



# VIRGINIA MOUNTAIN SECTION NEWSLETTER

**IEEE Region 3, Council 09, Section 65**

**November 2000**

**Meeting: Thursday, November 16**

**David L. Livingston**

**Department of Electrical Engineering, Virginia Military Institute**

## **An Introductory Overview of Computational Intelligence**

### **Abstract**

Computational intelligence is the study of the use of certain models, such as neural networks and fuzzy logic, to analyze and synthesize machine intelligence. The term is still evolving and was coined to differentiate these models from the traditional artificial intelligence (AI) approach of, primarily, attempting to program intelligence into a machine. Computational intelligence differs from AI in that intelligence “emerges” from the application of various methods such as learning, competition, and evolutionary-based searches. Another term that is often used synonymously with computational intelligence is “soft” computing.

This talk will be a broad overview of the three main areas of computational intelligence: **Artificial neural networks** consist of networks of simple processing units coarsely modeled after biological neurons. **Fuzzy logic** is a model used to solve problems in a manner similar to the way humans approach interactions with their environments and each other. **Evolutionary algorithms** are used to solve optimization problems and produce novel designs using Darwinian theory of natural selection.

Applications of computational intelligence will also be discussed.

### **About the speaker**

David L. Livingston received the B.S.E., M.E., and Ph.D. degrees in electrical engineering from Old Dominion University in 1976, 1978, and 1986. From 1981 to 1986, he was a Senior Associate and Staff Engineer in Intelligent Workstations at IBM, responsible for processor and memory system design. He was an Assistant Professor of Electrical and Computer Engineering at Old Dominion University from 1986 to 1993 teaching and doing research in computer engineering. From 1993 to 1999 he was Program Head and Professor of Electrical/Electronics Engineering Technology at Virginia Western Community College.

Livingston joined VMI in 1999 as Associate Professor of Electrical Engineering. He is a PE in the Commonwealth of Virginia, a member of IEEE, NSPE, the Skeptics Society and Eta Kappa Nu, and has served as Secretary/Treasurer, Vice Chair, and Chair of the VMS.

### **Reservations**

Date: Thursday November 16, 2000  
Social: 6:30 PM  
Dinner: 7:00 PM  
Talk: 8:00 PM  
Cost: Member or Guest \$12.00  
Student \$ 7.00

### **Clarion Hotel Roanoke Airport**

2727 Ferndale Drive NW  
1581 Exit 3 Hershberger Rd West  
1st Rt. onto Ferncliff Ave.,  
2nd Rt. onto Ferndale Drive.

### **Back to OLD DEADLINE**

Reserve by **5 PM Monday** Nov. 13

**Reservation system is being consolidated.**

**Call Dave Kingma 552-3011 x304  
or e-mail: dkingma@ieee.org**

Leave a message stating who will be attending.

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## VMS Activities

Meeting Report – October 19, 2000

James C. Squire

### Engineering in Clinical Research: A Case Study

The second meeting of the 2000-2001 season was held at the Clarion Hotel Roanoke Airport with fourteen in attendance. Dr. James C. Squire, an assistant professor of electrical engineering at Virginia Military Institute, spoke after dinner on the subject of biomedical engineering. Dr. Squire used his own Ph.D. research as an example of the interdisciplinary nature and team approach to biomedical engineering. Only about 1% of bioengineers are specialists in biomedical engineering, but the field is expected to grow strongly in the next 10 years. Electrical engineers working in the biomedical area must gain additional knowledge to understand the applications and design constraints from a clinical and biological perspective.

Jim's presentation outlined his study of endovascular stent expansion as a treatment for advanced atherosclerotic disease. This disease causes stenosis (narrowing) or occlusion (blockage) of blood vessels such as the heart's coronary arteries. Treatment has typically involved balloon angioplasty where a balloon tipped catheter is inserted, inflated to widen the restricted area, and then withdrawn. A less traumatic and more effective technique using endovascular stents is now gaining in popularity as a replacement for balloon angioplasty. An endovascular stent is a perforated metal tube which is approximately 1 inch long and pencil-lead thick. The stent is inserted and expanded to be left in place.

A poorly understood patient response to stenting called hyperplasia caused approximately 30% of patients receiving stents to require further intervention within 3 months. Dr. Squire's research investigated whether the damage to blood vessels was a result of the way in which

## Electronic Newsletter

### Please Sign On

Many thanks to all of you who have signed on to accept the e-mail version of the Newsletter in lieu of hard copy.

Taking some clues from other Sections, we will be trying to expand the methods of delivery and notification. These options are being tried elsewhere:

- Surface Mail
- e-mail, document included as text
- e-mail, attached doc. (Word 7)
- e-mail, notification only, with link to PDF version on the Web Site.

Perhaps you can suggest others. (See Chair's Comments, this page).

...*editor*

the stents expand. This research involved theoretical modeling, devising experimental instrumentation, performing experiments on the iliac arteries of rabbits, and correlating the results. Optical means were used to measure axial, circumferential, and torsional strains on the blood vessel. The research led to guidelines regarding stent configuration, construction and the delivery system. Recurrence of patient problems has now been reduced from the 30% to 5% indicating the effectiveness of the research.

A spirited question session followed the talk. Dave Kingma presented Dr. Squires with a certificate of appreciation to close the evening.

...*Howard J. Moses*  
*Secretary/Treasurer*

### CHAIR'S COMMENTS

CONGRATULATIONS to DAL Y. OHM, Chair of our Industry Applications Society Chapter, on his election as a Senior Member.

There are many others in the Section who are eligible for Senior Member grade. There are three basic requirements: ten years in the profession of which education may count for three, four or five years depending on the degree; five years of significant performance; and three references who must be Senior Members or Fellows. This last seems to be a stumbling block for many applicants. If you don't know for sure who are Senior Members contact John Fennick or me.

If you are interested in receiving this Newsletter electronically, e-mail or notification that it is on the Web site, contact John Fennick,

**[j.fennick@ieee.org](mailto:j.fennick@ieee.org)**

The Section Executive Committee will be considering various methods of delivery of the Newsletter and communication with all members of the Section. We need your input as to what YOU will find best.

The October Newsletter had an article about the UCITA, the Uniform Computer Information Transaction Act. This act will have considerable effect on all software makers and USERS. You need to know what it is all about. Virginia has passed a state UCITA but it has not yet taken affect. To find out more about this challenge to your livelihood visit the IEEE-USA website,

**[www.ieeeusa.org](http://www.ieeeusa.org)**

specifically,

**[http://  
www.ieeeusa.org/grassroots/ucita/](http://www.ieeeusa.org/grassroots/ucita/)**

Your IEEE-USA is working for you but they are not always as successful as you might like. There are others in Washington and Richmond who have different ideas as to what is best for the engineering profession and the country. If you want your ideas to be heard contact the IEEE Washington office,

**[c.brantley@ieee.org](mailto:c.brantley@ieee.org)**

phone: 202-785-0017;

fax: 202-785-0835.

RENEW YOUR MEMBERSHIP! You can do it online!

*Dan Jackson, Chair*  
*d.jackson@ieee.org*

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## Computer/Control/Industrial Electronics Chapter



### Free Magazines!

The IEEE Control Systems Society provides a limited number of free issues of its bi-monthly magazine, *Control Systems*, as an incentive to attract new members.

The magazine specializes in articles on control applications, rather than theoretical development. It is more accessible than the *Transactions* to practitioners (like myself) who have been out of school for a few years (or more).

In addition to technical articles, the Magazine also includes coverage of Control Society conferences, employment opportunities, and, unlike the *Transactions*, advertisements! (mostly for lab equipment and software).

For tables of contents of recent issues (but not the current issue) point your browser to:

<http://www.ieeeccs.org/PAB/csm/issues.html>

If you have been away from control theory for awhile, or just have an interest in what control engineers think about, here is a chance to get your feet wet.

For a free copy of the current issue, contact Dave Geer at [d.geer@ieee.org](mailto:d.geer@ieee.org). A few copies of recent back issues are also available.

*...Dave Geer, Chapter Chair*

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## VMS Election

Regular Members (IEEE Fellows, Senior Members, Members and Associates) will receive a ballot for the VMS election later this month.

Please take the time to read the included candidate information, mark, sign, fold and return it.

You will note there are two chapter chairs with no nominees, just a line for chapter members to write in your choice. Those blanks reflect the on-going problem of getting and retaining members as volunteers helping to make and keep the Section as a viable member resource.

We desperately need people to serve as officers, Chapter Chairs, Committee Chairs, and Executive Committee Members at Large. A few hours a month is all that is required for most of the jobs available and that little bit will be greatly appreciated.

However, please don't offer unless you are truly willing to put in those few hours. Help on paper only is not needed.

Look over the positions, filled and vacant, on page 4 to get a feel for what is needed. Then contact anyone currently listed there for more information.

*...editor*

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### Name Your Topic

#### New on our VMS Web Site

Not interested in the VMS meetings?  
Topics have no appeal?  
Speakers are dull?

Now make your own suggestions for topics/speakers/location or any other facet of our meetings. Go to

[http://  
www.ewh.ieee.org/r3/virginia-mountain/](http://www.ewh.ieee.org/r3/virginia-mountain/)

Click on

#### Recommend a Meeting Topic

and tell us. Please supply any and all information you may have, especially

concerning speakers and availability. We will do our best to accommodate your wishes.

*...editor*

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### On The VMS Web

While on the subject, have you visited the Web Site recently (or at all)? Here is a sampling of current items. Why not take a look?

#### VMS Meeting

Current, past and future meeting topics.

#### Chapters

Pages for individual Chapter announcements

#### Recommend a Meeting Topic

The new one described above.

#### Student Branches

Links to those that have their own sites

#### VMS Newsletter

Past copy archive as well as the current issue

#### PACE Page

PACE items of interest. Mostly as described by Dan Jackson.

#### What Is? (FAQs)

FAQs about IEEE. Emphasis on the lesser known entities.

#### IEEE Leadership Wire Items

Past issues of this newsy IEEE publication containing articles often of interest to many.

#### VMS Calendar

Important Section activity dates

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### HELP US HELP YOU

To enable IEEE staff to provide us with the most accurate lists, labels and member contact information, up-to-date information must be provided by you. Please, any and all members who have changed address, email or phone number, send a note to:

[address-changes@ieee.org](mailto:address-changes@ieee.org)

*...editor*

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## 2000-2001 MEETING SCHEDULE

DATE	SPEAKER/TOPIC	MEETING PLACE
September 21 <b>Spouses' Night</b>	<b>Kenneth R. Laker</b> 1999 IEEE Past President 21st Century IEEE The Exemplary Global Engineering Society	Clarion Hotel Roanoke
October 19	<b>James C. Squire</b> Department of Electrical Engineering, VMI Engineering in Clinical Research: A Case Study	Clarion Hotel Roanoke
November 16	<b>David L. Livingston</b> Department of Electrical Engineering, VMI An Introductory Overview of Computational Intelligence	Clarion Hotel Roanoke
January 18	TBD	TBD
February 15	TBD	TBD
March 15	TBD	TBD
April 19	TBD	TBD
May 17	TBD	TBD

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**Monday following each meeting**

Submit To: Editor

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 (Changes are forwarded to the Newsletter)

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**[www.ewh.ieee.org/r3/virginia-mountain](http://www.ewh.ieee.org/r3/virginia-mountain)**  
 Section/Chapter meeting notices, and reports. Past issues of the Newsletter, PACE Patter, etc. Articles, organizations, and activities affecting our profession. Contributions welcomed - make them on-line.