Hybrid Spectroscopy Imaging System for In-Vivo Tissue Investigation by Juan Giraldo | Dr. Wei-Chiang Lin

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Improvements for a hybrid spectroscopy imaging system were performed in order to make it more applicable to a surgical environment. The hybrid spectroscopy imaging system holds great value for in-vivo tissue investigation since it is able to quantify optical absorption and scattering properties of tissue. These properties are highly useful for the study of tissue functionality, tissue injury, and tissue pathology due to the fact that they share a direct relationship with tissue structural and compositional characteristics. In this study, integration of the point spectroscopic modality of the system with a surgical microscope was carried out to allow intra-operative use. Moreover, an aiming mechanism was employed in order to guide the data acquisition process. Automation of site selection was implemented with the purpose of improving user's experience. All improvements were developed in Dr. Wei-Chiang Lin's lab. Further development of the system will include incorporation of a laser Doppler mechanism and a laser speckle imaging mechanism to measure blood flow. A motorized scan of a user-specified area of investigation will also be implemented. Finally, in-vivo animal testing will be done to test the performance of the system.