Optimization of a catheter tip design to maximize visibility in the aorta
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A novel catheter-based imaging device has been developed to visualize the interior surface of blood vessels and to guide endovascular therapies. This device cannot see through blood and currently uses saline ejected from the catheter tip to displace the blood and increase the field of view of the probe.

The objective of this project is to design and optimize the catheter tip and saline delivery system to maximize the field of field and allow the probe to better visualize the vessel walls. This project will be carried out using computational fluid dynamics (CFD) models, benchtop flow loop testing, and ultimately in-vivo studies. The goal of this project is for the student to develop the CFD models for catheter tip design and optimization to maximize performance before prototypes are constructed and for iterative performance testing.

Prerequisites: a) Previous course(s) in fluid mechanics, b) experience using ANSYS Fluent or related CFD package, c) proficiency in computer programming using MatLab and C/C++, and d) basic knowledge of vascular anatomy and physiology (optional).

Research area: Computational Fluid Dynamics