

Abstract Submitted
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Designing a Low Reynolds Number Ejector Pump for Infants with a Single Ventricle DONGJIE JIA, MAHDI ESMAILY, MATTHEW PERONI, Sibley School of Mechanical and Aerospace Engineering, Cornell University, TIGRAN KHALAYAN, Dept of Cardiothoracic Surgery, Stanford University School of Medicine — Simulations have shown modifying stage-1 operation on single ventricles to incorporate an ejector pump presents several advantages, including improved oxygen delivery and low heart load. However, the efficient operation of an ejector pump relies on sufficient mixing to transfer energy and pump low-pressure fluid. Thus, the standard design of an ejector pump cannot operate effectively in infants where the blood flow Reynolds number is low. To address this issue, we present a novel design of an ejector pump that can effectively operate at a low Reynolds number environment. The performance of this ejector pump will then be demonstrated through implementation in the assisted bidirectional Glenn procedure that treats Hypoplastic heart syndrome. The further potential use of the device will be discussed.

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