Design request. Interventional Cardiology of Columbia University Medical Center has expressed the interest and need to develop a percutaneous transcatheter remote suturing device to close the patent foramen ovale (PFO).

Justification. Patent foramen ovale (PFO) is a persistent communication between the two atria. It is diagnosed by echocardiography and is known to affect 25% of population. It can be the cause of embolic stroke and may be associated with migraine or seizure. Current non-surgical method of closure is to use a transcatheter occluder, e.g., Amplatzer or CardioSeal. A physiological way of closure is to suture the foramen valve to the atrial septum. This technique is currently not available. Development of a remote cardiac suturing device via a catheter through the femoral vein will provide a non-surgical, minimally traumatic and most physiological way of PFO closure.

Required Specifications. The remote suturing device should be operated via a catheter of approximately 90 cm long. The lumen of the catheter can be up to 3 mm in diameter. The catheter tip will be in the cavity of the right atrium. The tip of catheter can be advanced to the right ventricle and also to the left atrium through the PFO. The remote suturing device is used for closing the PFO by suturing the PFO valve to the atrial septum.

Desired Specifications. The operation of the remote suturing device should be under the procedure of cardiac catheterization. The cardiac remote suturing will be guided by the transesophageal echocardiography.