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**Dana Paquin\*** (dpaquin@calpoly.edu), **Brady Berg**, **Conor Carroll**, **Weston Grewe**,  
**Brian Knight** and **Tuyen Pham**. *Multiscale Registration-Based Image  
Segmentation*. Preliminary report.

Image segmentation, the process of partitioning an image into separate components, has many applications in image processing and analysis, especially as related to medical imaging. Although numerous image segmentation algorithms have been published and analyzed, many existing methods fail to produce accurate segmentation results when the images to be outlined contain high levels of noise. In this talk, we present a novel Iterative Multi-Scale Registration-Based Segmentation Algorithm (IMMRSA), which allows for the successful segmentation of noisy images via multi scale image registration. Image registration is the process of determining the optimal spatial transformation that maps one image to another. The IMMRSA algorithm is based on the multiscale registration algorithm of D. Paquin, D. Levy, E. Schreibmann, and L. Xing (Multiscale Image Registration, Mathematical Biosciences and Engineering, Volume 3, Number 2, April 2006), which uses the hierarchical multiscale image decomposition of E. Tadmor, S. Nezzar, and L. Vese (A multiscale image representation using hierarchical  $(BV, L^2)$  decompositions, Multiscale Modeling and Simulations, vol. 2, no.4, pp. 554-579, 2004) to accurately register highly noisy images. (Received September 17, 2019)