

**TITLE: Deep Learning Approaches to Perioperative Ultrasound Image Interpretation**

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**RESEARCH PROJECT DESCRIPTION**

Point-of-care ultrasound offers the potential to substantially improve perioperative decisions in domains ranging from acute pain medicine to fluid management and cardiac assessment. Computerized recognition of relevant structures on ultrasound images has traditionally required extensive, task-specific development. Recently, the development of a branch of machine learning known as 'deep learning' has promoted common frameworks consisting of very 'deep' neural networks that are adaptable to a wide range of problems in computer vision. This project will apply a number of deep learning algorithms to ultrasound images to detect relevant features in ultrasound images of perineural, cardiac and pulmonary structures. Student participation can range from facilitation of image acquisition of ultrasounds from healthy volunteers to development of novel deep learning algorithms using TensorFlow, Keras, and other deep learning libraries.

Background in computer science, math, or image analysis necessary for algorithm development. Importantly, students without these backgrounds, but still interested in this line of research, will have the ability to contribute through assistance with image acquisition, and will learn about machine learning and deep learning approaches to clinical decision support throughout the summer.

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