CLAIMS

1. A system for controlling a heart pump, the system comprising:

a heart pump comprising:

an impeller;

a blood inlet;

a blood outlet;

a pump motor; and

a first portion configured to be positioned within a left ventricle of a patient,

wherein, the heart pump, during operation, is configured to pull blood from the left ventricle of the patient into the impeller through the blood inlet and expel the blood through the blood outlet into an aorta of the patient;

a first sensor positioned within the left ventricle of the patient and configured to generate an output used to measure or calculate a left ventricular systolic pressure (LVSP) within the left ventricle of the patient; and

a controller coupled to the heart pump and configured to measure or calculate the LVSP based on the output of the first sensor and to control an operation of the heart pump to maximize mechanical unloading of the left ventricle of the patient based on the measured or calculated LVSP,

wherein the heart pump has a pump speed and a flow rate, and the controller is configured to control one or more of the pump speed and the flow rate of the heart pump, such that the LVSP within the left ventricle of the patient is maintained at a target reference pressure, and

wherein the controller is configured to set the target reference pressure to a fraction of an end-systolic pressure in a normal ejecting beat, wherein the end-systolic pressure is measured by the first sensor, and wherein the fraction is between 0.2 and 0.4.

2. A method for controlling operation of a heart pump, comprising:

positioning a first portion of the heart pump within a left ventricle of a patient,

wherein the heart pump further comprises an impeller, a blood inlet, a blood outlet, a pump motor, and

wherein, the heart pump, during operation, is configured to pull blood from the left ventricle of the patient into the impeller through the blood inlet and expel the blood through the blood outlet into an aorta of the patient;

measuring or calculating a left ventricular systolic pressure (LVSP) within the left ventricle of the patient using an output generated by at least one sensor positioned within the left ventricle of the patient; and

controlling an operation of the heart pump to mechanically unload the left ventricle of the patient based on the measured or calculated LVSP,

wherein controlling the operation of the heart pump comprises controlling one or more of a pump speed and a flow rate of the heart pump, such that the LVSP within the left ventricle of the patient is maintained at a target reference pressure;

measuring or calculating end-systolic pressure in a normal ejecting beat; and

setting the target reference pressure to a fraction of the end-systolic pressure, wherein the fraction is between 0.2 and 0.4.