

RAS Chapter (Washington Section) Member Speaker Series

Design of a Biomimetic Controlled– Curvature Robotic Pectoral Fin

Mr. John Palmisano

Naval Research Laboratory, Washington D.C.

<http://www.societyofrobots.com/>

Date: December 12th, 2007

Time: 7:00 PM

Location:

Univ. of Maryland, College
Park, Kim Engineering Bldg.
(PepCo Rm. #1105)

Contact Information

Raj Madhavan, Ph.D.
Chair

raj.madhavan@ieee.org
301-975-2865

Intelligent Systems Division
NIST
Gaithersburg, MD 20899.

Summary

The design, construction, and testing of a biomimetic pectoral (side) fin with actively controlled curvature for UUV propulsion will be discussed. First, a 3D unsteady computational fluid dynamics (CFD) analysis tool has been adapted to computationally optimize any fin design, followed by a full parametric study based on our findings. Second, this said fin has been constructed, and our working optimized mechanical design is offered. We demonstrate an experimental vs. computational result comparison for thrust, lift, and flapping moment data – showing that a UUV with this technology can have dramatic improvements in low-speed propulsion and control over traditional thruster methods. Lastly, pectoral fin control theory using a prototype UUV will be discussed.

Speaker Biography

John Palmisano has a strong research interest in designing and studying unique forms of robot chassis design and locomotion. A graduate in Mechanical Engineering of Carnegie Mellon University and alumni member of the CMU NanoRobotics Lab, he now does research on robotic fish design at the Naval Research Laboratory in Washington, DC. John also has interests in real-time sensing and control using limited processing power, directly applying those concepts in his current research. John is the author of the popular robot hobbyist website www.societyofrobots.com.

