Technion-Israel Institute of Technology
Faculty of Mechanical Engineering

הטכניון-מכון טכנולוגי לישראל
הפקולטה להנדסת מכונות

סמינריון

הנך מוזמן/ת להרצאה סמינריונית של הפקולטה להנדסת מכונות שתתקיים ביום ד' 23.01.2019
(יז' בשבט, תשע"ט), בניין דן קאהן, אודיטוריום 1, 13:30.

מרצה: אנטולי דבורסקי

מנחה: פרופ' סטיבן פרנקל

על הנושא:

Design Optimization of pediatric Viscous Impeller Pump by Applying Computational Fluid Dynamics

The seminar will be given in English

תקציר ההרצאה :

Computer modeling and simulation has revolutionized the field of medical devices. Gone are the days of building a physical prototype in a machine shop to test every new idea. Nowadays, medical device developers can use computer models as a powerful tool during the design stage for rapid virtual prototyping of different designs and analyzing performance parameters before converting them to a drawing.

Recent advances in computational resources have introduced the use of Computational Fluid Dynamics (CFD) as a powerful commonplace tool in the development and design analysis of ventricular assist devices, prosthetic heart valves, stents, blood filters, Cavo pulmonary assist devices and other blood-contacting medical device.

The lack of reliable standardized methods has been a major limiting factor in the applicability CFD for both demonstrating device safety and predicting potential problems within a regulatory review.

As an attempt to overcome the aforementioned barrier, the U.S. Food and Drug Administration (FDA) have managed an interlaboratory study utilizing two benchmark standard models (a generic medical device - nozzle and simplified centrifugal blood pump)

In this research we applied state-of-the-art computational fluid dynamics software for design optimization of novel so-called viscous impeller pump (VIP) developed for treating univentricular congenital heart disease in idealized total Cavo pulmonary connection geometries. Our main efforts were concentrated on investigating the effect of the blade curvature on hemodynamic performance. This is performed by in silico comparative study on redesigned pediatric viscous impeller pump .

A validation of the applied CFD model was performed by applying it to the benchmark models (nozzle and simplified centrifugal blood pump) and comparing the calculated results to experimental the data obtained during interlaboratory studies.

בברכה,

פרופ"מ מתיו סאסו
מרכז הסמינרים