1135-65-776 **Jacob Jacavage*** (jjacav@udel.edu) and **Constantin Bacuta** (bacuta@udel.edu). *A Nonconforming Saddle Point Least Squares Approach for Elliptic Interface Problems.*

Numerical methods for elliptic interface problems have been widely studied. One difficult challenge when approximating such problems is related to discontinuities of the coefficients at the interface. Body-fitted mesh methods involve aligning the mesh with the interface to capture discontinuities. In this category, we propose a new least squares method to approximate the solution of such problems. The method is based on a general Saddle Point Least Squares (SPLS) method for discretizing mixed variational formulations of boundary value problems and involves finite element discretization with piecewise polynomial spaces. The SPLS method has the advantage that a discrete inf-sup condition is automatically satisfied for standard choices of test and trial spaces. The proposed iterative solver is easy to implement and benefits from the way the discrete trial spaces are chosen. For interface problems, we will focus on using projection trial spaces. Local projections are used if the gradient of the solution is discontinuous along the interface. This idea, combined with classical gradient recovery techniques, leads to a better approximation of the (global) flux as shown by the numerical results. (Received September 14, 2017)