

# UNIVERSITY OF SOUTH FLORIDA

## *Major Research Area Paper Presentation*

### *Active Learning and Preprocessing for Medical Histopathology - A Literature Review*

by  
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*For the Ph.D. degree in Computer Science and Engineering*

The most pressing issue in the application of deep learning to medical histopathology is the clash between the voracious appetites for data of supervised deep learning algorithms and the difficulty and cost of acquiring that data. Research for effective machine learning in the medical field is just as well research to either improve performance using less data, or cheaply and automatically label new data. A promising approach to this problem is active learning in its numerous variations. We will review recent advances in the application of active learning to medical histopathology, and we will review the challenges of applying the method to deep learning. We will discuss uncertainty sampling variants of active learning as well as new variants which enable automatic labeling. Then, we will review the challenges of inconsistent microscopy conditions which hurt the performance of machine learning models, and review approaches to preprocessing which attempt to normalize these inconsistencies for analysis by both

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#### **Disability Accommodations:**

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-974-4373 at least five (5) working days prior to the event.