



VIRGINIA MOUNTAIN SECTION NEWSLETTER

IEEE Region 3, Council 09, Section 65

November 2006

Thursday, November 16, Holiday Inn Hotel Roanoke Airport (former Clarion)
*Biologically Inspired Novel Locomotion Strategies
for Mobile Robots*

Dr. Dennis W. Hong
Assistant Professor, Mechanical Engineering, Virginia Tech

ABSTRACT

Several biologically inspired novel locomotion strategies for mobile robots currently under development at Virginia Tech are presented with a focus on a unique locomotion mechanism inspired by the motility mechanisms of amoebae. These single celled organisms use cytoplasmic streaming to generate pseudopods for locomotion, and the Whole Skin Locomotion, as we call it, works by way of an elongated toroid which turns itself inside out in a single continuous motion, effectively generating the overall motion of the cytoplasmic streaming ectoplasmic tube in amoebae. With an elastic membrane or a mesh of links acting as its outer skin, the robot can easily squeeze between obstacles or under a collapsed ceiling and move forward using all of its contact surfaces for traction, or even squeeze itself through holes with diameters smaller than its nominal width making this the ideal locomotion method for search and rescue robots that need to traverse over or under rubble, or for applications where a robot needs to move in and maneuver itself into tight spaces such as for robotic endoscopes. This talk will summarize the many existing theories of amoeboid motility



DARwIn: Dynamic Anthropomorphic Robot with Intelligence

mechanisms, and examine how these can be applied on a macro scale as a novel mobile robot locomotion concept. Besides the whole skin locomotion concept, several other interesting robots under development at Virginia Tech's RoMeLa (Robotics & Mechanisms Laboratory) will be presented, including; an actuated spoke wheel system for unstructured environments (NSF), a hexapod crawler with dry adhesive feet for zero gravity space

applications (NASA), a novel tripedal locomotion robot for sensor deployment (ONR), and a bipedal walking humanoid robot (ROBOTIS).

SPEAKER



Dennis W. Hong is currently an Assistant Professor of Mechanical Engineering at Virginia Tech. He received his B.S. degree in Mechanical Engineering from the University of Wisconsin-Madison in 1994, his M.S. and Ph.D. degrees in Mechanical

Engineering from Purdue University in 1999 and 2002, respectively. Dr. Hong's research interests lie in the area of robotics with a focus on biologically inspired locomotion, design and analysis of mechanical systems, kinematics, and dynamics. As the director of RoMeLa (Robotics & Mechanisms Laboratory) at Virginia Tech, most of his research is funded by the National Science Foundation, Office of Naval Research, DARPA and by the NASA Jet Propulsion Laboratory. Dr. Hong is a two-time recipient of the Magoon Award (1998 and 1999) for excellence in teaching at Purdue University, won the ASME Freudenstein / General Motors Young Investigator Award and the 2nd Annual Biomimicry Award / Best Paper Award at the 29th ASME Mechanisms and Robotics Conference (2005), the ASPIRES Award (2004) and the Diggs Teaching Scholar Award (2006) at Virginia Tech, and was selected as a NASA Summer Faculty Fellow at the Jet Propulsion Laboratory in Pasadena, California (2005). Dr. Hong also has patents for a device for medical applications.

Date: Thursday Nov. 16, 2006

Social: 6:30 PM

Dinner: 7:00 PM

Speaker: 8:00 PM

Cost: Members & Guests \$ 15.00
Students \$ 8.00

Reserve by **5 PM Monday Nov 13**
Dr. Jan Helge Bohn (540) 231-3276
<mailto:bohn@ieee.org>

Please specify number of attendees.

Directions to
Holiday Inn Hotel Roanoke Airport
(formerly the Clarion)

2727 Ferndale Drive NW
1581 Exit 3 Hersherberger Rd West
1st Rt. onto Ordway Drive,
¼ mile, Rt. Into Parking Lot.

VMS Election Results

The following have been elected as officers of the Virginia Mountain Section for calendar year 2007.

Jan-Helge Bohn, Chair

Wilbur Dale, Vice-Chair

Chris Bonadeo, Secretary-Treasurer

Sandeep Shukla, Chair of Computer, Control Systems, & Industrial Electronics Chapter

At-large Members of the Executive Committee

David Geer

Gail Gray

Patrick Schaumont

Edward Tuttle

VMS Consultants Network Affinity Group

The Virginia Mountain Section Consultant's Network Affinity Group has been officially approved by IEEE. The purpose of this Affinity Group is to share information concerning consulting opportunities, and to make a list of consultants and their areas of expertise available to potential employers. Anyone wishing to be added to this group, or desiring more information should contact Ed Tuttle, tuttleone@earthlink.net.

Voting on VMS By-Laws Changes

The Virginia Mountain Section (VMS) has approved some changes to its by-laws and these are now being submitted to the VMS membership for approval. The principal change is that the Faculty Advisors of the Student Branches in our section will be added as ex-officio members of the Executive Committee, and in addition there will be a non-voting representative elected by each Student Branch. These changes have been recommended by IEEE to further foster interaction between IEEE sections and the student branches in their geographical area. (The student branches in our area are at Virginia Tech

and VMI.) A few minor editorial corrections were also made. A ballot for voting on these changes will be sent to members via the listserv by November 6. This will include as an attachment, the by-laws with the changes highlighted. The by-laws should also be available on the VMS website by November 6. If you do not receive a ballot by that date (and you are an IEEE member residing in the area encompassed by the Virginia Mountain Section, please contact Ira Jacobs ijacobs@vt.edu. Ballots must be returned by e-mail prior to 5PM on Wednesday, November 15, or you may vote in person at the meeting on November 18.

Attention Branch Counselors and Undergraduate Students:

The Virginia Mountain Section of the IEEE will be holding its annual Student Papers Contest on 15 February 2007. This is your chance to present the results of your independent research or class project work to practicing engineers, faculty, and your peers in the section.

The contest is open to undergraduates only. There will be four presentations: two from Virginia Tech and two from the Virginia Military Institute. Your branch counselor and faculty will make the decision as to which two presentations will be entered if there are more than two from your institution. Presentations can be given by an individual or by a group if the project was a group effort.

Contestants will be evaluated on the basis of their presentation mechanics as well as the technical merit of the topic by a panel of judges selected primarily from industry. Score sheets used by the judges will be made available to the contestants. Each contestant or group will be allotted 10 minutes for the presentation and 5 minutes for questions from the audience.

Substantial cash prizes will be awarded to each presentation; the amount of

which will depend on the presentation's place as determined by the judges. Aside from the financial reward, your participation in the contest is good material for your resume.

The only writing requirements are a title, an abstract, and a short biographical statement for each presenter. Once you have been chosen by your branch counselor to present, you will need to send them to the VMS newsletter editor, Dr. Ira Jacobs, in time for the February newsletter.

Note, the VMS contest has no direct connection to the IEEE Region 3 Student Papers Contest; however, many students use the section contest as a tune-up for the region. If you have any questions please email Dr. David L. Livingston, VMS Student Activities Chair at livingstondl@vmi.edu. Good luck!

Report from October Meeting Improving the State of Engineering

Dr. Ralph W. Wyndrum, President of IEEE USA gave a highly stimulating talk on "Improving the State of Engineering in the USA at our October meeting.



Ralph Wyndrum (left) with Brian Crosby VT IEEE Student Branch President and Prof. Amy Bell, VT Student Branch Faculty Advisor

Dr. Wyndrum pointed to the large increases in engineering graduates in China and India, contrasted with declining numbers in the USA. This is coupled with serious concerns about pre-college education in the U.S., where "more than 60% of public school students in some areas of math and science learn from teachers who haven't majored in subject taught.." Dr. Wyndrum pointed to several programs

at IEEE-USA directed towards dealing with these concerns.

Two days after our October meeting, Dr. Wyndrum participated in a panel at the National Academy of Engineering

WASHINGTON (24 October 2006) –

Because the offshoring of U.S. engineering and other high-skill jobs to developing countries is increasing, America needs a coordinated national strategy to maintain its technological leadership and promote job creation, IEEE-USA President Ralph W. Wyndrum Jr. said at the National Academy of Engineering today.

Wyndrum, speaking during the Academy's two-day Workshop on the "Offshoring of Engineering: Facts, Myths, Unknowns and Implications," said the offshoring of the U.S. engineering enterprise is an almost inevitable outcome of globalization.

"Labor cost is undoubtedly the major factor at present, but offshoring is much more complex than that," Wyndrum said. "Business is also motivated by such considerations as market access and market development, access to talent, the cost of capital, governmental economic incentives, special or lower cost infrastructures and capabilities (e.g. subsidized telecommunications or Internet), access to universities and research centers, comparative government regulations, and a host of other factors. Even if labor cost-margins narrow, there will still be strong incentives for offshoring."

Wyndrum's panel, "Implications for the Engineering Workforce and Profession," included Richard Freeman, the Herbert S. Ascherman Professor of Economics at Harvard University; and Vivek Wadhwa, Executive-in-Residence and Adjunct Professor at Duke University's Pratt School of Engineering. Lori Kletzer, Professor of Economics and Department Chair at the University of

California, Santa Cruz, served as moderator.

Although U.S. engineers cannot guarantee their jobs will not be offshored, Wyndrum recommended mid-career and lifelong education, as well as being innovative and entrepreneurial to remain employed. "It will require a modicum of tough love at times to change engineers' thinking about their careers," he said. "And it will take time to affect changes and see the results."

For more on the workshop, go to <http://www.nae.edu/nae/engecocom.nsf/weblinks/PGIS-6SKKDZ?OpenDocument>.

See Wyndrum's presentation at <http://www.ieeeusa.org/communications/presidentscolumn/wyndrum/WyndrumNAEOffshoring.pdf>

IEEE Mentoring Connection - an online program to foster mentoring relationships between IEEE members

Call for IEEE Mentors!

Opening 14 July 2006, IEEE is offering its members the opportunity to participate in an online program which will facilitate the matching of IEEE members for the purpose of establishing a mentoring partnership. By volunteering as a mentor, individuals use their career and life experiences to help other IEEE members in their professional development. As a mentee, you lead your partnership by selecting your mentoring partner from among those who have volunteered to serve in this capacity. We ask that you review the time and effort commitment to the program to ensure a successful mentoring partnership.

Presently, IEEE is offering potential Mentors, like you, the opportunity to enter the program first. IEEE has partnered with The Training Connection, a vendor that has developed a web-based mentoring program to facilitate the matching process.

Participation in the program is voluntary and open to all IEEE members above the grade of Student Member.

If you are interested, please go to <http://www.ieee.org/mentoring> for information on the roles and responsibilities of each mentoring partner, the program, as well as additional information on time and effort commitments. To access the online program site visit the IEEE Membership Benefits page listed under Core Benefits "New for 2006" at <http://www.ieee.org/web/membership/benefits/index.html>. This will then take you to the online mentoring program site.

If you have any questions, please contact Cathy Downer, IEEE Mentoring Program < c.downer@ieee.org >

Southeastcon Paper Acceptance Deadline Extended

The submission deadline for the Technical Conference of IEEE SoutheastCon 2007 has been extended to December 15, 2006.

You are cordially invited to submit your work including research papers and abstracts, and tutorials to IEEE SoutheastCon 2007, **by this new deadline.**

All submitted full papers will go through a regular review process, and all accepted full papers will be allowed 6 pages for publication in the conference proceedings.

If a paper cannot be accepted as a full paper, it may be acceptable as an abstract. All submitted abstracts will be evaluated through a simplified procedure, and all accepted abstracts will be allowed 1 page for publication in the conference proceedings.

Proposals for tutorial sessions are also welcome and they will also be evaluated after their submission. For more

information, please visit the conference webpages:

<http://www.southeastcon.org/2007>
<http://www.southeastcon.org/2007/technical/>
<http://www.southeastcon.org/2007/papers>

For paper and abstract submission, please go to the webpage:

<http://www.softconf.com/start/secon07/>

IEEE Membership Renewal

Please remember to renew your IEEE membership. You can renew online at <http://www.ieee.org/renew>. Those who renew by 1 December will be entered into a drawing to win a Dell Inspiron laptop computer. Paper renewal invoices should arrive in the mail in early November. Please note that the major source of funds for the operation of the Virginia Mountain Section is the \$10 rebate that we receive from IEEE for each member in our Section. Among the new products and services to be available from IEEE in 2007 is IEEE.tv, Internet television broadcasting for IEEE members including conference highlights, and interviews with IEEE authors. This may be accessed through your myIEEE account www.ieee.org/myieee

LOOKING AHEAD

November Meeting

Thursday, November 16, 2006
Biologically Inspired Locomotion Strategies for Mobile Robots
Dr. Dennis Hong, Virginia Tech

No meeting in December
Happy Holidays!

January Meeting

January 18, 2007
Cognitive Radios
Dr. Charles Bostian, Virginia Tech

February Meeting

February 15, 2007
Undergraduate Student Paper Contest

2006 VMS OFFICERS

Chairman: Jim Squire
<mailto:squirejc@vmi.edu> 464-7548

Vice Chairman: Jan Helge Bohn
[mail to:bohn@ieee.org](mailto:bohn@ieee.org) 231-3276

Sec./Treasurer: Wilbur Dale
[mail to:dalewn@vmi.edu](mailto:dalewn@vmi.edu)

VMS EXECUTIVE COMMITTEE

Chris Bonadeo
cbonadeo@primephotonics.com
David Geer dgeer@ieee.org
F. Gail Gray fggray@vt.edu
Patrick Schaumont schaum@vt.edu
Junior Past Chairman: Cy Harbourt
<mailto:cdharbourt@ieee.org>

VMS Chapter Chairs
Computer, Control Systems, & Industrial Electronics:
Sandeep Shukla shukla@vt.edu

COMMITTEE CHAIRS

Student Activities: Dave Livingston
<mailto:d.livingston@ieee.org>
Virginia Council: Jan Helge Bohn
[mail to:bohn@ieee.org](mailto:bohn@ieee.org)
PACE & Membership Development:
Howard Moses
hjmoses2@adelphia.net
Awards & Nominations:
Cy Harbourt
<mailto:cdharbourt@ieee.org>

NEWSLETTER

Editor: Ira Jacobs
<mailto:ijacobs@vt.edu> 231-5620

Contact Newsletter Editor to be added to the VMS listserv

WEBSITE

<http://www.ewh.ieee.org/r3/virginia-mountain>

Webmaster: Chris Bonadeo
cbonadeo@primephotonics.com