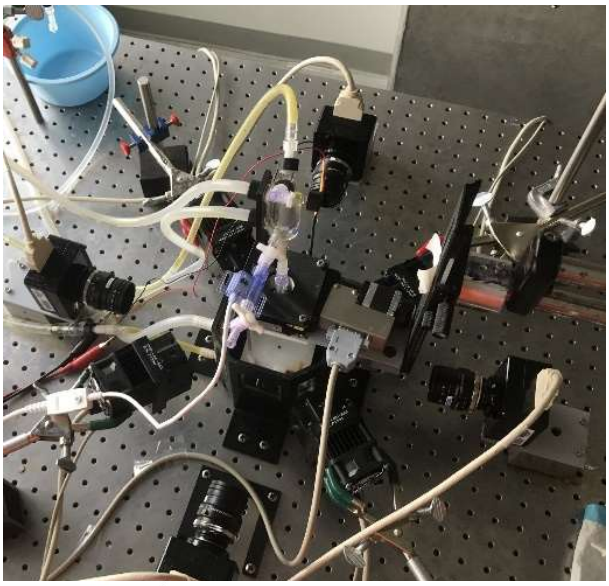
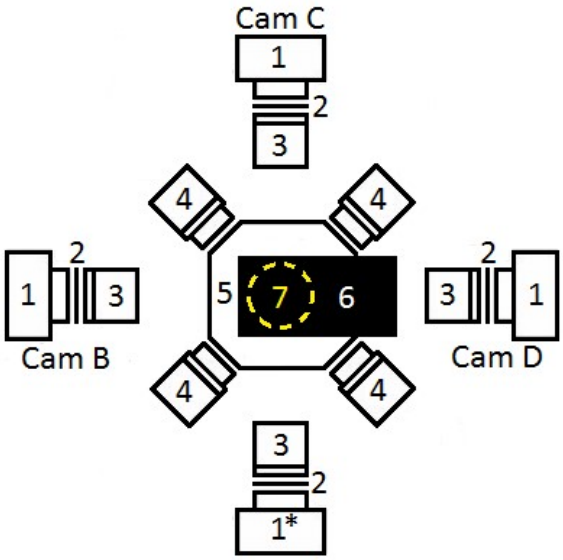
Hardware Setup

Camera Setup

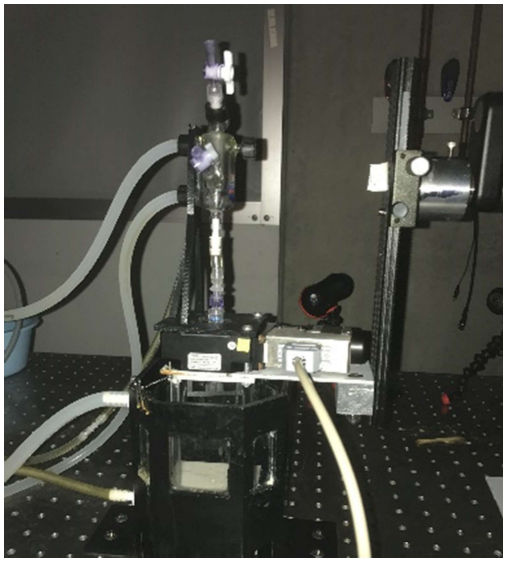


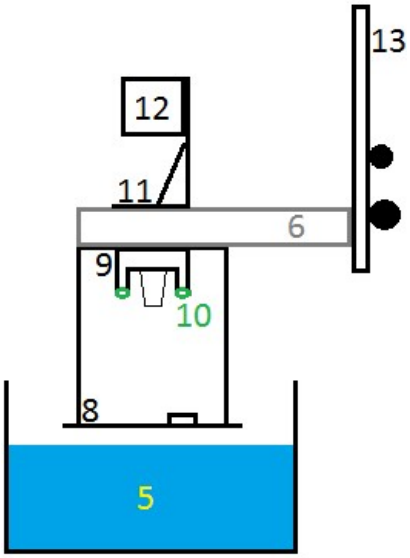


Number	Item	Supplier
1	MiCAM05 CAM-ULT Optical Camera	1stVision
	* Geometry Camera (UI-322XCP-M)	Imaging Development Systems (IDS)
2	655 nm Long Pass Filter (ET655lp)	Chroma Technology Corp.
3	33 mm C-Mount Lens (MLV35M1)	Navitar
4	630 nm Red LED (UHP-T-LED-630)	Prizmatix Ltd.
5	3D-Printed Tissue Chamber	N/A
6	Rotation Stage (URS50)	Newport Corp.
7	Heart Fixture (See next Figure)	

The camera setup involves 4 cameras located 90 degrees away from each other. Camera 1 can either be the optical camera or the geometry camera, while cameras 2-4 are optical cameras. Each camera has a long pass filter and c-mount lens attached, and is secured to a magnetic table using magnetic stands from ThorLabs and Gaertner Scientific Corporation. Between each camera is a red LED also secured to the table using magnetic stands. A 3D-printed tissue chamber is placed in the center of the setup, with a rotation stage above it. The optical cameras are attached to an acquisition system connected to the computer to save videos and pictures.

Heart Fixture





Number	Item	Supplier
8	3D-Printed Heart Platform	N/A
9	3D-Printed Cannula Mount	N/A
10	Ag-AgCl Electrode	Sigma-Aldrich
11	3D-Printed Bubble Trap Mount	N/A
12	Bubble Trap	Radnoti
13	200mm Movable 2-Way Focusing Rail Slider	FotoMate

The heart fixture consists of many 3D-printed parts. The heart platform is used for tying down the apex of the heart to minimize movement of the heart while taking recordings and is attached to the bottom of a platform holding the rotation stage. The platform leveler lowers and raises fixture into/out of the chamber. Attached to the bottom of the rotation stage is a cannula mount designed to hold the cannulated part of the heart. On the ends are Ag-AgCl electrodes used to record pseudo-ECG readings. On top of the rotation stage is a bubble trap mount that attaches the bubble trap at a height. The exact height is determined by comparing the pressure and flow rate. This fixture is attached to a Diagnostic Instruments stand able to raise and move the entire fixture, which is necessary when trying to minimize camera changes for calibration and geometry acquisition. The perfusion system to the chamber consists of MasterFlex tubing connecting multiple bubble traps to two MasterFlex pumps (one for inflow and one for outflow).