PROJECT TITLE: Systematic investigation of parameters affecting microfluidic droplet production

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**Project Description**

Our laboratory is investigating the use of ultrasound-activated droplets as a therapy for reperfusion injury, a type of injury that happens when blood is returned to tissue after there has been a lack of blood (such as occurs after intervention for a heart attack). Droplet activation and efficacy improves with larger droplet sizes. However, large droplets are a risk for occluding flow in microvasculature. To investigate the effect of droplet sizes, we need to manufacture droplets with a narrow size distribution. We are currently doing this using a microfluidic technique. In this project the student will systematically modify parameters such as microfluidic channel flow rates and surfactant concentrations to create droplets of different sizes. Subsequently the student will study how the activation and efficacy of the droplets varies as a function of their diameter. This project builds upon techniques already present in the laboratory and represents a critical area for moving forward.