

EXECUTIVE SUMMARY [NON-CONFIDENTIAL, NON-TECHNICAL ABSTRACT FOR PUBLIC INFORMATION OR PROGRAM PROMOTION]: State the application's broad, long-term objectives and specific aims, making reference to the potential public benefits of the project relevant to California. Do not include proprietary or confidential information. This may be distributed before the funding decision has been finalized.

Left Ventricular Assist Devices (LVADs) are mechanical pumps implanted in patients to improve or replace the function of a failing heart and restore end-organ blood flow. Newer LVADs, designed to fit into smaller persons, have resulted in higher incidence of stroke and complications. This ability to produce clots arises from nonphysiological flow patterns which can be corrected following careful study. Our research addresses this problem by creating an experimental system for measuring the 3-D flow field in a simulated heart and circulation both with and without an LVAD. The *broad goal* of this research is to improve the design of LVADs and their integration into the human body by providing detailed information on the blood flow through the native heart when using these devices. Undergraduate engineering students have designed and constructed a prototype system using state-of-the-art software and machining tools. The system will be modified and improved to produce the final version, and flow visualization studies performed in the fall. The results of this research will be most useful to surgeons, who may use this tool to modify implantation techniques; engineers for improvements in LVAD design; and to patients whose lives will be made safer.