



**PETER L.  
REICHERTZ INSTITUT  
FÜR MEDIZINISCHE  
INFORMATIK**



## Ringvorlesung Medizinische Informatik

### Processing and Analysis of Histological and Hyperspectral Images to Aid Diagnosis

Prof. Dr. Joaquim Cezar Felipe  
University of São Paulo

Vorlesung:	25.10.2019, 10:00 – 11:30
Nachbesprechung:	07.11.2019, 8:45 – 9:30
Ort:	IZ 404
Vortragssprache:	english

We present studies conducted by the Computing Applied to Biomedical Information research group of the University of São Paulo, Brazil. These studies aim at supporting the diagnosis based on the processing and analysis of histological and hyperspectral images. The first study consists of a method for structural analysis of histological images of the cervix. We created neighborhood graphs for different tissue layers, having the segmented nuclei as vertices, with subsequent extraction of their features, based on the concept of complex networks, to train a classifier. In the second study, we developed a computational environment for automatic segmentation, extraction and analysis of morphometric features of myelinic fibers. For segmentation, we developed methods based on fiber shape, size and color. We developed routines to extract fiber and axon measures. In the next study, we used a set of morphological operators to perform the segmentation and identification of glandular structures in sample images of colorectal polyps, followed by the extraction of network features. The last study consists of a method for pattern recognition in colon tissues, based on hyperspectral images obtained from infrared light applied to biopsy slides, which, through the application of Deep Learning techniques, can assist in identifying tissue abnormalities.

Joaquim Cezar Felipe received the B.Eng. degree from the University of São Paulo at São Carlos, Brazil, in 1986, the M.Sc. degree in Computer Sciences from the Federal University of São Carlos, Brazil, in 2000, and the Ph.D. degree in Computer Sciences from the University of São Paulo at São Carlos, Brazil, in 2005. Currently, he holds the position of Associate Professor at the Department of Computers and Mathematics in the University of São Paulo at Ribeirão Preto, Brazil. His current research interests include digital image processing, pattern recognition, computer-aided diagnosis systems and content-based data retrieval. Dr. Felipe received the best paper award from the Journal of Digital Imaging (Springer) of the Society of Imaging Informatics in Medicine (SIIM), in 2009.



Prof. Dr. Joaquim Cezar Felipe