1126-65-97 **Andrea Bonito** and **Alan Demlow*** (demlow@math.tamu.edu). *Adaptive finite element methods for the Laplace-Beltrami operator on smooth surfaces.*

FEM for elliptic PDE on smooth surfaces involve approximating both the surface itself (leading to a "geometric" consistency error) and the PDE (leading to a standard Galerkin error). The behavior of the geometric error depends heavily on the choice of surface representation. Parametric representations based on mappings from Euclidean domains are more flexible and generally easier to implement, but lead to a lower-order (larger) geometric error. Implicit representations based on a closest-point projection are less flexible because they require a C^2 surface and because the closest-point projection is not usually analytically computable. However, the geometric error derived from such representations is of higher order due to special properties of the closest-point projection. Because existing estimators based on the closest-point projection require actually computing it, non-computability of the closest-point projection becomes critical when carrying out adaptive computations. In this talk we merge these two perspectives by constructing estimators which preserve many of the best properties of closest-point and parametric estimators and discuss behavior of AFEM based on our new estimators. (Received January 06, 2017)