

Abstract Submitted  
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**Water Channel Facility for Fluid Dynamics Experiments** AZAR ESLAM-PANAH, Penn State University, DANIEL SABATINO, Lafayette College — This study presents the design, assembly, and verification process of the circulating water channel constructed by undergraduate students at the Penn State University at Berks. This work was significantly inspired from the closed-loop free-surface water channel at Lafayette College (Sabatino and Maharjan, 2015) and employed for experiments in fluid dynamics. The channel has a 11 ft length, 2.5 ft width, and 2 ft height glass test section with a maximum velocity of 3.3 ft/s. First, the investigation justifies the needs of a water channel in an undergraduate institute and its potential applications in the whole field of engineering. Then, the design procedures applied to find the geometry and material of some elements of the channel, especially the contraction, the test section, the inlet and end tanks, and the pump system are described. The optimization of the contraction design, including the maintenance of uniform exit flow and avoidance of flow separation, is also included. Finally, the discussion concludes by identifying the problems with the undergraduate education through this capstone project and suggesting some new investigations to improve flow quality.

Azar Eslam Panah  
Penn State University

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