

Abstract Submitted
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A Mechanics-Based Framework Leading to Improved Diagnosis and Treatment of Hydrocephalus BENJAMIN COHEN, Rensselaer Polytechnic Institute, VEDELS SOREN, Danish Technical University, MARK WAGSHUL, MICHAEL EGNOR, SUNY-Stony Brook, ABRAM VOORHEES, Siemens Medical Solutions, TIMOTHY WEI, Rensselaer Polytechnic Institute — Hydrocephalus is defined as an accumulation of cerebrospinal fluid (CSF) in the cranium, at the expense of brain tissue. The result is a disruption of the normal pressure and/or flow dynamics of the intracranial blood and CSF. We seek to introduce integral control volume analysis to the study of hydrocephalus. The goal is to provide a first principles framework to integrate a broad spectrum of sometimes disparate investigations into a highly complex, multidisciplinary problem. The general technique for the implementation of control volumes to hydrocephalus will be presented. This includes factors faced in choosing control volumes and making the required measurements to evaluate mass and momentum conservation. In addition, the use of our Digital Particle Image Velocimetry (DPIV) processing program has been extended to measure the displacement of the ventricles' walls from Magnetic Resonance (MR) images. This is done to determine the volume change of the intracranial fluid spaces.

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