use a higher order basis with $n << N$ terms when applied using a Galerkin or collocation formulation. In this talk, initial results demonstrating validity of the use of a higher order basis for image deblurring will be presented. Results will be contrasted with those obtained using the standard techniques with an aim to find the technique which is most computationally efficient while maintaining accuracy and stability. Due to issues with the stability of the discretization of the Chebyshev operators, a standard domain stretching will be introduced to improve the conditioning of the formulation. Our interest in developing the method is motivated by the need to develop a computationally tractable algorithm for the solution of large-scale inversion problems. (Received September 21, 2018)