Syracuse Chapter of EMBS Presents:
The EMBS HealthTech Symposium Spring 2008
(HealthTech, Spring 2008)

Thursday April 10th 2008 4:00-7:00pm

At the Welch Allyn Lodge
4341 State Street Rd, Skaneateles Falls, NY 13153-0220

Cost: $20 for professionals, $10 for IEEE Members, Free for students & EMBS Members
Payment received at the door

Program:

Presentation: **A novel magnetically levitated axial flow left ventricular assist device – Dr. Steven Day, Rochester Institute of Technology**

Presentation: **The Time is Now: Engineering opportunities in biology, medicine and economics – Ted Farrell, Group Director, Systems R&D at Ortho-Clinical Diagnostics (a Johnson & Johnson company)**

Poster sessions by local students

see http://www.ewh.ieee.org/r1/syracuse/EMBSWeb/SyracuseEMBS.htm

Informal Reception (food & beverages provided)

IEEE/EMBS bags and promotional materials available for attendees

Sponsored by Syracuse Section of the IEEE

An opportunity to network and meet many others in the Medical Engineering field, find out more of the Engineering in Medical and Biology Society local chapter and hear about some local medical engineering being done.

RSVP: e-mail to EMBS Webmaster (syrembswebmaster@ieee.org)

A novel magnetically levitated axial flow left ventricular assist device.

Abstract

The limited cardiac donor supply emphasizes the critical need for developing a reliable functional left Ventricular Assist Device (LVAD) to be used as either a bridge to myocardial recovery (BTR) or more importantly, destination therapy. This proposed multi-year effort involves the final development and experimental testing of a compact, axial flow, magnetically LEVitated impeller, left Ventricular Assist Device (LEV-VAD) for clinical use. The value of magnetically suspending the impeller in small rotary blood pumps is well recognized and has been utilized in at least three different clinically used radial (centrifugal) blood pumps. The flow paths in centrifugal pumps are complex and no one has been successful in eliminating the often stagnant area behind the rotating disc impeller. The flow path or paths in axial flow pumps have proven superior in several ways including the elimination of all complex recirculation zones and obstructed flow paths.

In contrast to currently available rotary VADs, this team has designed an axial flow LEV-VAD with an unobstructed blood flow path, thus eliminating retrograde flow, stagnant areas, and without mechanical support bearings. Our prototype axial flow LEV-VAD has a diameter of 45 mm and a length of approximately 110 mm, with a design goal of 20 year life expectancy. The initial design incorporates several new and innovative magnetic components that simplify and streamline the fluidic design, while simultaneously improving and refining the magnetic device performance. These innovations resulted in one recently awarded patent and a second patent application. We have successfully fabricated all components of the pump, including the very complex fluid pumping components, such as the blades of the diffuser. We have performed detailed empirical validation of all components of the sensor system, magnetic suspension, and fluid handling elements to corroborate previous computer models. Most importantly, we have demonstrated levitation and rotation of an impeller and measured the hydrodynamic performance of the pump. We are anticipating the first animal implants will occur in the fall of this year.

Biography

Steven Day is currently in his third year as faculty in the Department of Mechanical Engineering at the Rochester Institute of Technology. After completing a BS in Mechanical Engineering at the University of Virginia, Dr. Day attended the von Karman Institute for Fluid Dynamics in Belgium and graduated from the program in Experimental and Applied Fluid Mechanics. He returned to the University of Virginia and completed his PhD in Mechanical and Aerospace Engineering. Dr. Day's research applies methods in experimental and computational fluid mechanics to a wide range of applied and biological flows. At the University of Virginia, his research focused on the development of a state-of-the-art implantable blood pump, focusing on experimental measurements of the pump performance and internal fluid dynamics. During two years before joining RIT, Dr. Day collaborated with a group of evolutionary biologists at the University of California, Davis on a series of studies involving the complex application of fluid dynamics to suction feeding in fish. All of these novel collaborative efforts effectively cross the traditional boundaries between the basic, medical, and applied sciences and he hopes to continue these and similar projects at RIT.

The Time is Now: Engineering opportunities in biology, medicine and economics

Abstract

There has been more learned about human biology in the last decade than in all of human history. Information technology and sensors are providing more information than ever. Healthcare costs and expectations for quality continue to rise. These factors are resulting in extremely complex situations with large risks and opportunities for companies and society. What role does engineering play in finding solutions in biology, medicine and economics?

In this presentation, Ted Farrell will describe some of the challenges and opportunities for engineering with examples from the medical devices and diagnostics industry.

Biography

Ted Farrell is Group Director, Systems R&D at Ortho-Clinical Diagnostics (a Johnson & Johnson company), responsible for development of new in-vitro diagnostic analyzers. OCD's analyzers are used in clinical laboratories and transfusion medicine centers throughout the world. Since coming to OCD in 2000, Ted has focused on the application of systems engineering approaches to development of medical diagnostic equipment.

Before coming to J&J, Ted was technical director and senior program manager at BBN and General Electric for a variety of defense-related R&D programs including real-time signal processing and system performance modeling for sonar, radar, speech detection, nuclear test monitoring and computer network defense systems.

Ted is a graduate of the GE Edison Engineering program and has an MSEE from Syracuse University.

Poster Sessions:

Expectation maximization SPECT reconstruction with a content adaptive singularity-based mesh-domain image model
Yao Lu, Syracuse University; Advisors Yuesheng Xu (Department of Mathematics, Syracuse University) and Andrzej Krol (Department of Radiology, SUNY Upstate Medical University)

Neuronal nuclei localization in 3D using level set and watershed segmentation for laser scanning microscopy images
Yingxuan Zhu, Syracuse University; Advisors Pramod Varshney (EECS, Syracuse University) and Andrzej Krol (Department of Radiology, SUNY Upstate Medical University)

Identifying genes involved in multidrug resistance in Gram-negative bacteria
Miao Duo, Syracuse University; Advisor Dacheng Ren (BioMedical and Chemical Engineering, Syracuse University)

Interdisciplinary approaches to controlling microbial biofilm formation
Shuyu Hou, Syracuse University; Advisor Dacheng Ren (BioMedical and Chemical Engineering, Syracuse University)

Parametric Dynamic F-18-FDG PET/CT Breast Imaging
Alphonso Magri, Syracuse University; Advisors Edward Lipson (Department of Physics, Syracuse University and Andrzej Krol (Department of Radiology, SUNY Upstate Medical University)

Soft-tissue small avascular tumor imaging with x-ray phase-contrast micro-CT in-line holography
Russell Kincaid, Syracuse University; Advisors Edward Lipson (Department of Physics, Syracuse University and Andrzej Krol (Department of Radiology, SUNY Upstate Medical University)

In-Plane Low Volume Microfluidic Interconnects
Dean Johnson, Rochester Institute of Technology; Advisor David Borkholder (Electrical and Microsystems Engineering: Rochester Institute of Technology)

Micromachined actuators for cochlear hair cell transduction studies
Sam Shin, Rochester Institute of Technology; Advisor David Borkholder (Electrical and Microsystems Engineering: Rochester Institute of Technology)