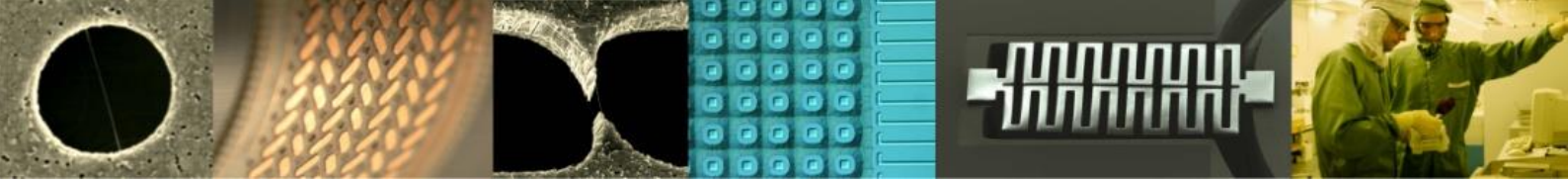

Heat transfer coefficient measurement in pulsatile flow in aortic grafts

Motivation

On cardiovascular implants, the detection of implant infection is often obstructed by difficult access to information at the implant surface, impairing efficient treatment. Precision medicine using sensors at the implant surface could thereby aid early diagnosis of localized infections. Literature research supports the potential of heat flux changes for the localized detection of implant infection

Project

We wish to further understand and investigate the influence of the flow environment in the aorta for the potential application of heat flux sensors for infection detection on aortic implant surfaces. The approach is to use a PDMS cast vascular graft with integrated heat flux sensors measuring the heat transfer coefficients dependent on the liquid velocity, distance from inlet, and pulsatility.

Your Task

3D printing and building a PDMS cast to mimic the vascular graft. Designing a system to integrate heat flux sensors in the PDMS. Testing and measuring the heat transfer coefficient and comparing it to already existing calculations and simulations.

Figure 1: Model system with integrated sensor

Your Profile

Master student looking for a thesis or semester project in the field of heat and mass transfer, heat flux sensors and a specific interest of these topics in relation to medical applications.

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