**AIMS2 Research Project in Electrical Engineering**

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| **Research Duration:** | Fall 2018 – Spring 2019 |
| **Faculty:** | John Valdovinos |
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| **Contact No:**  **Title of Project:** | JD 3525, x7595, OH: Mondays and Wednesdays 11am-12:30pm  Magnetoelectric Effect Sensors for Mechanical Circulatory Support Pumps |

**Goals and Objectives of the Project, Expectations and Outcomes**

Mechanical circulatory support (MCS) devices, like left and right ventricular assist devices, have bridged thousands of heart failure patients to transplantation. As the use of these devices has increased, their long-term effect on patient hemodynamics has been a topic of investigation. In their current design, MCS devices function in an open-loop fashion. Surgeons implant the device and manually set the speed and thus, the amount of supplemental flow, for the patient’s given physiological state. One reason for the open-loop use of MCS is the lack of simple and easily integrated sensors on the assist device. Magnetoelectric effect sensors have been used as pressure sensors and magnetic field sensors. Because most MCS devices utilize electromagnetic fields to drive magnetic impellers, these two parameters can be measured and used to predict impeller speed (an indirect measure of flow rate) and pressure. The primary objective of this proposed research is to demonstrate the feasibility of utilizing magnetoelectric (ME) effect devices as integrated sensors receivers for a pediatric left ventricular assist devices. Students under this project will learn how to design and fabricate ME effect devices, test for their ME coefficients, perform data acquisition with LabVIEW, and carry out experiments with the Jarvik 2000 pediatric blood pump.