1147-65-732 **Adrian J Lew*** (lewa@stanford.edu), **Kyuwon Kim** and **Ramsharan Rangarajan**.

Universal Meshes for Piecewise-Smooth Curves.

We discuss our recent results on constructing Universal Meshes for piecewise-C^2 domains in $\mathbb{R}^2$. A Universal Mesh for a set of curves is a mesh of triangles (or tetrahedra in $\mathbb{R}^3$) that can be deformed to conform to any curve in the set. This is particularly adavantageous for problems with moving domains, such as fracture propagation or some fluid-structure interaction problems. The mesh-deformation algorithm we introduce consists of two parts: (1) Given a piecewise-C^2 curve immersed in the universal mesh, identify a set of edges that is homemorphic to the curve under a map that is closely related to the closest-point projection to each smooth part of the curve, and (2) a mesh-relaxation strategy, called Directional Vertex Relaxation, to move nearby triangles and accommodate the motion of such edges. Our results provide conditions under which part (1) is possible. This also defines a set of curves that a Universal Mesh can be conformed to. We will show applications of the Universal Mesh to crack propagation problems. (Received January 28, 2019)