Biomedical Informatics Grand Rounds

Wednesday, March 3, 2021 3:00pm - 4:00 pm

A RAPSODI of Radiology and Pathology Images to Learn MRI Signatures of Aggressive Prostate Cancer

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Remote Access

Join Zoom Meeting https://stonybrook.zoom.us/j/95617197636?pwd=KytzZ2pVRG9SZGpKZUtpNXJISjNjZz09
Meeting ID: 956 1719 7636 Passcode: 924293

Bio: Dr. Rusu is an Assistant Professor in the Department of Radiology at Stanford University where she leads The Laboratory for Integrative Personalized Medicine. Her laboratory focuses on developing analytic methods for biomedical data integration, with a particular interest in radiology-pathology fusion. Such integrative methods may be applied to create comprehensive multi-scale representations of biomedical processes and pathological conditions, thus enabling their in-depth characterization. The radiology-pathology fusion allows the creation of detailed spatial labels, that later on can be used as input for advanced machine learning, such as deep learning.

Dr. Rusu received a Master of Engineering in Bioinformatics from the National Institute of Applied Sciences in Lyon, France. She continued her training at University of Texas Health Science Center in Houston, where she received a Master of Science and PhD degree in Health Informatics for her work in biomolecular structural data integration of cryo-electron micrographs and X-ray crystallography models.

During her postdoctoral training at Case Western Reserve University, Dr. Rusu has developed computational tools for the integration and interpretation of multi-modal medical imaging data and focused on studying prostate and lung cancers. Prior to joining Stanford, Dr. Rusu was a Lead Engineer and Medical Image Analysis Scientist at GE Global Research Niskayuna NY where she was involved in the development of analytic methods to characterize biological samples in microscopy images and pathologic conditions on MRI or CT.

Abstract: The subtle difference in MRI appearance of prostate cancer and benign prostate tissue renders the interpretation of prostate MRI challenging, causing false positives as well as wide variation in interpretation. My laboratory focuses on improving the interpretation of prostate MRI by using deep learning models trained to automatically identify and distinguish aggressive from indolent prostate cancers on MRI scans. Our approach involves using our RAPSODI platform to map accurate labels of cancer from whole-mount histopathology images on MRI in patients that underwent radical prostatectomy. Next, we identify the MRI features that correlate with pathology image features and used them to train deep learning models to detect cancer on MRI. Our approach was shown to outperform existing deep learning models. In patients outside our training cohorts, such predictive models will outline the extent of cancer on radiology images in the absence of pathology images, thus helping guide the prostate biopsy and local treatment.

Educational Objects: Upon completion, participants should be able to:

- Learn about radiology-pathology registration in the prostate
- Learn about deep learning methods trained using pathology information
- Learn about clinical applications of deep learning methods in the prostate

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Mirabela Rusu, has research grants from GE Healthcare and Philips Healthcare
An appropriate mechanism has been implemented to resolve all conflicts of interest prior to the presentation.

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